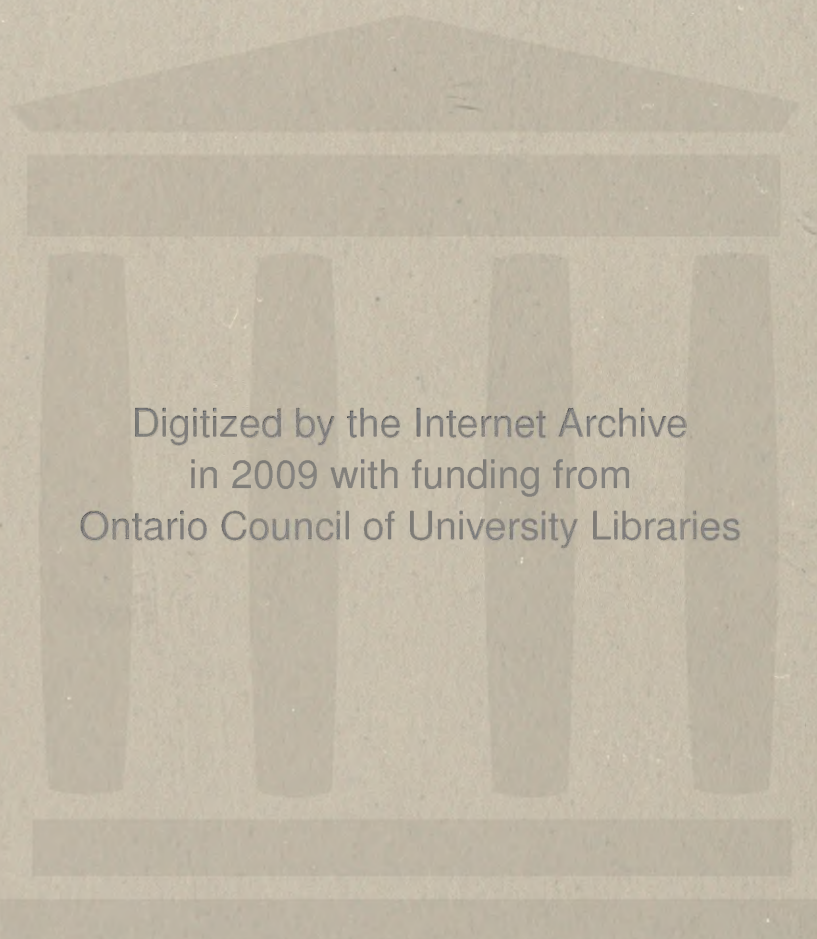




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THE NEW INTERNATIONAL ENCYCLOPÆDIA

SUPPLEMENT

VOLUME XXIV

718810

NEW YORK
DODD, MEAD AND COMPANY

1925

THE NEW INTERNATIONAL ENCYCLOPEDIA

SEVENTH

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BOSTON BOOKBINDING Co., CAMBRIDGE, U.S.A.

SET UP AND ELECTROTYPED BY
THE VAIL-BALLOU PRESS, BIRMGHAMTON, N. Y.

PREFACE TO THE SUPPLEMENT

THE last complete revision of THE NEW INTERNATIONAL ENCYCLOPÆDIA, when the entire work was reset, began in 1914, and the present SUPPLEMENT covers the ten years following. The war had so dominated the decade that it was hard to maintain the proportions of a really encyclopædic review; yet the historical perspective of the war had certainly changed and it was essential to a general work of reference that detailed accounts of campaigns, battles, diplomatic struggles, revolutions and political and economic efforts at readjustment should no longer be allowed to prevent response to the diversity of public interests. Therefore the special aim has been to treat the war compactly and clearly and it is hoped that a reasonable balance has been maintained. The pages directly devoted to the war and its consequences probably do not exceed in space an octavo volume of average length, although of course the indirect effects of the war ramify incalculably throughout all parts of the text. The war articles have been prepared in the same manner as the text of the ENCYCLOPÆDIA itself, that is by the editorial staff and specialists and not by either alone. That method, indeed, has been followed throughout the present volumes, as it was in the ENCYCLOPÆDIA.

Space is lacking for a classification of contents or for an outline of the plan, but the scope of the work may be inferred from the following list of a few of the larger groups of articles: The three largest departments are biography, prepared by an editorial staff and special contributors; history, by staff writers and members of the faculty of Columbia University; and the industrial, commercial and financial record of countries (their economic movement described statistically and in narrative), written or revised by experts in the Department of Commerce at Washington. Among the other departments may be mentioned: Agriculture, Forestry, Horticulture, and allied subjects, a large group of articles contributed by a dozen specialists; Anthropology and Ethnology; Applied Science; Archaeology; Architecture; Astronomy; Botany; Chemistry; Civil, Mechanical, Municipal, and Sanitary Engineering; Education; Electricity; Finance; Geology; Industries and Manufactures; Medicine; Labor Topics; Law; Literature; Mineralogy and Mineral Production; Music; Painting and Sculpture; Philology, Classical and Modern; Philosophy; Psychology; Railways; Social Economics; Zoölogy, etc.

In general the plan of the work has been to supplement effectively the text of the ENCYCLOPÆDIA not by carrying forward its minor entries but by so grouping subjects that they could receive well-rounded treatment.

FRANK MOORE COLBY.

October, 1924.

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THE NEW INTERNATIONAL ENCYCLOPÆDIA

ABBE, ROBERT (1851-). An American surgeon, a prolific writer in nearly every field of operative surgery. He was born in New York City and educated at the College of the City of New York (S.B., 1871) and Columbia University (M.D., 1874). Beginning as a pioneer in 1904, he became an authority in the surgical uses of radium and a vigorous opponent of tobacco as a cause of cancer. He has reported over 100 personal cases of smoker's cancer. He has been connected with several of New York's leading hospitals, including St. Luke's, New York Cancer, and New York Post-Graduate, and has held the professorships of surgery in the New York Post-Graduate Medical School and Woman's Medical College.

ABBOT, CHARLES GREELEY (1872-). An American astrophysicist (see VOL. I). Using a spectroheliometer, he succeeded in measuring the heat of the stars to within $\frac{1}{100,000,000}^{\circ}$. The experiments began in 1922 and were carried on at the Mt. Wilson Observatory in California with the aid of the great 100-inch reflector. The results are regarded as of the highest interest to scientists.

ABBOTT, EDVILLE G. (1871-). An American orthopaedic surgeon born in Hancock, Me., and educated at Bowdoin College. He was well known through his mechanical so-called Abbott method of treatment of lateral curvature of the spine. In 1913 he demonstrated his method in England and on the Continent. He was professor of orthopaedics at Bowdoin College and has been connected with the Maine General Hospital, the Children's Hospital, etc.

ABBOTT, EDWIN MILTON (1877-). An American lawyer, born at Philadelphia and educated at the Central High School there and the University of Pennsylvania. He was admitted to the bar in 1896 and subsequently distinguished himself in criminal cases. He was chief counsel in the fight of the Philadelphia commuters against the railroads, a member of the Pennsylvania House of Representatives, 1911-12, chairman of the Commission on the Revision of Criminal Laws of the State of Pennsylvania, 1912-15 and 1917-23, and in 1913 minority nominee for judge of the Court of Common Pleas. He was appointed secretary of the American Institute of Criminal Law and Criminology in 1913.

ABBOTT, ELEANOR HALLOWELL (MRS. FORDYCE COBURN) (1872-). An American writer of fiction. She was born at Cambridge, Mass., and was educated in private schools and at Radcliffe College, where she was a special student. She is a prolific and popular author of light, romantic stories. One of her best-known novels is *Molly Make-Believe*. Besides being a frequent contributor to magazines, especially *The Ladies' Home Journal*, she is author of *The Sick-a-Bed Lady* (1911), *The White Linen Nurse* (1913); *Little Eve Edgarton* (1914), *The Indiscreet Letter* (1915), *Molly Make-Believe* (1916), *The Stingy Receiver* (1917), *Ne'er-do-much* (1918), *Old-Dad* (1919), *Peace on Earth* (1920), *Rainy Week* (1921), and *The Fairy Prince, and Other Stories*, a collection of stories published previously in magazines (1922).

ABBOTT, GRACE (1878-). An American social worker, born at Grand Island, Neb., and educated at the Grand Island College, the University of Nebraska, and the University of Chicago, from which she received the degree of Ph.M. in political science in 1909. Beginning in 1899, Miss Abbott taught for several years in the Grand Island High School and laid a sound foundation for her social work as director of the Immigrants' Protective League (1908-17) and as a resident of Hull House, Chicago (1908-15). She was an extremely efficient director of the Child Labor Division of the Children's Bureau, Washington, D. C. (1917-19), secretary of the Illinois Immigrants' Commission (1920-21), chief of the United States Children's Bureau (1921-), unofficial representative of the United States on the advisory committee of the League of Nations on traffic in women and children (Geneva, 1923), and president of the National Conference of Social Work (1923), the fourth woman to hold this office. Miss Abbott is the author of *The Immigrant and the Community* (1917) and a contributor to various periodicals.

ABBOTT, LAWRENCE FRASER (1859-). An American editor and writer, son of Lyman Abbott. He was born in Brooklyn, N. Y., and educated at Amherst College. In 1891 he became president of the Outlook Company. He was secretary to Theodore Roosevelt during the latter's tour of Europe and Africa, and edited Roosevelt's *African and European Addresses*

(1910). He is the author of an article on Theodore Roosevelt in the *Encyclopædia Britannica* (1911), and of *Impressions of Theodore Roosevelt* (1919).

ABBOTT, LEONARD DALTON (1878-). An American publicist and radical leader, born in Liverpool, England. He came to the United States in 1897. He early plunged into the socialist movement and remained an active worker up to 1905. His interests later turned to libertarian education, in which he at once assumed a commanding place. He was associated in the publication of *The Commonwealth*, *The Free Comrade*, and *The Modern School*, and aided in the founding of the Rand School of Social Science, the Intercollegiate Socialist Society, and the Ferrer School at Stelton, N. J. He is the author of *Ernest Howard Crosby* (1907), and *Francisco Ferrer, His Life, Work, and Martyrdom* (1910), besides many tracts and pamphlets. From 1905 he was one of the editors of *Current Opinion*.

ABBOTT, LYMAN (1835-1922). An American Congregational clergyman and editor (see VOL. I). In 1913 he was expelled from the American Peace Society because military preparedness was vigorously advocated in the *Outlook* which he edited and because he was a member of the Army and Navy League. During the War he was a strong supporter of the government's war policies. His later writings included *Reminiscences* (1915); *The Twentieth Century Crusade* (1918); *What Christianity Means to Me* (1921).

ABBOTT, WILBUR CORTEZ (1868-). American historian and educator (see VOL. I). In 1917 he wrote the *Expansion of Europe*, one of the most important modern American historical works, having as its theme the story of the Commercial Revolution which changed the character of European affairs and inaugurated the modern era. He also wrote *Colonel John Scott of Long Island* (1918). In 1920 Professor Abbott went to Harvard University as professor of history.

ABDERHALDEN, EMIL (1877-). A Swiss chemist and physiologist, born in the Canton of St. Gallen. He was educated at the University of Basle and took his medical degree at Berlin in 1902. After doing research under Prof. Emil Fischer, the distinguished chemist of Berlin, he was made professor of physiology in the University of Halle (1908). Of much original research his discovery of the so-called defensive ferments is best known, together with "Abderhalden's reaction" in connection with their demonstration. His literary activity has been almost without parallel among his contemporaries. In addition to many articles, often in collaboration with others, he has published numerous books. His *Lehrbuch der Physiologische Chemie*, which first appeared in 1906, has gone through many editions including English translations; the *Handbuch der Biochemischen Arbeitsmethoden* appeared in 1909. Other works of his are *Physiologisches Praktikum* (1912); *Abwehrfermente der Tierischen Organismen* (1913; also an English translation); *Synthese der Zellbausteine* (1912; also an English translation); and *Handbuch der Biologischen Arbeitsmethoden* (1920). His crowning work is the immense *Biochemisches Handlexikon*, the publication of which began in 1910. Ten volumes of this encyclopedia had appeared up to 1923.

ABDUL HAMID II (1842-1918). Thirty-fourth sultan of the Ottoman Empire (see VOL. I). After his deposition in 1909 he was held a prisoner by the Young Turk army and was confined first in Saloniki, and later (1915) in Smyrna. He died in a secluded palace on the Asiatic side of the Bosphorus.

ABDUL MEJID EFFENDI (1868-). Former Caliph at Constantinople, born in 1868, the son of former Sultan Abdul Aziz. He was a learned man, a patron of the arts, a painter, and a composer of music. One of his paintings was hung in the Paris Salon of 1914, at the request of Pierre Loti. After the Greek defeat in 1922, the Sultan-Caliph Mohammed VI fled, the office of sultan was abolished, and on Nov. 1, 1922, Abdul Mejid was made Caliph. President Mustapha Kemal Pasha determined that religion should be separated from politics and persuaded the Assembly to accept his views. On Mar. 3, 1924, the caliphate was abolished, and Abdul Mejid and his family were obliged to leave immediately for Switzerland. See CALIPHATE.

ABERCROMBIE, LASCELLES (1861-). An English poet born at Ashton-upon-the-Mersey, Cheshire. He was educated at Malvern and Victoria University, Manchester, and lectured in poetry at the University of Liverpool, contributing at the same time to various magazines. His poetry has been characterized as in the Victorian tradition. His first work, *Interludes and Poems*, appeared in 1908. His other works include *Mary and the Bramble* (1910), *The Sale of St. Thomas* (1911), *Emblems of Love* (1912), *Deborah* (1912), *Speculative Dialogues* (1913), *The Epic* (1914), *Theory of Art* (1922), and *Four Short Plays* (1922), besides *Thomas Hardy, a Critical Study* (1912).

ABERNON, EDGAR VINCENT D, BARON OF Esher (1857-). A British diplomatist, born at Slinfold, Sussex, England, and educated at Eton. From 1877 to 1882, he was in the Coldstream Guards, in which he became a lieutenant. In 1880 he began to serve in various capacities as British representative in the Near East. In 1883 he was president of the Council of the Ottoman Public Debt, and from 1883 to 1889, financial adviser to the Egyptian Government. Thereafter until 1897 he was governor of the Imperial Ottoman Bank in Constantinople. He became a member of Parliament in 1899. Sir Edgar Vincent was raised to the peerage as Baron d'Abernon in 1914 and during the War was prominent as chairman of the Central Liqueur Control Board. He was appointed British Ambassador at Berlin in 1920. He wrote *A Grammar of Modern Greek* (1881) and collaborated in other publications.

ABNORMAL PSYCHOLOGY. See PSYCHOLOGY, ABNORMAL AND CONSCIOUSNESS AND THE UNCONSCIOUS.

ABORTION. At one time justifiable or therapeutic abortion was practiced principally in the case of women with narrow pelvis. Owing to the perfection of the aseptic Cæsarean operation, which now has a very low mortality and can be performed successfully by any good surgeon, interruption of pregnancy for simple contraction of the pelvis is no longer considered as wholly justifiable. On the other hand, in the interest of reducing maternal mortality from childbirth and in the salvage of maternal health, many obstetricians advocate and practice interruption of pregnancy in a series of

pathological conditions, such as tuberculosis, heart disease, insanity, etc. This attitude receives some support from the birth control and eugenic movements, but there is an energetic counter-propaganda from religious bodies and from advocates of higher birth rates which tends to reduce cases of artificial termination of pregnancy to a small minimum; in other words, in nearly every case in which abortion is held to be justifiable there are about as many good reasons for non-intervention.

ABRAMS, ALBERT (1863-1924). An American physician (see Vol. I). He died at San Francisco in 1924. He was internationally known as the inventor of spondylotherapy and as the inventor of an apparatus with which he claimed he could diagnose a disease by testing a drop of blood. His theories were investigated by the *Scientific American*, which found that no satisfactory conclusion could be reached, since numerous obstacles were placed in the way of the investigators by Dr. Abrams and his followers.

ABRUZZI, PRINCE L. A. (1873-). An Italian vice-admiral and explorer (see Vol. I). He was commander-in-chief of the Italian naval forces in the War and showed exceptional ability in operations in the Adriatic. He resigned in 1917 and afterward planned a colonization scheme in Somaliland.

ABYSSINIA. One of the two independent states of Africa on the east coast. The area is variously estimated from 350,000 to over 430,000 square miles. The population is about 11,500,000, a much higher figure than earlier estimates, which ranged from 3,500,000 to 8,000,000. The boundaries, on the side of the Sudan and of the Italian territory, were being delimited in 1924. The leading towns, with their estimated populations, were: Addis-Abeba, the capital (60,000), and Harrar, (40,000).

Industry and Trade. In spite of the richness of its resources, the economic development of the country was retarded by the instability of the social life and the absence of a strong administrative machinery. Agriculture remained primitive and intercourse was hindered by the want of means of communication. Products entering into the export trade were coffee, hides, wax, ivory, civet, and native butter. Deposits of copper, iron, salt, lignite, and potash were known but were as yet little worked. After the War, Abyssinia began to receive the serious attention of foreign capital. A British company was formed in 1918 for the purpose of commercial exploitation; in 1923 were commenced the activities of an Anglo-American company financed largely by American money. A concession of some 60,000 square miles, the northern part of which was crossed by the French Ethiopian railway, was received, and preliminary surveys showed the presence of oil in the Harrar mountains. Estimated figures, the latest available in 1924, showed that commerce was on the increase. Imports and exports for 1913 totaled 49,080,000 francs; for 1917, 56,665,000 francs. The principal trade route was the Ethiopian railway, connecting Jibuti, in French Somaliland, with Addis-Abeba, a distance of 590 miles, which was completed in 1917. Trade was carried on by caravan in the interior and with the Sudan, British East Africa, British Somaliland, Italian Eritrea, and Italian Somaliland. Gambela, on the Baro River, leased to the Sudan government in

1907, was an important trade centre, and a steamer service was maintained between it and Khartum.

History. At the beginning of the European war, Lij Yasu, the young grandson of the Emperor Menelek, was on the throne. He had already embraced Islam, and under Turco-German influence he embarked on a policy of Moslem solidarity, in coöperation with his father, Ras Michael, whom he caused to be crowned king of the Moslem province of Wollo. In April, 1916, he openly acknowledged the overlordship of the Turkish Sultan as Caliph, and about the same time he gave it out that he would take the field against the Allies as soon as the expected German victory was announced. The Allies, particularly the British, offset the German Turkish influence by propaganda of their own, and the Emperor's policy was opposed by most of the native chiefs and by the Christians. Finally the Abuna, or head of the Abyssinian church, publicly proclaimed the dethronement of the Emperor on the ground of his apostasy (Sept. 27, 1916), and his aunt, the princess Zauditu, was crowned empress at Addis-Abeba, Feb. 11, 1917. The direct control, however, was placed in the hands of her cousin, Ras (prince), Taffari, who was made regent and heir to the throne. A desultory civil war followed, lasting more than a year. Lij Yasu, after a slight attempt at resistance, left Harrar in secret for the Danakil country on October 8, but Ras Michael gathered a formidable force, estimated at 80,000, and on October 17 he destroyed the army of the new government after a sharp battle in which 12,000 men were said to have been killed. A few days sufficed the government, however, to rally in great numbers and with superior artillery, and by October 27 it succeeded in cutting off the rear of Michael's army and nearly surrounding it. Forced to surrender or to fight at a disadvantage, he chose the latter. After a desperate encounter and heavy losses on both sides, his army was routed, all his artillery captured, and himself taken prisoner. In this three weeks' campaign the loss of life was placed at 60,000. Of these, 20,000 were Shoan or government troops. No attempt was made to follow up the victory or to subdue Wollo, the disaffected province; and Lij Yasu, taking advantage of this neglect, gathered the remnants of his father's forces and held out in the Wollo country till the latter part of 1917. In December of that year the town of Magdaba, where he had taken refuge, was captured. Lij Yasu escaped, and after futile wanderings among neighboring tribes he returned toward the end of 1920 to the province of Tigré, where in January, 1921, he was captured by government troops. After the War the government of Ras Taffari and the Empress definitely sided with the Allies, and in the summer of 1919, Abyssinian missions of congratulation were despatched to London, Paris, Washington, Rome, and Brussels. On this occasion they received various counsels in respect to measures of social and economic progress and were urged in particular to suppress slavery, which had been stimulated by Menelek's conquests and continued to prevail. Great Britain, primarily, manifested an interest in Abyssinian affairs, and as a result of a British agitation against slavery, the League of Nations Assembly appointed an investigating committee in

September, 1922. This renewed concern over Abyssinia was regarded with suspicion; the agitation, Abyssinians feared, might be seized by interested powers as a pretext for interference in their internal affairs. The result was that to protect their independence, Abyssinia's rulers sent a delegation to Geneva in August, 1923, to apply for League membership. The Regent, at that time, stated justly that Abyssinia's problem was the suppression not of slavery, which was mild in character, but of slave-running, which was caused by the illicit trade in arms. As a result of the violation of the British frontiers by marauding bands of Abyssinians in search of slaves and ivory, Great Britain had gained, in 1919, the cessation of arms importations into Abyssinia, the prohibition applying even to the needs of the central government. It was to supply the general dearth that slaves were being smuggled out across the Red Sea in exchange for munitions and rifles. Abyssinia was admitted to membership in the League of Nations on Sept. 28, 1923. In the winter of 1923-4 an educational commission sent out by the Phelps-Stokes Fund of New York visited Abyssinia and on the conclusion of its investigations reported unofficially that while slavery still persisted, corruption flourished among officials, and commerce was hampered by harsh restrictions, nevertheless there was bright promise of future development, thanks to the country's rich natural resources and the latent abilities of the native population.

ACADEMIC FREEDOM. See UNIVERSITIES AND COLLEGES.

ACADEMY, FRENCH (ACADÉMIE FRANÇAISE). Founded in 1635, this is the oldest and highest of the five academies which make up the Institute of France. Between 1914 and 1924 the following members died: Jules Lemaitre; Albert, Comte de Mun; Charles Jean Melchior, Marquis de Vogüé; Henri Roujon (1914); Alfred Jean François Mézières; Paul Hervieu (1915); Emile Faguet; Marquis Pierre de Ségur; Francis Chalmes (1916); Emile Rostand (1918); Etienne Lamy (1919); Emile Boutroux; Jean Aicard (1921); Alfred Capus; Ernest Lavisse; Paul Deschanel; Mgr. Duchesne (1922); de Freycinet; Pierre Loti (L. M. J. Viaud); Alexandre Ribot; Maurice Barrès; Frédéric Masson (1923). The following were elected: Maréchal Joffre (1917); Louis Barthou; Mgr. Baudrillart; René Boylesve-Tardieu; François de Curel; Jules Cambon; Maréchal Foch; Georges Clemenceau (1918); Henri Bordeaux (1919); Robert de Flers; Joseph Bédier; André Chevrillon (1920); René Doumic; Georges Goyau; Pierre de Nolhac (1922); Georges de Porto-Riche; Edouard Estautnié; Maître Henri Robert; Charles Jonnart; and Abbé Bremond (1923). Frédéric Masson, who became permanent secretary in 1919 on the death of Etienne Lamy, was succeeded in 1923 by René Doumic. The Academy was engaged throughout the period on the seventh edition of the great dictionary. The complete list of members at the beginning of 1924 stood as follows: Comte de Haussonville, Paul Bourget, Anatole France (Jacques Anatole Thibault), Gabriel Hanotaux, Henri Lavedan, René Bazin, Maurice Donnay, Jean Richepin, Raymond Poincaré, Eugène Brieux, R. Doumic, Marcel Prévost, Henri de Régnier, H. R. D. Cochin, Maréchal Lyautey,

Pierre de la Gorce, Henri Bergson, Maréchal Joffre, Louis Barthou, Mgr. Baudrillart, René Boylesve-Tardieu, François de Curel, Jules Cambon, Georges Clemenceau, Maréchal Foch, H. Bordeaux, Robert de Flers, Joseph Bédier, André Chevrillon, Pierre de Nolhac, Georges Goyau, Georges de Porto-Riche, Edouard Estautnié, Maître Henri Robert, Charles Jonnart, and Abbé Bremond.

ACADEMY OF ARTS AND LETTERS, AMERICAN. See ARTS AND LETTERS, AMERICAN ACADEMY OF.

ACCIDENTS, INDUSTRIAL. See LABOR LEGISLATION, also WORKMEN'S COMPENSATION.

ACHESON, EDWARD CAMPION (1858-). American bishop of the Protestant Episcopal Church, born at Woolwich, Kent, England, and educated at Wycliffe College in the University of Toronto and at New York University. After service in Canada (1888-9), New York City (1889-92), and Middletown, Conn. (1892-1915), he became suffragan bishop of Connecticut in 1915. He was chaplain in the Canadian army during the rebellion in the Canadian Northwest in 1885 and was Red Cross chaplain and field worker with the American army in France (1918-19).

ACIDOSIS. See DIET.

ACKERMAN, CARL WILLIAM (1890-). An American journalist, born at Richmond, Ind., and educated at the University of Chicago; Earlham College, Richmond, Ind.; and the School of Journalism, Columbia University. He has been correspondent of important news publications, especially of the United Press from the Central Powers (1915-17), of the *Saturday Evening Post* in Mexico, Spain, France, and Switzerland (1917-18), and of the *New York Times* with the Allied armies in Siberia (1918-19). Besides press and magazine articles, he is author of *Germany, the Next Republic?* (1917), *Mexico's Dilemma* (1918), and *Trailing the Bolsheviks* (1919).

ACOUSTICS. See AUDITION and PHYSICS.

ACTION. While the psychological theories of action and their respective arguments have remained unchanged in the interval since 1914, there was a definite drift in the decade following that year to the explanation by means of reflexes. The school of psychology known as behaviorism (q.v.) has sought to orient psychological research from such mental data as sensations, perceptions, and ideas to the consideration of action responses. From a theoretical point of view, this merely shifts the problem, for it is just as difficult to explain mental life if reflex action is taken as elementary, as it is to pass from passive conscious representation to action. The emphasis upon action as the psychological simple has favored the various developments in applied psychology. It has led to the statistical tabulation of reaction times for different individuals placed either in the same situation or with the same task to do. (See PSYCHOLOGY, APPLIED.) The intelligence tests and the learning and memory curves illustrate the successful empirical use of the concept of action. They measure the rapidity of response among different individuals but do not provide any theoretical insight as to the causes. During the War a section of American psychologists rashly undertook to treat the whole province of human action as a branch of psychology. While this topic belongs rather to moral and political philosophy,

it is significant that the emphasis on action in psychology has accompanied the spread of pragmatism, a philosophy which champions action as against intellectualism. Consult Watson, *Psychology from the Standpoint of a Behaviorist* (1919), and Woodworth, *Psychology, a Study of Mental Life* (1921).

ADAM, PAUL (1862-1920). A French writer (see VOL. I) and *porte-parole* of the symbolist movement. His most celebrated novel, *La Ville Inconnue*, passed through more than a dozen editions. He was an active writer until the year of his death. During the War he engaged in propagandist activity and shortly before his death published *Reims Dévastée* and *Le Lion d'Arras*, which portray the heroic ruins of Northern France. He died in Paris, Jan. 17, 1920.

ADAMI, JOHN GEORGE (1862-). An English pathologist born at Manchester (see VOL. I). During the War he was a colonel in the Canadian Army Medical Corps. He published *War Story of the C.A.M.C.* (1918) and *Medical Contributions to the Study of Evolution* (1919). He moved from Montreal to Liverpool in 1919 and was appointed vice-chancellor of the University of Liverpool.

ADAMS, ANNETTE ABBOTT (1877-). An American lawyer, born at Prattville, Cal. She was educated at the Chico State Normal School, Cal., and the University of California. In 1912 she was admitted to the California bar. She held the office of Assistant United States Attorney in the Northern District of California, 1914-19, and in 1918-20 she was attorney in the same district. In 1920 she was appointed Assistant Attorney General of the United States, an office which she resigned in 1921. She subsequently became chairman of the legislative committee of the California State Federation of Women's Clubs.

ADAMS, CHARLES CHRISTOPHER (1873-), An American zoologist born at Clinton, Ill., and educated at Illinois Wesleyan University, Harvard University, and the University of Chicago. He was assistant in biology at Illinois Wesleyan (1895-96), assistant entomologist at the Illinois State Laboratory of Natural History (1896-98), Curator of the Museum of the University of Michigan (1903-06), director of the Cincinnati Society of Natural History and curator of the Museum of the University of Cincinnati (1906-07), associate in animal ecology at the University of Illinois (1906-14), assistant professor of forest zoology at Syracuse University (1914-16) and professor (1916-), and director of the Roosevelt Wild Life Forest Experiment Station (1919-). Besides numerous papers on animal ecology he published *An Ecological Survey of Isle Royal, Lake Superior*, in collaboration (1909); *Guide to the Study of Animal Ecology* (1915); *An Ecological Study of Forest and Prairie Invertebrates* (1915); and *Variations and Ecological Distribution of the Snails of the Genus Io* (1915).

ADAMS, COMFORT AVERY (1868-). An American electrical engineer, born in Cleveland, Ohio. He graduated in 1890 from the Case School of Applied Science, where from 1886 he also served as an assistant in physics, and for a year was an electrical engineer with the Brush Electric Company. In 1891 he was called to Harvard, where he remained. He became full professor of electrical engineering in 1906, later Lawrence professor of engineering,

and Dean of the Engineering School. During the War he was chairman of the division of engineering of the National Research Council and also served on the Council of National Defense, besides acting as advisor to the Emergency Fleet Corporation. He has given much attention to the study of induction and synchronous motors, to commutations, and to dynamo design schedules. Besides membership in many scientific societies he was president of the American Institute of Electrical Engineers in 1918 and of the American Welding Society in 1919.

ADAMS, ELEANOR N. (?-). An American college president born in Lebanon, Ohio, and educated at the Universities of Cincinnati, Oxford, and Yale. She was a teacher in private schools in Cincinnati before 1911; instructor in English in the University of Cincinnati (1911-12); professor of English (1915-18) at Oxford College for Women (Ohio), of which she was elected president in 1918. She is the author of *Old English Scholarship in England* (1917).

ADAMS, FRANKLIN PIERCE (1881-), American poet and columnist (see VOL. I). As "F. P. A." he was *arbiter elegantiarum* for an increasing circle during the decade 1914-24. His intellectual honesty and his scorn for all pretense and stupidity, whether in politics, literature, or everyday affairs, were factors in his popularity, though his light verse, strongly reminiscent of C. S. Calverley, his parodies, and his translations from the Latin poets, were among the best of their sorts being written in America. In the New York *Tribune* and after 1922 in the New York *World*, his daily column, "The Conning Tower," attracted contributors whose prose and verse were often quite as witty and perspicacious as his own. From 1914 on, his published volumes were *By and Large* (1914), *Weights and Measures* (1917), *Something Else Again* (1920), and *So There* (1923).

ADAMS, FREDERICK UPHAM (1859-1921). American author and industrial engineer (see VOL. I). In the latter years of his life he became a leading exponent of Frederick W. Taylor's system of scientific management for industry. His publications since 1914 have been *The Romance of Big Business* (1915), *The Open Shop* (1919).

ADAMS, GEORGE BURTON (1851-). American college professor and historian (see VOL. I). Continuing his work in the studies of the English constitution, he made contributions which were acclaimed in both England and America. After 1914 he published *Outline Sketch of the English Constitution* (1918), *The British Empire* (1919), and *The Constitutional History of England* (1921). The last named presented in epitome the fruits of the lifelong researches of the author, the purpose of which was to reject the Stubbs-Freeman explanation of the Teutonic origin of the English constitution and to establish his own theory of feudal or Norman antecedents.

ADAMS, HARRIET CHALMERS (?-). An American explorer and lecturer born at Stockton, Cal. She made extensive journeys through Mexico and into the heart of South America (1903), traveling 40,000 miles and exploring regions never before visited by a white woman. In 1916 she was a war correspondent at the French front. Mrs. Adams has lectured on her

travels and has written of them in the *National Geographical Magazine*, *Travel*, etc.

ADAMS, HENRY CARTER (1851-1921). An American economist and educator (see VOL. I). His later works included *Description of Industry* (1918) and *American Railway Accounting* (1918).

ADAMS, HERBERT (1856-). An American sculptor (see VOL. I). He received a medal of honor from the Panama-Pacific International Exposition in 1915 and the Watrous Gold Medal from the National Academy of Design (1916). During recent years he was twice president of the National Sculpture Society, and once (1917-20) of the National Academy of Design. His most important recent works are two seated bronze statues, John Marshall and Rufus Ranney, and two historical figures, Stephen Langton and Simon de Montfort, for the courthouse of Cleveland, Ohio, and the graceful group of the McMillan fountain, Washington, D. C.

ADAMS, JAMES TRUSLOW (1878-). American historian. He was born in Brooklyn, N. Y., educated at the Brooklyn Polytechnic Institute and Yale, and from 1900 to 1912 devoted himself to business. During this period he was a partner in a New York Stock Exchange firm and acted as director of several banking, manufacturing, and railroad corporations. He ended his commercial activities in 1912 and from then on devoted himself to literary and historical pursuits, publishing *Memoirs of Old Bridgehampton* (1916) and *History of the Town of Southampton* (1918). His first considerable work was *The Founding of New England* (1921), which won immediate recognition not only for its scholarly worth and stylistic qualities, but also because of its very able and challenging analysis of the Puritan character. As a cultural study of American regionalism, a field too little regarded by the academic scholar, Mr. Adams's work was of the first importance. It received the Pulitzer Prize for the best historical book of the year. In 1923 he continued his chronicle with the volume *Revolutionary New England, 1691-1776*.

ADAMS, JOHN TAYLOR (1862-). An American manufacturer and politician, born at Dubuque, Iowa, and educated at the Dubuque High School. He entered the sash and door manufacturing business in 1881 and later became president of the Carr, Ryder and Adams Company. He entered politics in 1908 as manager of the successful campaign of United States Senator Allison. In 1912 he was manager of the Taft campaign in the Iowa primaries. In the same year he was a member of the Republican National Committee for Iowa and was vice-chairman in 1917. From 1912 to 1916 he was a member of the executive and campaign committees, and in 1921 he became chairman of the National Republican Committee. He was a member of the Iowa State Council of National Defense in 1917.

ADAMS, JOSEPH QUINCY (1881-). An American college professor, born at Greenville, S. C., and educated at Wake Forest College, S. C., the University of Chicago, Cornell University, London, and the University of Berlin. After holding various pedagogical positions, he was appointed professor of English in Cornell University in 1919. Besides contributing to American and European philological journals, he is author of several valuable studies, espe-

cially in the field of the Elizabethan stage, which include: *A Manual of American Literature*, in collaboration (Leipzig, 1909), *Shakespearean Playhouses* (Boston, 1917); with Northup, *A Bibliography of English Philology* (1918); *The Bones of Ben Jonson*, with articles by others (Chapel Hill, N. C., 1919); with Bradley, *An Allusion-Book to Ben Jonson* (1922); and *A Life of William Shakespeare* (1923). He edited Sheridan's *The Rivals* (Boston, 1910) and *The Turke* by John Mason. He was associate editor of *Materialien zur Kunde des Aelteren Englischen Dramas* and joint editor of *Cornell Studies in English*.

ADAMS, SAMUEL HOPKINS (1871-). An American author and publicist (see VOL. I). The work he had done so effectively in exposing the quack medicine industry Mr. Adams continued in the field of dishonest newspaper advertising. His column, "The Ad-Visor," in the *New York Tribune*, succeeded remarkably in raising the standards of advertising in the daily press. He wrote *The Clarion* (1914) and *Success* (1921), both studies of modern journalism, and several novels, including *The Unspeakable Peck* (1916), *Our Square and the People in It* (1917), and *Siege* (1924).

ADAMS, WALTER S. (1876-). An American astronomer (see VOL. I). In 1917 he received the gold medal of the Royal Astronomical Society of London and the Draper medal of the National Academy of Sciences in 1918. His many papers were originally contributed to the *Astronomical Journal* and to the *Astrophysical Journal*, but they later appeared under the general title of *Contributions to the Mt. Wilson Observatory*. He is also the author of several memoirs, the most important of which were a series of four papers published in 1916 as *Investigations on Stellar Spectroscopy*.

ADAMSON EIGHT-HOUR LAW. See LABOR ARBITRATION; UNITED STATES, *History*; and STRIKES.

ADAMSON, WILLIAM (1863-). British Labor politician, born at Halbeath, Fife. For many years before his public appearance he worked as a miner. In 1902 he became assistant secretary of the Fife and Kinross Miners' Association and in 1908 its general secretary. He was elected to Parliament for West Fife in 1910, and when the Labor party was reorganized in 1917, he became its chairman. In 1918 he was sworn in as a member of the Privy Council. As leader of the Labor party he was head of the official opposition in the House of Commons in 1919 and took a prominent part in the debates in the coal industry and the trade union discussions of 1919, 1920, and 1921. When on Jan. 22, 1924, Ramsay MacDonald formed his Labor cabinet, Adamson was made Secretary for Scotland.

ADAPTATION. The adjustment of a plant or animal to its environment or surroundings as shown in its structural form or habits. Adaptations are rarely or never perfect, and the elimination of the less well adapted in the struggle for existence has been supposed to be a factor in evolution. See ZOOLOGY.

ADDAMS, JANE (1860-). An American settlement worker (see VOL. I) and a regular contributor to the *New Republic*, *Survey*, *Nation*, etc. Her last work, published in 1916, was *The Long Road of Women's Memory*. She was a delegate to the International Women's

Congress at The Hague (1915) and was elected its president. She was also a delegate to similar congresses held at Zurich (1919) and Vienna (1921). Though an avowed pacifist, Miss Addams illustrated her wealth of common sense in the practical rather than theoretical attitude she took toward the War.

ADE, GEORGE (1866-). An American author and humorist (see Vol. I). His popular *Ade's Fables* and *Nettie* appeared in 1914. He was a member of the Indiana State Council of Defense (1917-18).

ADELPHI COLLEGE. A nonsectarian college of liberal arts for women, in Brooklyn, N. Y., founded in 1896. In 1913 the students numbered 176 in regular college courses and 98 in extension courses, and the faculty comprised 18 persons. In 1923-24 there were about 400 students and 28 faculty members, not including the extension courses and summer school. The library was increased from 15,000 to 19,000 volumes. A campaign for an addition of \$1,000,000 to the endowment was conducted during the academic year 1922-23. The president of the institution is Frank D. Blodgett, LL.D.

ADEN. A peninsula and a British protectorate on the southeastern Arabian coast. Area of the peninsula, 75 square miles; of the protectorate, 9000 square miles. The island of Perim, included in the settlement, has an area of 5000 square miles. Population of Aden and Perim in 1911, 46,165; in 1921, 54,923; of the protectorate in 1921, about 100,000. Aden continued as an important entrepôt and transshipment station for the Red Sea country. Imports for 1911-12 were valued at £2,643,276, for 1919-20 at £6,517,000, and for 1922-23 at £7,761,505; exports for the same years were £2,318,595, £7,124,000, and £6,738,167. A railway was begun in 1915 to extend from Aden to Lahej (25 miles). In 1921 administration was transferred from the India Office to the Colonial Office.

ADLER, FELIX (1851-). A German-American educator born in Germany (see Vol. I). Among his later publications are *The World Crisis and Its Meaning* (1915); *Divorce* (1915); *An Ethical Philosophy of Life* (1918), and *The Punishment of Children* (1920). In 1923 Dr. Adler delivered the Hibbert Lectures at Oxford; in 1924 they were published in a volume entitled *The Reconstruction of the Spiritual Ideal*.

ADLER, HERMAN MORRIS (1876-). An American physician, psychiatrist, and criminologist born in New York City. He graduated from Harvard in 1897 and received his degree of doctor of medicine from Columbia University in 1901. He was appointed State criminologist of Illinois in 1917. After 1917 he was director of the Juvenile Psychopathic Institute and after 1919 professor of criminology at the University of Illinois. He has made psychopathic surveys of Cook County, under the auspices of the Rockefeller Foundation, and of the military prisoners during the War.

ADLER, VICTOR (1852-1918). An Austrian Socialist leader (see Vol. I). He played only a passive part in the War, but with its termination, in 1918, he once more took a prominent place in Austrian politics. With other Social Democrats he advocated Austrian union with the German Reich. For a few days he served as Austrian Foreign Minister, but his collapse

and death, on Nov. 12, 1918, lost for the young and helpless republic the counsel of one of its most astute politicians.

ADLER, WOLFGANG FRIEDRICH (1879-). Austrian politician, born at Vienna. He was educated at the Realgymnasium in Vienna and the University of Zurich and lectured in physics in Zurich, 1907-11. From 1910 to 1911 Dr. Adler edited the Social Democratic daily *Volkrecht*, and for the next five years he was secretary of the Austrian Social Democratic party and editor of *Kampf*. His sympathy for the Socialists during the War and expectation of a rising of the proletariat led him at the breakup of the International (1916) to shoot the Austrian prime minister, Count Stürgkh. He was condemned to death on May 19, 1917. This sentence was commuted to 18 years' imprisonment, and in the chaos of 1918 he was amnestied. In 1919 he was elected to the National Assembly. He was president of the Austrian National Workmen's Council and secretary of the International Labor Association of Socialist Parties. It was due to his initiative that the last mentioned was founded in 1921. His later works include *Die Erneuerung der Internationale* (1918); *Mach's Ueberwindung des Mechanischen Materialismus* (1918); *Ortszeit, Systemzeit, Zonenzeit und das ausgezeichnete Bezugssystem der Electrodynamik, eine Untersuchung über die Lorentzsche und die Einsteinsche Kinematik* (1920).

ADOR, GUSTAVE (1845-). A Swiss statesman, born at Geneva, where he studied law at the academy. He was twice mayor of Cologne and a member of the cantonal parliament almost continuously from 1874 to 1915. After holding other important government offices he was elected president of the Swiss National Council in 1901. In June, 1917, he became federal councillor of the federal executive and head of the department of foreign affairs. He was elected by parliament as president for the year 1919. Later he was chairman of the International Committee of the Red Cross (1921).

ADRENALIN. Whereas in 1914 this drug was considered merely as a strong astringent, by 1924 it had become known as one of the most useful in the pharmacopœia. It is a heart stimulant of great value. It has sometimes reanimated the apparently moribund patient when injected directly into the heart. Its power of constricting the blood vessels also makes it of value in hemorrhages. See SECRECTIONS, INTERNAL.

ADRIATIC SEA. See FIUME-ADRIATIC CONTROVERSY.

ADSORPTION. See PHYSICAL CHEMISTRY.

ADVANCEMENT OF SCIENCE, AMERICAN ASSOCIATION FOR THE. See SCIENCE, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF.

ADVENT CHRISTIANS. See ADVENTISTS.

ADVENTISTS. The "Advent Movement" originated about 1840 with William Miller, who became convinced that the coming of Christ in person must be premillennial. It embraced the following churches: The Advent Christian Church, the Seventh Day Adventists, Life and Advent Union, the Church of God, Adventist, and the Churches of God in Christ Jesus. The Seventh-Day Adventists, the largest body of the group, differed from the other branches in that it never set a definite date for the coming of the Lord. Its membership in-

creased throughout the world from 125,844 in 1914 to 208,771 in 1922. In North America the number of members increased from 72,015 in 1914 to 102,797 in 1923, the number of churches rose from 2054 to 2226, and the number of ordained and licensed ministers from 769 to 1069. During the ten years the denomination supported 153 mission fields, and 123 colleges, theological seminaries and intermediate schools. Fifty-one publishing houses and branches issued 3904 separate volumes of literature.

ADVERTISING. As the most sensitive outpost of modern business, advertising underwent a remarkable development during the War and the years succeeding it. Not only did the stimulation of business activity during the six years of war inflation lead to an enormous increase of the expenditure for advertising, but the entry of governments and semi-official agencies into selling campaigns lent a new dignity to the profession.

The British government was the first to use advertising methods to sell its war bonds to the people of Great Britain and the United States. Early in 1915 it became evident that the size of the financial operations made it indispensable to appeal beyond the regular investing class reached through the banks. An expenditure of £100,000 was decided upon for newspaper and poster advertising. It produced extraordinary results. The experiment was repeated on a larger scale in the United States when the Liberty Loans came to be floated in 1917 and 1918. By coördinating publicity, propaganda and paid advertising, the number of investors in government bonds was increased fiftyfold. The Victory Loan was sold to more than 21,000,000 individual bondholders.

The adoption of conscription by the belligerent countries made it unnecessary to employ poster advertising for recruiting. This method was extensively used, however, for the maintenance of civilian morale. The war poster attracted leading artists.

In commercial advertising the perfection of the four-color press made it possible to illustrate the text appeal with pictures of advertised goods in their natural colors. This development has been most prominent in American periodicals. In one national magazine between 50 and 75 pages of advertising are printed in colors. The annual expenditure for advertising in the United States is said to approach \$1,500,000,000, although exact figures are not available. This expenditure reflects a growth of more than 100 per cent since the War. Out of it advertising has built itself up as a professional activity, drawing some of the best brains of the land. The centre of the profession is the advertising agency, which has grown from a mere brokerage office for the purchase of space to a technical bureau which plans campaigns and writes and executes the advertising copy. One of the most interesting developments in this connection is the use of publicity to supplement paid advertising. Free publicity before the War was used chiefly by theatrical press agents, who were successful in creating news "stunts" for their stars. During the War, all the relief and welfare agencies maintained publicity bureaus informing the newspapers of their activities, and this practice was speedily imitated by private industrial organizations. In the latter case it was not al-

ways easy to make out a legitimate news interest, and editors put themselves on guard against printing as news what was obviously private propaganda. Large amounts of such copy do get into the newspapers, however, inasmuch as the line between private interest and public interest is not always easy to draw. Publicity cannot be used to sell merchandise, but it can create a favorable atmosphere, which big corporations regard as invaluable. With the growth of advertising as a profession, special steps have been taken to eliminate as far as possible improper methods. Prominent in this activity are the advertising clubs, which bring together the advertising writers of the United States and England in a common federation. These clubs spread the slogan "Truth in Advertising" and endeavored in other ways to standardize practices.

The attempt to apply the methods of experimental psychology to advertising have been for the most part abandoned. Whatever relation advertising has to psychology is seen to belong rather to the empirical psychology of motives, the psychology that is practiced by interpreters of human nature whether they be historians, philosophers, or novelists. In advertising the recognized principle is to associate a strong sentiment with the prosaic announcement of the goods to sell. The use of this principle is open to many moral objections, and it may become more and more necessary for society to legislate against its too enthusiastic application. But as things stand, it is part of the economic system and the necessary competition for public attention.

A. E. F. See WAR IN EUROPE, *Western Front*.

AËRONAUTICS. If one were to exclude the actual invention of the heavier-than-air machine for mechanical flight and its early practical development, it might be said without fear of contradiction that the period 1914-24 was the most momentous in the history of aerial navigation. In these years not only was mechanical flight reduced to practice, but it was made a method of transportation which had to be seriously considered, and which, while it had not supplanted existing means of locomotion, showed great promise for the future. The War stimulated the use of aircraft and made possible both experimental and service applications on a larger scale than would have been possible otherwise and led to abnormally rapid progress of the art. (See WAR IN EUROPE, *Aërial Operations*; also BOMBING OF VESSELS BY AIRCRAFT.)

Our consideration will take up first the spherical balloon or aërostat, where naturally there had been but little advance save in the use of better fabrics for the gas container, as the utility of this device was limited. Except for flights, rather of a sporting nature, or to test the air currents, spherical or freely flying balloons had a narrow field of usefulness. Secondly can be considered the dirigible, which had reached a point where it was able to cross the Atlantic Ocean, not to mention its use as a serious engine of war for purposes of demolition when not opposed. Third in order will be discussed the various types of heavier-than-air craft, such as airplanes, seaplanes, and helicopters.

Spherical Balloons. During the War, naturally there was little opportunity for the use of spherical balloons, by the belligerents, and

in the neutral countries, also, little attention was paid to this field of aeronautics. For observation the captive kite or sausage balloon was used, but freely flying balloons had no use on or even behind the battle line. Accordingly activity in this department was not resumed until in 1919, the annual balloon race in the United States again was held. On Oct. 2, 1919, this competition was resumed at St. Louis, with entries from 10 American cities. This competition ordinarily is held annually and serves to select the American competitor and alternates for the annual Gordon Bennett balloon trophy race which is held in the country of the winner of the previous year's competition. This now became an annual event, and limited interest attached to the outcome of the competition, which was to determine the largest distance to be flown by any of the contestants. The national balloon race for 1924 was started April 23, at San Antonio, Tex., and while the winner's distance, 1072 miles, did not break the earlier American record made in 1910, nevertheless it developed interesting competition and was in every way successful.

Gordon Bennett Competition. In 1920 the annual international balloon race for the Gordon Bennett trophy was resumed. The United States was then the trophy holder, so that the start was made from North Birmingham, Ala., on Oct. 23, 1920. Eight large spherical balloons participated, filled with by-product coke gas from the Sloss-Sheffield Steel and Iron Company furnaces. From this time this international air competition was held regularly in different countries, but without improving on the record of 1887.6 kilometers, or 1172.9 miles, made by Augustus Post and A. R. Hawley, Oct. 17-19, 1910; this was also the American record for distance for the spherical balloon up to 1924. The Gordon Bennett balloon competition took place annually without any specially significant incidents until 1923, when on September 23, the twelfth competition was started at Solbosch, outside of Brussels. The weather conditions, which included severe gales, heavy rains and electric storms, resulted in destruction or damage to some six balloons and fatal casualties to three pilots and two aids, as well as serious injuries to three pilots and two aids. This competition developed considerable discussion, as the rules, which did not permit of postponement under dangerous weather conditions, were followed to the letter. It was believed that some provision should be made whereby subsequent competitions should not be started when to do so would make the flights extra hazardous.

On June 15, 1924, 17 balloons, representing 7 nations, started in the fourteenth competition for the Gordon Bennett cup, taking off from the great Solbosch plain outside of Brussels, Belgium. Unlike the 1923 competition, the weather conditions were favorable, and after the balloons had been filled they left the ground. The first to rise was the *Belgica*, piloted by Ernest de Muyter of Belgium, three times winner of the cup. There were three balloons from the United States, the *Uncle Sam*, piloted by Capt. H. E. Honeywell, the *Good-year*, piloted by Capt. W. T. Van Orman, and the *Si2*, piloted by Major Peck and Lieutenant Grey of the United States Air Service. Conditions of wind and weather were not such as to develop fast traveling, and several of the bal-

loons that were carried to the west were forced to land rather than be driven out over the Atlantic Ocean. The competition was won again by the Belgian balloon *Belgica*, piloted by Lieutenant de Muyter, which achieved a distance of 745 miles, landing in Scotland at Alb's Head, 45 miles east of Edinburgh. Lieutenant de Muyter thus became the permanent possessor of the trophy. Second place was taken by the French balloon, *Ville-de-Bordeaux*, piloted by F. Laport, which crossed the English Channel and landed at Brighton, England, covering 198 miles. The United States balloon, *Uncle Sam*, H. E. Honeywell, pilot, was third, with 180 miles.

Outside of the Gordon Bennett international trophy competition and the national balloon race, several important flights were made, some of which developed unusual experiences due to enforced landings in desolate regions. Thus in 1920 the United States naval spherical balloon 45598 left the naval air station at Rockaway Point, N. Y., and after a trip of 800 miles descended on December 14 in Ontario. None of the various flights exceeded the record for duration made by H. Kaulen of Germany on Dec. 13-17, 1913, of 87 hours, or that for distance made by the German, Berliner, on Feb. 8-10, 1914, of 3052.7 kilometers (1896.9 miles), while for altitude Suring and Berson on June 30, 1901, reached a height of 10,800 meters (35,424 feet).

The International Aeronautic Federation (F. A. I.) makes a distinction of class for spherical balloons, grouping in the first category those up to 600 cubic meters capacity, in the second category those from 601 to 900 cubic meters, and in the third category from 901 to 1201 cubic meters. Up to 1924 the International Federation's records for duration and distance were, for balloons of the first category, as follows: duration, (France) Gaston Fleury and George Fleury, Aug. 15-16, 1923, 19 hours 43 minutes; distance, (France) George Cormier, July 1, 1922, 804.173 kilometers (499.69 miles).

Dirigibles. Prior to the War dirigible balloons or airships had been developed principally for military purposes. They were classified as rigid, semirigid, and nonrigid, depending on arrangement of the gas bags and the supporting frame. At this time the sole examples of the rigid type were the Zeppelin airships of Germany, which had found a limited application for passenger transportation. Of the last two groups named, the airships of French workers and of the Schütte-Lanz and Parseval types in Germany were, perhaps, the most important, though airships of these types had been built in Great Britain and the United States. The Italians also had a semirigid airship which served to train pilots as well as indicate the possibility of future designs. During the War a number of these semirigid and nonrigid craft were built and used, but without decided military advantages.

The Zeppelin Airships. In the field of the rigid airship, the work of Zeppelin done before the War on a systematic basis looking not only to military applications but also to use in commercial air travel and transportation was significant and had an important bearing. In 1913, 10 Zeppelin airships were in service in Germany, and others were being built for the military or naval service. Of the latter, two of the larger craft were destroyed accidentally in

1913. At the outbreak of the War there were three Zeppelins, each of 15,000 cubic meters capacity (19,619 cubic yards; 530,000 cubic feet) in the German Navy. With manufacturing facilities previously developed, it was possible straightway to proceed with further construction, following essentially the same designs but increasing capacity and motive power and improving equipment of the craft. The greater capacity naturally was required for explosives, incendiary, and other bombs which were dropped in the course of raids on enemy territory.

It was stated that the total number of German Zeppelins by the end of the War was 67, of which 17 were lost in action with the enemy, 34 were accidentally destroyed, and six were captured. This statement shows clearly the usual hazards incidental to the operation of dirigibles and the war dangers to which they were exposed from hostile airplanes. In fact when the French and British air squadrons were well organized and the defense measured up to its full strength, it was impossible to employ the Zeppelins on the western front or even in air raids over Great Britain.

British Dirigibles. Previous to the War the dirigible balloon had aroused little interest in Great Britain, and even in 1915 the British Government decided that they were not worth building, principally on account of the inflammability of the hydrogen gas, which could be readily ignited by an incendiary bullet from an airplane. The British government did build in 1916 a series of nonrigid or semirigid dirigibles or miniature airships, known as "blimps," largely for observation purposes. In 1918, when it was realized that there could be made available helium in quantity, it was decided to build a fleet of rigid airships which would be safe from dangers of explosion or fire. Accordingly, with the experience derived from the War and particularly from a study of captured Zeppelins which had been brought to earth, including the *L33* which had been brought down in England, Sept. 23, 1916, there was designed in England, before the Armistice, a type of airship which, filled with helium gas, not only would be suitable for a transatlantic trip, but which would be able to transport and discharge large amounts of high explosive. Inasmuch as the British had suffered severely from the Zeppelins, they sought to make these craft, eight of which were projected, as efficient as possible. None was completed before the Armistice. The *R34*, put into commission in 1919, made the first transatlantic flight by a dirigible. Unfortunately, this craft ran aground and was destroyed, Jan. 28, 1921, during night flying in Yorkshire. Another of the group, the *R38*, was purchased by the United States government and was preparing for an overseas trip to America when it was wrecked in the air, and almost the entire crew of British and American officers and men perished. The *R36*, on June 10, 1921, had a successful endurance test; it was 30 hours in the air on a trip from Pulham to Land's End and back. The *R80*, the *R34* and the *R38* were completed, or practically completed, by 1920. The *R80* had a volume of 1,250,000 cubic feet and a length of 530 feet, as against a volume of 1,980,000 cubic feet and length of 643 feet for the *R34*, and a volume of 2,720,000 cubic feet and a length of 698 feet for the *R38*. The *R34* scored the first transatlantic flight for a dirigible, leaving East Fortune, near Edinburgh, Scot-

land, at 2 A.M., July 2, 1919 and flying by way of Newfoundland, arrived at Roosevelt Field, Mineola, N. Y., at 9 A.M., July 6, 1919. A return trip was made even more successfully, leaving New York on July 9, and reaching Great Britain on the morning of July 12, a distance of 3200 miles in 75 hours and 3 minutes, or a total flying time for the *R34* of 183 hours and 15 minutes for some 7000 miles on this transatlantic trip. This achievement was notable in that the airship experienced various kinds of weather, including fog, heavy squalls, thunderstorms and head winds, and indicated the possibilities of transatlantic flight by a dirigible on a commercial scale.

The *R38*, also referred to above, was designed and constructed by the British for the United States, being known in the United States Navy records as *ZR2*. This airship was the largest and most powerful of the British dirigibles; it had six Sunbeam Cossack engines, each of 350 horse power, or a total of 2000 horse power, and a maximum speed of 72 miles per hour. It was designed for a cruising range of 5000 miles. The *R38* made a number of flights in England and was destroyed on a trial trip, Aug. 25, 1921, falling into the Humber River and carrying with it some 62 officers and men, both British and American. The Americans were included in the training crew which was to take the airship across the Atlantic for the United States. While there was no definite information as to the reason for the failure, it was believed that certain features of design had been overlooked and that there was lack of strength at certain important points. Once the structure failed, the ignition of the gas by the broken electric wires resulted in a fire.

United States Dirigibles. Before the United States had entered the War several small dirigibles had been secured for the army and when it was decided to participate actively in the conflict a number of nonrigid dirigibles resembling the British "blimps," which had been ordered, became available, the first of which were tested in May, 1917. By 1919, a useful American dirigible had been developed, of which the *C5* was a representative. This nonrigid airship was 192 feet in length, 43 feet wide and 45 feet high, with a capacity of 180,000 cubic feet of gas. It had a cruising speed of 42 miles an hour and in May, 1919, made an attempt to cross the Atlantic by way of Halifax. A distance of 1050 miles was accomplished successfully, but a heavy gale arising, the airship was driven from its moorings and carried out to sea, where it was destroyed.

The United States War and Navy Departments, however, had manifested an interest in still larger dirigibles, as they seemed to possess for the United States a considerable field of usefulness. In addition to the airship ordered from the British and a Zeppelin to be secured under the Treaty of Versailles, the American government put under way the *ZR1*, still another airship of the rigid type, but following the lines of the German Zeppelin *L49*, captured intact in France during the War, and supposed to represent the best efforts of the German designers. See NAVIES OF THE WORLD under *United States*.

United States Airship "ZR1." It was decided to construct this airship and its engines entirely in the United States, using the Philadelphia aircraft plant of the United States navy for the

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OFFICIAL PHOTOGRAPHS, BUREAU OF AERONAUTICS, UNITED STATES NAVY

UNITED STATES NAVY AËRONAUTICS

1. U. S. NAVY RIGID AIRSHIP "SHENANDOAH" at Naval Air Station, Lakehurst, N. J.
2. U. S. NAVY—CURTISS RACER. The World's Fastest Airplane, 1924.
3. U. S. NAVY—CURTISS SEAPLANE RACER. Winner of Schneider Seaplane Trophy, 1923, at a Speed of 177 miles per hour.

AËRONAUTICS



OFFICIAL PHOTOGRAPHS, UNITED STATES ARMY AIR SERVICE

UNITED STATES ARMY AËRONAUTICS

1. UNITED STATES ARMY AIR SERVICE WORLD CRUISER OF 1924, EQUIPPED WITH WHEELS
2. UNITED STATES ARMY AIR SERVICE BARLING BOMBER—THE WORLD'S LARGEST AIRPLANE, 1924

fabrication and their assembly at the large hangar at Lakehurst, N. J. While the airship was based on the Zeppelin designs, these were not to be followed absolutely, and improvements were to be introduced wherever possible. In fact with the serious disaster attending the *ZR2* which the British government had built for the United States, the plans of the *ZR1*, as the *Shenandoah* was called until after she had been put into commission, were submitted to the most careful scrutiny of experts and engineers connected with aeronautics, as well as technical men outside of aircraft circles. The *ZR1* was designed by Com. Jerome C. Hunsaker of the United States navy and was intended to be used by the navy with the surface fleet. It was 677.49 feet in length and 78.74 feet in diameter, with a height of 93 feet. There were 20 gas cells, or balloonettes, inside the frame and fabric, with a total capacity of 2,115,000 cubic feet of buoyant gas. Surrounding these cells were 19 ring frames between which were lighter rings, making a total of 41 rings.

The hull itself was of the general Zeppelin form of streamline design and was built of longitudinal and transverse girders which were braced and covered by fabric, within which were the gas cells already referred to. The rings, girders, and parts involved approximately some 400,000 pieces of the metal alloy duralumin which were riveted together like bridge work and braced by heavy wire. From the hull were suspended the various cars; the control car was located forward, and five engine cars were hung at intervals near the keel between the control car and the outer structures. In each of these cars was installed a 6-cylinder 300-horse power Packard airship engine which turned the propellers. The forward outer wing and inner wing cars had geared propellers, each 16 feet in diameter, while the inner wing cars had direct drive propellers 12 feet in diameter. The *ZR1* weighed 76,000 pounds without fuel, supplies, or crew, and was able to carry a load of from 30,000 to 50,000 pounds of fuel, supplies, crew, etc., depending on whether helium or hydrogen was used and the degree to which the airship was inflated. A crew of 20 to 25 officers and enlisted men was required.

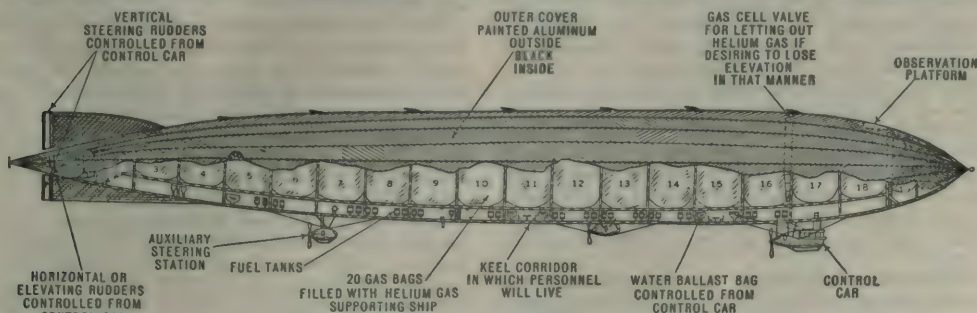
The *ZR1* was the first airship of Zeppelin type to be filled with helium gas, and in September, 1923, it made a very satisfactory trial flight from the naval air station at Lakehurst, N. J. The first extended flight was on October 1-3 of the same year, when a voyage was made from Lakehurst to St. Louis, Mo., and return, a total distance of some 2200 miles, which was

negotiated in a total elapsed time of flight of 47 hours and 49 minutes, of which the actual time in the air was 45 hours and 11 minutes, with an actual flying time of 42 hours and 11 minutes, including a 4-hour cruise over the city of St. Louis. The average speed was 52 miles per hour, and the highest speed 78 miles per hour. Subsequently, during the autumn of 1923, the *Shenandoah*, as she was christened on October 10, made several trips from Lakehurst, including a flight up the Shenandoah Valley on October 27 and a cruise to New England on November 20.

During the spring of 1924, in addition to the repairs occasioned by her breaking loose from the mooring mast, improvements were made, and five engines instead of six were installed. The engine formerly located in the after section of the control car was removed, and a new specially constructed long range radio sending and receiving set was installed in its place.

United States Airship "Roma." The United States government in the autumn of 1921 purchased from Italy a large semirigid dirigible named the *Roma*, which with a capacity of 1,200,000 cubic feet and a length of 410 feet was stated to possess a range of action of approximately 3500 miles at 80 miles per hour, and had at cruising speed a range of 8000 miles. This airship was shipped to the United States and assembled at Langley Field near Washington. The six 12-cylinder 400-horse power Ansaldo motors received from Italy were later replaced with Liberty motors, and flights were made with fair success until Feb. 21, 1922, when flying near the army base at Hampton Roads, Va., the craft was forced to earth through the failure of the rudder with its vertical controls. The metal-clad nose of the airship came into contact with high tension electric power wires, and immediately the gas bag was ignited. With the exception of those members who were able to jump, those on board were burned to death. The casualties included 13 officers and 21 non-commissioned officers, privates, and civilians.

United States Airship "ZR3." The United States navy, after the War, determined to make a thorough test of dirigibles, and in 1921 the Allied Council of Ambassadors in Europe agreed to permit the Zeppelin works in Germany to build for the United States on the reparation account a commercial airship of the *L90* type with a gas capacity of 2,475,000 cubic feet. This permission was essential as in the protocol signed in June, 1919, 30,000 cubic meters (1,059,000 cubic feet) maximum capacity had been made the limit for the largest rigid air-



THE U. S. S. "SHENANDOAH"

Showing the details of assembly and the disposition of the various parts of the navy-constructed rigid airship.

ship that Germany was permitted to construct. Airships of this size built after the War had not been found profitable in operation. The Zeppelin airship thus constructed for the United States was notable in representing the design and construction of the most experienced men in Germany. It was the highest development of this special type, which in the future must be built outside of Germany if it is to endure. The *ZR3* was a commercial type, as it was stipulated that even a reparations ship must be used only for commercial purposes. It is 650 feet long, 90.75 feet in diameter, and 101.8 feet high from the floor of the control car to the top of the hull. The cruising speed ranges from 45 to 71 miles an hour, affording a radius of action of some 5000 miles as compared with 4000 miles for the *Shenandoah*. There are five Maybach engines, directly reversing without gears, each of 400-horse power, installed in cars suspended close to the keel. The gas capacity is 2,475,000 cubic feet, and a gross lift of approximately 150,000 pounds is afforded, 60 per cent of it useful load, including passengers, fuel, supplies, etc. The control car includes the passenger cabin, supplied from an adjoining electric kitchen, a radio and engineer's room, and forward, the navigator's cabin. The passenger quarters accommodate 30 with berths similar to those of a sleeping car, and a crew of 30 men is required.

Completed in 1924 and brought to the United States, *ZR3* represented the last and best work of the famous plant of Friedrichshafen, which was to be dismantled after contributing so much to aeronautical science and art. In the meantime the Goodyear Rubber and Tire Company secured the rights of manufacture for North America in the autumn of 1923, and announced that it proposed to develop the lighter-than-air craft on a basis of extended commercial air routes. It was well known that German aeronautical engineers had contemplated the establishment of a two-and-a-half day passenger service across the Atlantic. Surveys were made for a 12-hour service between New York and Chicago, and more ambitious plans, involving transatlantic flight, were seriously discussed.

On Oct. 17, 1922, the United States Army dirigible *C2*, the largest "blimp" or nonrigid dirigible in the American air service at that time, was destroyed by explosion, and members of the crew were injured. The accident occurred at San Antonio, Tex., after a flight from Washington to San Francisco. The United States Army Air Service by 1924 had in commission other nonrigid dirigibles, of which one of the *TC* type, built by the Goodyear Tire and Rubber Company, was of 200,600 cubic feet capacity and could transport a total useful load of 4107 pounds with a maximum speed of 60 miles per hour. This airship had a cruising speed of 47 miles per hour and a range of action of 830 miles. About this time the United States Navy Bureau of Aeronautics had built a nonrigid airship of the *J1* class of almost the same size of envelope but shorter and fatter, having a capacity of 173,000 cubic feet. The power plant consisted of two 125-horse power engines.

Helium for Airships. In view of many serious accidents caused by the ignition and explosion of the hydrogen in the gas containers of airships, unusual interest attached to the development during the War of a process and plant for

the production on a commercial scale of a substitute for hydrogen, in the form of helium. The gas helium was next lightest to hydrogen, but was not inflammable or susceptible to ignition from an electric spark or incendiary projectile, and at the same time it was most inert. Its production in bulk was accomplished by the United States government at Fort Worth, Tex., using the oil from certain wells in Texas and Oklahoma and separating the helium from the other gases by a complicated refrigerating process. This plant and process was developed so that on Dec. 1, 1921, the United States navy nonrigid airship *C7* was successfully inflated with gas thus produced and made a number of trips, and later the *Shenandoah* was also inflated with the gas. Helium is noninflammable and is nonexplosive, but it has 92 per cent of the lifting power of hydrogen, and accordingly for the same gross lift would require an airship of 10 per cent greater volume. In 1924 the United States was able to produce sufficient helium to fill two such airships as the *Shenandoah* which used the gas successfully on all its trips. For other nations no such supplies were available, or, with the possible exception of Canada, likely to be developed.

Development of the Airplane, 1913-1924.

From the time of the first flight by Wilbur and Orville Wright, Dec. 17, 1903, up to the opening of hostilities in August, 1914, there had been a rapid development, with the result that practical machines were available which could fly under conditions of satisfactory balance and control, and over distances sufficiently great to prove their usefulness. At the beginning of the second decade of mechanical flight, an interesting landmark was noted when the original Langley "aërodrome," built in 1903, was shipped with its engine from the Smithsonian Institution in Washington to the Curtiss factory at Hammondsport, N. Y. Here the original machine was reclothed without change of size or shape, and the framing, engine, propellers, wings, rudders, and control just as Langley had left them, were put in proper adjustment. With the single addition of a modern radiator and carburetor to the engine, and the use of floats so that the machine could rise from the water, various successful tests were made with the original construction. The few additions referred to involved about 200 pounds more weight and some considerable extra air resistance to the original machine; nevertheless, with Mr. Curtiss as pilot, on May 28, 1914, the machine rose on an even keel and sailed from the surface of the lake under the control of the aviator.

Thus it was demonstrated clearly that the first airplane provided with an internal combustion engine not only was capable of carrying a passenger in sustained flight but also possessed inherent stability sufficient to take care of itself in bad weather. It will be remembered that Langley's earlier machine was a tandem monoplane, driven by twin propellers and carrying above four great dragonfly wings with a long double tail and a steering rudder placed beneath and behind the centre. The original inventor had made no provision in the way of landing gear or pontoons but had relied on a special launching apparatus which in large measure was responsible for disaster in the original tests where the possibilities of the machine failed of demonstration. When a Curtiss

90-horse power engine with a direct connected tractor screw was mounted on the forward part of the frame of the Langley "aërodrome," in place of the original propeller, there was further demonstration of the soundness of the theory on which the original designs were made. The original machine is now in the National Museum at Washington.

Airplanes in 1914. By 1914 there had been developed four fundamental types of heavier-than-air machines: the tractor land plane and seaplane, the latter fitted with pontoons, and pusher land planes and flying boats. With the exception of the Russian Sikorski plane, which was provided with four engines, all were single engine machines, England and the United States favoring biplanes, and France and Germany monoplanes. Largely as a result of racing contests for which substantial prizes had been offered, the French planes of 1914 were the fastest in the world, and at that time the world speed record stood at 125 miles per hour, made by Prévost at Rheims, Sept. 29, 1913, when he flew a Deperdussin plane with a 100-horse power Gnome engine.

In contrast to the sporting competitions of the French, the Germans had arranged military tests and offered prizes for competitions, where the chief importance was to demonstrate reliability and endurance. Accordingly, at this time the non-stop flight record was held by a German, Boehm, who made it with an Albatross plane with a 100-horse power Mercedes engine at Johannesthal, July 10-11, 1914. The altitude record was also made by a German, Oelrich, who on July 14, 1914, at Leipzig flew a D.F.W. plane with a 100-horse power Mercedes engine to a height of 26,730 feet.

The British airplanes of this time, while faster than those of Germany, and capable of carrying larger loads than the French machines, were notable for their stability and ease of control rather than for speed or power. The United States at this time was considerably behind the Europeans, in regard both to the engines and to the planes themselves. It was the manifest availability of the airplane and airship for military purposes that first won encouragement and support for practical aëronautics from the European governments.

The Stimulus of the War. With the outbreak of hostilities in 1914 it was soon found that the airplane possessed not only all the possibilities claimed for it in the way of observation and as an auxiliary to troops, but also that it was to be developed as a weapon of offense. From carrying a camera, when the province of the plane was merely to observe, there was developed special equipment and armament, and not only different hand weapons, but machine guns, bombs, radio and other signaling equipment were installed. This naturally led to changes in the design of the aircraft with due regard for defense as well as offense. It was early found necessary to sacrifice the speed of the French racing machines to reliability and to increase the speed of the British two-seater airplanes and make them single-seaters.

France at this time had a rather heterogeneous collection of airplanes and nonrigid airships, with many types representing experimental work rather than the attainment of definite standards. The same was true of Great Britain and Italy; the air equipment of both these powers was inferior to that of Germany and showed a variety

of types. On the other hand, Germany entered the War with a standardized fleet of airplanes and a group of Zeppelin airships made up not only of those designed for naval purposes but of those successfully employed in passenger service. The German air service, however, starting with ample and standardized equipment of general utility machines, soon found itself seriously handicapped on this very score and was compelled to develop new machines, not only for observation but for fighting and bombing, as the Allies increased the quality and amount of their air strength, developing such types as experience showed were advantageous and efficient.

By all the combatant nations there were required airplanes of power, strength, speed, capacity, reliability, durability and other essential qualifications as engines of war for tactical employment, and these the designers and manufacturers were forced to turn out as fast as possible on an unprecedented scale. Different types were developed, as for observation, for combat with other aircraft, for carrying and discharging large amounts of explosive, and for other purposes. To these, if the War had lasted longer, would have been added without question the actual transportation of considerable bodies of men. To the production and improvement of aircraft were devoted without reserve the wealth, resources, and scientific and mechanical skill of the combatant nations. For its operation, even under extra-hazardous conditions, the picked youth of the warring powers were trained to a high degree of skill and efficiency, while for improvement of design and mechanism endless experiments based on theory, experience, or inventive genius, were freely undertaken on the largest possible scale. For the production of aircraft vast establishments highly and scientifically organized and operated, were established, and a vast industry arose overnight in each of the Allied countries as well as in the Central Powers, where normally such undertakings would have been of slow growth.

Obviously this development was along purely military lines, and the single-seater combat machine, for example, fast and readily maneuvered, was entirely without commercial value. Likewise the two-seater observation plane of the air services had the power and speed desirable for military use but was highly uneconomical in operation, on a commercial basis. Extraordinary progress in developing large bombing machines also was made, but these for the most part required the use of special landing fields. In general, in all of the War design, manufacturing, and operation, cost and economy figured but slightly, and complicated and delicate equipment often met with short life. All these factors must be realized, for while four years of the War did a vast amount to develop aviation, yet at the same time they imposed handicaps and conditions which after the Armistice had to be considered and met. The production of distinct and separate types of airplanes to function along special lines naturally led to corresponding applications in peace times. Thus the observation or message plane became the mail plane for high speed service, the heavier combat plane became the light passenger or express craft, and the heavier bomber at once suggested the large plane susceptible of carrying a number of passengers or substantial amounts of freight. The reconnaissance and military mapping of the War found its counterpart in the surveying, map-

ping, and panoramic photography which soon after the Armistice became an important and recognized branch of aerial activity, bearing a distinct relation to topographic and other surveys. During the War, naturally, military efficiency was the sole measure of performance, and designs and tests were made with that end in view, but with the close of hostilities came again such trials as would demonstrate speed, capacity, altitude, duration, extent of flight, and similar characteristics susceptible of quantitative standards of performance and test. Aircraft in non-military and commercial service had to be operated on a basis of safety and economy, and a commercial service must pay for itself either directly or indirectly but unmistakably.

Seaplanes. After the first successful trials of the airplane it was realized that by arranging the plane so that it would rest on the surface of the water it would be possible to dispense with the landing field for taking off and returning to the ground. With the light weight of the plane it was feasible either to supply pontoons or to construct a fuselage in the form of a boat or hull. The possibilities of the flying boat straightway appealed to a number of yachtsmen, and just before the War a competition for the Schneider International Cup for Modern Flying was arranged at Monaco, on Apr. 20, 1914. The competition covered a course of 150 nautical miles which the winner negotiated in 15 hours, 13.2 seconds. The hydroplane straightway commanded the attention of naval officers, and it was increased as the War developed, inasmuch as it afforded a convenient means of scouting, particularly with reference to submarines. Accordingly, large and substantial planes were built with a sturdy hull that could ride on a fairly rough sea, and with naval officers and yachtsmen interested in their design, useful boats were soon developed and for a while were more generally used than other aircraft in the United States; long flights were made overseas and following the course of rivers. After the War the international competition for seaplanes was reestablished and the Schneider trophy was won in 1923 by a seaplane representative of the United States navy.

Tendency of Design. Even before the outbreak of the War, designers and manufacturers of airplanes realized that in addition to securing lightness for the plane and adequate power for the engine, considerable was to be accomplished. The first progress made was toward securing greater structural strength, and soon it was realized that other factors than lightness must be considered. After satisfactory devices for controlling the plane had been developed on a practical basis, attempts were made to secure greater aerodynamic efficiency of wings. All-metal construction was developed for airplanes of different types and capacities, as they were found to possess greater strength and were in general more serviceable. In fact, the increased use of metal framing and construction was but one of the indications that all aeroplane construction was an engineering matter where technical study and accurate construction were essential for safety and more powerful and generally more efficient machines. With metal construction came the increased use of metal alloys, which for strength and lightness were found suitable. By 1924 a large number of all-metal planes had been built, and the only obstacle to further progress in the construction of metal aircraft was the high cost.

When the supply of duralumin and aluminium alloys became generally available, they were extensively used in airplanes. Magnesium alloys were found available for parts not subject to stress and it was believed that engine crank cases made from such materials might prove as successful as those from aluminium alloys.

While the United States was inferior in the number of its airplanes in 1924, yet unquestionably it had the fastest fighting equipment in the world; this was strikingly illustrated in its pursuit planes, which undoubtedly surpassed the aircraft of European nations. In the Pulitzer trophy competition held at the St. Louis air meet in 1923, a United States navy Curtiss racer, the *NCR* made a record of 243.67 miles per hour, for the St. Louis closed course, and 266.6 miles per hour for the 3 kilometer distance. Later in the year, on November 4, at Mitchel Field, the speed record was increased to 266.59 miles an hour for 3 kilometers (1.864 miles). Such achievements were entirely the result of research and experimental engineering. With the D12 Curtiss engine, which was used in this plane, there was employed the Curtiss C62 airfoil section, the wing type radiator and the Curtiss-Reed one-piece metal propeller. The full streamline wheel and shock absorber, the cellular wooden wing construction, and other improvements in design, the results of aerodynamical investigations, all contributed to the wonderful performance of this type of airplane. The Curtiss army pursuit plane also had been improved and refined to such an extent that in 1924 it could realize a speed of 180 miles per hour. It was virtually a modification of the army Pulitzer racer of 1922, and was used by Lieutenant Maughan in his dawn-to-dusk flight across the continent, June 23, 1924. It was provided with a D12 engine. The Schneider cup racer of the United States navy which was successful in the seaplane contests in England in 1923 was a modification of the navy Pulitzer racer of 1921.

The Barling Bomber. A heavy capacity airplane, completed in 1923, was the largest in the United States air service and, in fact, the largest in the world. The machine was really a triplane, but the intermediate or mid plane was of narrow chord, and the ailerons were on the top and bottom planes only. Six Liberty motors, each of 400-horse power, formed the power plant, and for operation it required a minimum crew of four men. The original specifications demanded that not more than 5000 pounds of bombs shall be carried at one time, but were a 10,000 pound bomb developed, the Barling could lift and carry it for two hours. The weight of the airplane loaded was in excess of 40,000 pounds, and it had a flying speed of some 90 miles per hour.

Engines. The development of aircraft has gone hand in hand with the improvement of internal combustion engines. The aim has been always to secure greater power, reliability, and economy, and at the same time to reduce the unit weight of the power installation as compared with the horse power developed. The development in this field from 1903 to 1918 is shown by the accompanying table where the average values of the principal airplane engines for each year are given, except that in 1903, when the figures are for the Wright motor and the 1918 figure for horse power, 450 pounds, which is that of the Liberty motor. In this, it

will be noted, a ratio of 1.8 pounds per horse power was achieved.

Year	1903	1910	1914	1915	1916	1917	1918
Horse power	21	54	112	133	185	243	450
Weight (lbs.)	152	309	437	512	570	693	825
Lbs. per horse power	12.7	5.7	3.9	3.8	3.1	2.8	1.8

The Liberty engine is worthy of passing comment as a wartime attempt by the United States to produce on a quantity basis a new design in which all the best features of the various engines used in the airplanes of the combatant nations would be incorporated and which could be manufactured immediately in quantity. The design was developed in the United States by a group of skilled motor car engine designers, and by 1918 the engine was in quantity production; an output of 3878 motors was secured in that year. These motors were used not only for American airplanes in the closing months of the War but were supplied to the French, British, and Italian machines. The object of the Liberty engine was to combine high power with lightness, and the 12-cylinder motor was developed, in which the best features of American and European types were combined in a single efficient machine. The cylinders were made of steel inner shells surrounded by pressed steel water jackets. Above the cylinder heads were a cam shaft and valve mechanism with an improved arrangement for automatic lubrication. The cam shaft drive, copied almost entirely from the Hall-Scott motor, followed the type of drive used on the Mercedes, Hispano-Suiza and other successful machines. The included angle between the cylinders was 45° instead of 60° as in other 12-cylinder engines of the time. An improved system of lubrication also was employed and an improved type of water tank especially adapted to the new machine. The bore and stroke of the Liberty engines was 5 x 7 inches.

Notwithstanding that vast numbers of Liberty engines were available after the close of hostilities, there was no tendency on the part of American aviation engineers to remain satisfied with their design. As the engines were used and applied to various airplanes and airships, as well as to motor boats, the type was further improved by the army and navy designers and other engineers so as to increase its reliability and efficiency. While the Liberty engine was a pioneer American airplane power plant, it soon found competitors, and superior types were evolved in the United States. With the development of bombing planes for the military service, which continued after the Armistice, there was involved not merely reliability and endurance for the engines but considerable power to take care of planes that could carry large loads of passengers and freight. In the attempt to secure such high power with reliability, it was the general opinion that a large single engine was preferable to a number of engines, as the multi-engined plane required separate controls and did not secure any greater reliability, as three or more engines were necessary to provide against the failure of one.

Up to 1924, 600 horse power had been the usual limit for ordinary gasoline airplane engines, though some 13 or more had been built, rated in excess of this figure, and had received experimental tests.

It might be said here that even during the War, German engineers did not turn their at-

tention to large power plants, either for their airplanes or airships, as their air bases were situated comparatively near the fields of hostilities for the territory to be invaded, and the long trips which many of the Allied machines had to make were not required in their case.

As distinct from engines of great power for use on bombers, other improved types are developed for speed, pursuit, mail, and various other planes. The Curtiss D12 engine, which was employed with great success in planes participating in the Pulitzer, Schneider, and other competitions in 1922 and 1923, demonstrated its usefulness as an engine for a small high-speed airplane, single-seater, fighter, or scout, such as the Curtiss and Boring pursuit airplanes, or for a two-seated fighter. There was a V-arrangement of the twelve cylinders which were water cooled, and the entire engine weighed 670 pounds dry, requiring 44 pounds of water. This engine gave 400 brake horse power at 200 revolutions per minute. In connection with this engine was employed a wing type of radiator where two sheets of brass, one flat and the other corrugated, were soldered together and fastened to the surface of the near wing. The water flowing from edge to edge of the wing and through the corrugations of the two sheets is cooled in its passage. The wing type design eliminates the resistance of the former core type of radiator which interfered with the attainment of the highest possible speed. In the wing type radiator the flow of water to each section can be controlled by the pilot; this makes it possible to eliminate any section when desired on account of leakage. The Curtiss D12 engine was still further refined and the cylinder diameter and compression ratio increased. Its advantages were widely recognized, and straightway European airplane manufacturers secured machines for use with their planes.

The Wright Model T3 high-compression engine, as a result of United States navy tests in 1924, was claimed to be the lightest engine built for the power secured, weighing as it did but 1.7 pound per horse power developed. It was a 12-cylinder engine which developed 680 horse power at 2000 revolutions per minute, with a fuel consumption of .47 pound per horse power hour on nine-tenths running, and for the entire test that was run an average oil consumption of .0065 pound per horse power hour. The engine weighed, dry, 1155 pounds. It was capable of being used both in pursuit and observation planes and in large bombers and flying boats, its power and economy being available for both classes of service.

By 1922 the specifications in the United States army and navy for airplane engines had become most rigorous, and the Bureau of Aeronautics of the United States navy adopted for all types of aircraft engines a standard for service acceptability tests of 300 hours running at full throttle without failure of such a nature as would force the termination of the flight under service conditions. That this was not an impossible condition was demonstrated by the fact that the Wright model E4 completed such a test and ran a total of 572 hours at full throttle with voluntary stops for adjustments.

The Bureau of Aeronautics in 1923 decided on a startling innovation in abandoning definitely the use of water-cooled engines of less than 300-horse power in naval aircraft construction.

This action was taken as a result of the success of the Lawrance-Wright J1, a 200-horse power air-cooled engine. A new model of this engine, the J3, affording 200 horse power at 1800 revolutions per minute, became standard equipment for certain types of naval aircraft. The development of such air-cooled engines as these was bound to exert a very important effect on future aircraft engineering. Inasmuch as the cooling system of the water-cooled type of airplane engine usually amounted to 25 per cent of the weight of the engine itself, it was realized that the problem was to secure an air-cooled engine of such improved dependability that it would equal the best water-cooled device. Improved devices of turbine super-chargers had been developed which made possible ascents to higher altitudes. The most recent of these machines were better cooled and had greatly reduced head resistance. (See INTERNAL COMBUSTION ENGINES.)

Motorless Flight. After the War considerable attention was paid to airplanes without motors, which were used in soaring flight. These were popularly known as gliders, and so-called gliding contests were held; but this was a misnomer, since the devices were essentially planes or winged contrivances which depended on upward air currents for their power to overcome the force of gravity. A large number of different machines of this general class were developed, and the success obtained by 1924 indicated the possibility of producing inexpensive planes which would require engines with but from 5 to 25-horse power and consequently could be constructed and operated without large outlay. In the second place a future development might be the employment of towing planes or cargo carrying motorless airplanes to be hitched to a strong motored plane, in much the same fashion as a trailer to a motor car.

In 1911 Orville Wright made a soaring flight record at Kittyhawk, N. C., remaining aloft 9 minutes and 45 seconds. He started from a sand dune 75 feet high and rose to 230 feet, hovering over the same spot nearly 9 minutes, a record which stood until Dr. Klemperer, a German scientist, built a soaring plane in which he was able to make a 6-mile flight, remaining in the air 13 minutes and 3 seconds, in 1921. Inasmuch as the terms of the Peace Treaty restricted motor driven flight, students and professors who had been carrying on aviation studies prior to and during the War now devoted themselves to research and experiment in planes without motors. The record of Klemperer did not last any longer than September 6 of the same year, when it was broken by a student at the Hanover Technical University named Martens, who, flying from the Wasserkuppe at the head of the Rhoen Valley in Germany, was able to soar for 15 minutes and 40 seconds in a plane designed by Dr. George H. Madelung, then a professor at Hanover.

On Sept. 13, 1921, an aviator named Harth made a flight of 21 minutes and 37 seconds, being able to alight at a spot only 35 feet below his starting point. About this time competitions were held also in France, though in comparison with the work of German gliders the showing made was not at all good. In the year 1922, however, some notable German contests were held at the Wasserkuppe, where by this time the local air currents were well understood. A record of 3 hours and 6 minutes was

achieved by F. H. Hentzen, while two-passenger gliders were shown, one of which remained aloft for 13 minutes. In November, 1922, a British international contest for gliders was held near Brighton, over the English downs, and was won by Alexis Maneyrol, a French aviator, who remained aloft in a tandem plane for 3 hours and 21 minutes. This form of construction naturally suggested the original aërodrome of Langley, a type of design which had not figured extensively in the development of the motor-driven airplane. In 1923, extensive competitions were held, and on January 29 of that year Maneyrol made a world's glider record of 8 hours and 4 minutes, at Vauville, France. This lasted until May 11, 1924, when Ferdinand Schulz, a German glider pilot, established a new duration record for gliders of 8 hours and 40 minutes in the course of a flight in which he maintained an average altitude of 150 feet.

Light Planes. By 1923 it was realized that there was considerable opportunity for the development of light planes making use of the principle of the soaring plane and combining with it a light powered motor. In Germany in the glider competition of 1924, motor gliders also were included, and for these the engines for single-seaters were limited to 750 cubic centimeters (45.75 cubic inches) piston displacement, or 66 pounds weight; and for two-seaters the limit was 1000 cubic centimeters (61 cubic inches) piston displacement, or 88 pounds weight. The German regulations for the 1924 competition spoke of "gliders with auxiliary motors," and it was interesting to see just what differentiation would be made between such planes and "light planes," for which in the various countries competitions were announced for the season of 1924. In all of these, restrictions as to the size and capacity of the engine employed were most specific. Though somewhat heavier than the light plane referred to, an interesting airplane was developed in Germany, known as the Dietrich-Gobiet monoplane, which at the time was called the "Ford of the air." It was driven by a Haacke two-cylinder opposed type of motor rated at 30 to 35-horse power. This was said to give a power loading of 21 pounds per horse power, with a wing loading of 6.5 pounds per square foot. In the United States also a light plane competition was arranged for 1924.

Helicopter. As early as the time of Leonardo da Vinci, air travel by means of a revolving screw or propeller mounted on a vertical axis had been in the minds of scientific men. No attempt to realize this idea was successful until the twentieth century, when a number of devices were brought out which, if not successful on a practical basis, at least showed promise and indicated progress in this field. In 1919 Michelin of France, patron and promoter of aviation, announced a prize of \$100,000 to be awarded to the person who should produce and demonstrate the first heavier-than-air aircraft that would rise from and land on the ground vertically, or would, for example, rise to the roof of a modern house and then return to its starting point. The chief conditions of the Michelin prize provided for a machine to rise vertically from the ground, to possess the greatest possible speed up to 124 miles an hour, and to land vertically within a radius of 5 meters.

In France a helicopter was devised by Paternus Pescara and constructed by the French technical

section of aviation. Here vertical motion was produced by the rotation of two wings in a horizontal position, and a small propeller was provided. In 1923, in the course of experiments at Issy-les-Moulineaux, near the French capital, Pescara kept his machine in the air for three minutes, traveling above the ground at an average height of one meter, and at the conclusion remained stationary in the air for one minute. Other notable performances of the Pescara helicopter included a straight flight of 200 meters length, another of 460 meters, and a circular flight of 650 meters circumference, with the machine landing in a circle of 10 meters diameter from which it took off. Pescara's machine had an automobile-like body, on which was mounted a shaft turning a number of propellers. At official tests held at Issy-les-Moulineaux during November, 1923, Pescara managed to keep his machine in the air at a height of between 1 and 2 meters for 5 minutes and 44½ seconds, traversing a distance of 300 meters and returning to his starting point.

Other French work of importance was the helicopter of Etienne Oehmichen, which, like that of Pescara, was able to rise freely and make short flights. In 1923, a hovering flight of 5 minutes and 15 seconds was made before representatives of the French air department. In fact it was claimed that this helicopter of Etienne Oehmichen had lifted three persons to a height of 5 meters. The machine also twice rose with the same number of passengers to heights of 3 to 5 meters. The Oehmichen helicopter had to its credit a total of two hours in flight, with one flight of nine minutes. It also had accomplished a horizontal flight of 400 meters. Later he secured the first official record.

In Great Britain also, considerable attention had been devoted to this subject, and Louis Brennan, inventor of the mono-railway, had been engaged in experiments at the Royal Aircraft Establishment at Farnborough since 1918 under government auspices. Brennan also had executed more or less short flights or hops, but up to 1924 had not passed beyond an experimental stage.

In the United States a helicopter was devised by the distinguished Emile Berliner and after his death was improved by his son, Henry Berliner. In 1922 this device was able to rise freely seven feet from the ground and remain motionless and steady; in subsequent experiments it was demonstrated that it was possible to give forward motion to the helicopter from the same source of power that provided the upward lift. The Berliner machine involved three propellers, two for the upward motion and one for the forward motion. This device also had not proceeded beyond an experimental stage. The De Bothezat helicopter was constructed under the direction of the engineering division of the United States Army Air Service and reached a point where in the year 1922 it was able to make free flights and show encouraging prospects.

That the helicopter was becoming a serious factor in aeronautics was shown by the fact that after Apr. 1, 1924, the International Aeronautic Federation recognized officially records made with such machines. The first holder of an official helicopter record was Etienne Oehmichen. This was made on April 17, at Valentigny, France, when a horizontal flight of 525

meters (1772 feet) in a direct line was scored. This record was beaten the following day by Pescara at the Issy-les-Moulineaux aerodrome in a straight line horizontal flight with a distance of 736 meters (2550 feet), made in 4 minutes and 11 seconds, while the machine was over 6 feet above the ground. On May 5 Oehmichen made the first circuit flight accomplished by a direct lift machine, covering a triangular kilometer course in 7 minutes and 40 seconds. This flight, which was made under the control of the technical section of the French Air Service, won for Oehmichen a prize of 90,000 francs offered by the French air department for the first 1-kilometer circuit made by a helicopter.

On Apr. 30, 1924, entries were closed for the international helicopter competition for the British Air Ministry's prize of £50,000 offered in May, 1923. This competition attracted 15 or 20 competitors, including the best examples of this type of construction. To win the prize the helicopter must rise vertically to 2000 feet altitude; hover there for half an hour and descend safely; make a circular flight of 20 miles length at 60 miles per hour; and make a gliding flight from 3000 feet altitude with the engine stopped and land in a small area. These conditions seemed difficult of fulfillment, because at the time the entries closed no free helicopter had ever risen more than 10 feet from the ground, although 150 feet was the record height ascent for a captive helicopter of the Austrian designers, Karman and Petroczy. Furthermore, up to this time no helicopter had ever made a gliding flight with the engine stopped or a landing with precision, and the greatest horizontal speed ever made by a helicopter was about 6 miles per hour, or one-tenth that required in the competition.

The World's Aircraft. In 1924 the four leading military flying nations of the world, in order, were France, Great Britain, Italy, and Germany, while Russia and Japan were considered significant as potential powers with future possibilities in no way to be neglected. Of the 55 nations of the world reporting aircraft, 16 engaged in a deliberate policy of establishing air transport, and in particular France, Great Britain, Italy, and Germany were seeking to cover Europe with connecting lines, and also to extend air transportation into Africa, Asia, and South America. Great Britain, in 1923, after some neglect of air travel, was engaged in laying the foundation for considerable extension of aerial activity, particularly in relation to defense and to connection between the colonies. The British firms were building about 24 different types of military and naval aircraft, and types of troop-carrying planes had been produced, each capable of carrying 25 persons. Such designs could readily be developed for large cargo carrying and passenger planes. At the end of 1923 Great Britain had more naval aircraft in serviceable condition than all the other nations together.

As already stated, the military note was the loudest in Europe, and by the end of 1923 France had become the strongest power aeronautically, with a considerable military strength. In 1922 the French airplane factories had produced 3300 planes for military and civil purposes, which gave France a lead in aerial preparedness that was a source of concern to other nations. While in most countries, subsequent to the

Armistice of 1918, the general tendency had been to use up surplus war material, in France new developments were constantly put under way, and in 1923 there were 29 aircraft factories, two airship plants, and 11 concerns manufacturing airplane engines. These naturally brought many foreign orders to France, and with the large number of tourists from abroad, important air lines were operated.

By the terms of the Treaty of Versailles it was provided that all German aviation should be civilian, and even that was seriously handicapped. At the end of the War the Germans had a well organized and productive aircraft industry, and this was not altogether obliterated by the new conditions, notwithstanding the many transformations which were required. At a meeting of the conference of Ambassadors of the Allies held Apr. 14, 1922, there was adopted a prohibition against the construction of airplanes capable of more than $3\frac{1}{2}$ or 4 hours flight and a range of more than 600 kilometers (372.6 miles). This action led to the removal of the well trained technical assistants to foreign countries and the transfer in large measure of designing, supervising, and manufacturing organizations to cities in other countries, but working on German lines and practice. For example, Dr. Junkers became active in Moscow, the Fokker interests were established at Amsterdam, and other leading designers located at other points outside the Empire. Nevertheless, by 1924 Germany was well covered with airplane routes, some of which were maintained in connection with the services from other nations; the line between Berlin and Amsterdam connected with British airplanes regularly carrying passengers to London. The British machines, however, were built to carry nine passengers, while the German machines operating on such routes carried but four or five. In Italy also commercial and military aviation was being developed, though no extensive air routes were planned. Japan too had acquired a number of planes, while in Russia many important developments were in progress, and German designers were aiding the development of both military machines and commercial planes for land travel.

Commercial Flying. After the close of the War, and the period of readjustment involving the demobilization of the air forces of the various powers and the return to peace conditions, the development of civil flying, up to 1924, was confessedly disappointing, notwithstanding the fact that there were numerous improvements and machines of greater capacity, endurance, reliability, and speed were developed. The after-war conditions were in a large measure responsible for the failure to develop civilian flight and the lack of government support made necessary in most cases by necessity for the strictest economy. Furthermore, the general public failed to recognize that aviation had great possibilities outside of its military application.

The United States had developed its air mail to a greater extent than that of any other nation, so that in addition to other lines, on July 1, 1924, it was able to start a through transcontinental mail service on a permanent and scheduled basis. But it was also true that the passenger and parcels express service maintained by American aviation companies was not on as spectacular or methodical a basis as

in Europe. The first American passenger air line service was inaugurated on Nov. 1, 1920, by the Aëromarine Airways, Inc., to operate a daily schedule between Key West and Havana, a distance of about 100 miles, accomplished in a trifle over one hour. This was a private commercial undertaking without government subsidy or support, yet in 1921 this company, whose fleet had increased from three to five 11-passenger flying boats, established lines from New York City to Atlantic City, and also from New York City to Southampton, L. I., and Newport, R. I. In 1922 with its fleet increased to seven 11-passenger boats and nine 4-passenger flying boats, service was established between Cleveland and Detroit, and from Miami and Palm Beach to the Bahamas. By the end of 1923 the Aëromarine Airways in its regular transportation lines carried over 30,000 passengers more than 1,000,000 miles, with only one serious accident. Here the tendency was to establish a regular service with a maximum reliability and safety without making trips under unfavorable weather conditions or taking any chances, however slight.

In 1923 in the United States individuals and companies operating over fixed bases flew 3,014,611 miles, and passengers carried numbered 80,888, the majority of whom paid their passage, whereas in 1921, of 122,512 passengers reported it was doubtful if the majority paid for their transportation. These fixed base fliers gradually were practising business methods and management, and where new lines were established efforts were made to underwrite and guarantee the undertaking by persons most interested.

For the three years, 1921-23, the Aërial Chamber of Commerce of America compiled statistics of fixed base flying which was carried on by an average of 126 fixed base operators with an average equipment of 600 airplanes, of which probably one-fifth were water planes and four-fifths land planes. Altogether 327,510 separate flights were made in this period and 8,767,893 miles were flown, 278,668 passengers carried, and 442,186 pounds of freight transported.

Important as the military and naval situation was in Great Britain, the development of commercial aircraft was important in view of the insular situation and the amount of business with the Continent. At the end of 1923 it was stated that 45,531 passengers had been carried between England and the Continent by air, and 33,362 of these, or 73 per cent of the total, had traveled in British aircraft. There was a constant increase in traffic and in freight, and during the year 1923 a total of 15,137 passengers and over 800 tons of freight had been carried as compared with 12,359 passengers and 477 tons of freight in 1922. The proportion of passengers carried in British machines in 1923 was 79 per cent as against 77 per cent in 1922. In 1923 the average load carried increased to 1200 pounds, representing four or five passengers, and about 270 pounds of freight, whereas in the previous year it was but 810 pounds, three or four passengers, and about 150 pounds of freight. Up to the end of 1923 merchandise representing total of £3,180,319 had been imported and exported by aircraft, British and foreign combined, and in 1923 alone the total value of freight transported exceeded £750,000 sterling. On one single trip five hundred-weight of silver ingots and one ton of furs

were carried by air to France. In 1923 British aircraft engaging in air transport had a record of 943,000 miles flown, equal to about 38 circuits of the globe, an increase of 226,000 miles over the corresponding figure of 1922. In 1922 the London-Paris route which had been in operation since 1919 had a record of 92.5 per cent of flights completed within time limits fixed in the subsidy scheme, while in 1923 the corresponding figure for all routes reached 91 per cent.

After the War, various British air transport companies had sought to maintain foreign routes with more or less indifferent success and with inadequate subsidies but without the development of a comprehensive air policy by the government. There had been four important air transport companies operating under subsidy, and late in 1923 these were combined through efforts of the British Air Ministry so as to meet Continental competition and to develop the British industry. The organization resulting was known as the Imperial Air Transport Company, and it was decided to maintain the old routes, namely London-Paris-Zurich, London-Brussels-Cologne, Manchester-London-Amsterdam, and Berlin-Southampton-Channel Islands. The government granted to this company, which was British owned, a subsidy of £1,000,000 to be spread over 10 years, and stipulated that all aircraft employed were to be British built, registered in Great Britain, and operated by a British staff, and that further experiment and development was to be carried on. The station at Croydon was to be made the world's largest airport and an electric railway spur was to be built direct to the field.

Hazards of Aviation. Progress toward greater safety in civil flying continued, and in the United States in three years from 1921 there were but 470 civilian aviation accidents involving death to 221 persons and injury to 391. Analyses of these accidents show that but 51 occurred to individual or incorporated operators who, having a fixed base, were financially liable and were properly carrying on regular work, and from these 51 accidents death resulted to 25 persons and injury to 40. The observance of a proper safety code and requisite rules for flying provided by national legislation would have obviated many of the accidents, most of which occurred among the "gypsy" or itinerant fliers. Of the 12 fatalities to regular fliers in 1923, five could be properly recorded as marine casualties, since passengers were swept from an aerial boat by the waves after it had alighted safely. In fixed base flying in the United States it was found that for every accident, 171,919.47 miles were safely flown, for every fatality 350,715.72 miles, and for each injury 219,197,325 miles.

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RETURNING TO POINT OF DEPARTURE
WITHOUT FUELING

Duration—(United States) Lts. O. G. Kelly and J. A. Macready, U. S. Army T2, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Apr. 16-17, 1923., 36 hr. 4 min. 34 sec.

Distance—(United States) Lts. O. G. Kelly and J. A. Macready, U. S. Army T2, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Apr. 16-17, 1923. 4050 km. (2516.55 mi.).

Altitude—(France) Sadi Lecointe, Nieuport-Delage, Hispano 800 h.p., at Issy-les-Moulineaux, France, Oct. 30, 1923. 11,145 m. (36,555 ft.).

Maximum Speed—(United States) Lt. A. J. Williams, U. S. N., Curtiss R2C1, Curtiss 500 h.p., at Mitchel Field, Mineola, L. I., Nov. 4, 1923. 429.025 km. hr. (266.59 mi. hr.).

Speed for 100 km. (62.14 mi.).—(United States) Lt. A. J. Williams, U. S. N., Curtiss R2C1, Curtiss 500 h.p., at St. Louis, Mo., Oct. 6, 1923. 392.379 km. hr. (243.81 mi. hr.).

200 km. (124.27 mi.).—(United States) Lt. A. J. Williams, U. S. N., Curtiss R2C1, Curtiss 500 h.p., at St. Louis, Mo., Oct. 6, 1923. 392.154 km. hr. (243.67 mi. hr.).

500 km. (310.69 mi.).—(United States) Lt. Alex Pearson, U. S. A., Verville-Sperry R3, Wright 350 h.p., at Wilbur Wright Field, Dayton, Ohio, Mar. 29, 1923. 270 km. hr. (167.8 mi. hr.).

1000 km. (621.37 mi.).—(United States) Lt. Harold R. Harris, U. S. A., DH4B, at Wilbur Wright Field, Dayton, Ohio, Mar. 29, 1923. 205 km. hr. (127.42 mi. hr.).

1500 km. (932.05 mi.).—(United States) Lt. Harold R. Harris, U. S. A., DH4B, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Mar. 29, 1923. 184.03 km. hr. (114.35 mi. hr.).

2000 km. (1242.74 mi.).—(United States) Lt. Harold R. Harris, U. S. A., DH4B, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Apr. 17, 1923. 183.83 km. hr. (114.22 mi. hr.).

2500 km. (1553.42 mi.).—(United States) Lts. O. G. Kelly and J. A. Macready, Army T2, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Apr. 16-17, 1923. 115.60 km. hr. (71.83 mi. hr.).

3000 km. (1864.11 mi.).—(United States) Lts. O. G. Kelly and J. A. Macready, Army T2, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Apr. 16-17, 1923. 115.27 km. hr. (71.62 mi. hr.).

4000 km. (2174.79 mi.).—(United States) Lts. O. G. Kelly and J. A. Macready, Army T2, Liberty 400 h.p., at Wilbur Wright Field, Dayton, Ohio, Apr. 16-17, 1923. 113.93 km. hr. (70.79 mi. hr.).

In 1923 the International Aéronautic Federation (Fédération Aéronautique Internationale—F. A. I.) announced a new category of records for airplanes refueled in flight before returning to point of departure. These records were subject to ratification by the F. A. I. after the regulations covering this new category had been formulated at the 1924 General Conference in Paris. Up to March, 1924, Lieuts. L. H. Smith, and J. R. Richter, U. S. A. A. S., who had developed an effective method of refueling, at Rockwell Field, Santiago, Cal., on Aug. 27 and 28, 1923, flying in a DH4B plane, made a record for duration of 37 hours, 15 minutes and 48.8 seconds, and for a distance of 5300 kilometers or 3,293.28 miles. In the course of this flight speed records for distances from 100 kilometers to 5000 kilometers were made as follows:

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Distance in kilometers	Distance in miles	Speed km. hr.	Speed mi. hr.
100	62.14	140.96	87.59
200	124.27	142.29	88.41
500	310.69	143.48	89.15
1,000	621.37	144.56	89.92
1,500	932.05	144.53	89.81
2,000	1,242.74	144.01	89.48
2,500	1,553.42	142.78	88.72
3,000	1,863.11	141.17	88.15
3,500	2,174.79	142.17	88.34
4,000	2,485.48	142	88.23
4,500	2,796.16	142.36	88.45
5,000	3,106.85	142.53	88.55

Distance Flights. When Louis Blériot first crossed the English Channel in 1909 in his monoplane the possibilities of long trips over sea were clearly indicated, and naturally transatlantic flight became a goal for aviators which loomed up nearer with the achievements of the military and naval aviators in the War. In May 8, 1919, the United States navy planes NC1, NC3, and NC4, left the naval station at Rockaway, N. Y., for Trepassey Bay, Newfoundland, two of the planes arriving at their desti-

nation the same day, and the NC4, which had been forced down near Chatham, Mass., reached Newfoundland a few days later, after a new engine was substituted. The three planes left Trepassey Bay on May 16 for the Azores, the NC4 reaching Horta, 1250 miles distant, in 15 hours and 13 minutes. The NC4, the only airplane in good flying condition, then proceeded to Ponta Delgada, and on May 27 it flew from there to Lisbon, a distance of 810 miles, in 9 hours and 43 minutes; or for the entire trip across the Atlantic of 2472 miles, an actual flying time of 26 hours and 51 minutes. The next stage was to Ferrol, Spain, and the last was to Plymouth, England, where the flight terminated.

The success of the United States navy expedition lent interest to the attempt of Commander Grieve and Maj. Harry Hawker in a British Sopwith biplane, flying from St. Johns to make a non-stop transatlantic flight, but they were forced down 1000 miles from their starting point and rescued by a passing Danish steamer. Engine trouble was responsible for the interruption of the flight. On June 14, 1919, the Vickers Vimy bomber, a bi-motored Rolls-Royce biplane with two 4-bladed propellers, piloted by Capt. John Alcock, who lost his life on December 18 of the same year in a crash in France, and navigated by Lieut. Arthur W. Brown, made a landing at Clifton, Ireland, after a 1960-mile flight in 16 hours and 12 minutes, at an average rate of 120 miles per hour. This trip won the London *Daily Mail* \$50,000 prize for the first non-stop flight across the Atlantic. On Aug. 11, 1919, a Farman Goliath biplane flew from Paris to Morocco with 10 passengers in 16 hours and 20 minutes, a record that was, perhaps, as notable as any at this time and indicated the possibilities of long-distance aviation. Capt. Ross Smith in a Vimy bomber, won a prize of £10,000 by flying from Hounslow aerodrome in England to Port Darwin, Australia, 11,500 miles. This was within the 30 days stipulated, being accomplished in 27 days 20 hours and 20 minutes or from November 12 to December 10. In the United States, Lieut. B. W. Maynard in a DH4, equipped with 400-horse power Liberty motor, flew from New York to San Francisco and return, or 5402 miles, Oct. 8 to 30, 1919.

Transcontinental Non-stop Flight. The first non-stop flight across the United States, making a record for distance 2700 miles in 26 hours and 50 minutes, was successfully accomplished May 2-3, 1923, by Lieuts. Oakley G. Kelly and John A. Macready, U. S. A. A. S., in an Army-Fokker T2 plane, with Liberty engine. In the previous year these aviators had flown from San Diego to Indianapolis, where a forced landing was made, and at Dayton, Apr. 17, 1923, had made an endurance record of 36 hours, 5 minutes, and 20 seconds. The 1923 transcontinental trip was made in the same plane as was used for the other record-breaking flights, but the plane was improved from the original construction and increased gasoline capacity given to it.

Dawn-to-Dusk Flight. An equally notable flight across the American continent was made on June 23, 1924, when Lieut. Russell L. Maughan, U. S. A. A. S., in a Curtiss pursuit plane (Type PW8, 1924) with a 400-horse power Curtiss DI2 engine and supplementary fuel tanks, accomplished a dawn-to-dusk trip from Mitchel Field, N. Y., to Crissy Field, San Francisco, making the 2700 miles in a total elapsed

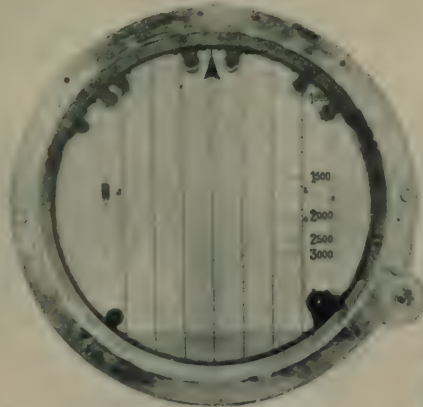
time of 21 hours, 44 minutes, and in a total flying time of 17 hours, 52 minutes. Lieutenant Maughan divided his trip into six stages. This flight demonstrated the ease with which pursuit planes of the United States Army Air Service, numbering but 25 in 1924, could cross the continent from coast to coast in time of emergency, traveling at an average flying speed of approximately 150 miles per hour.

Around-the-World Flights of 1924. In 1924 a number of important attempts to fly around the world were organized, and representatives of the United States, Great Britain, and France started on carefully organized trips, meeting with varying degrees of success, but all contributing to the development and knowledge of the conditions of long distance flying. On Mar. 17, 1924, the United States Army Air Service started its flight around the world with an itinerary measuring between 25,000 and 26,000 miles. This flight started at Santa Monica, Cal., and extended north to Seattle and thence along the coast to Alaska, thence to Japan, from which it was continued to China, India, and the Mediterranean. Extensive preparations had been made for this trip, and the airplanes and engines employed were all American in design, material, and construction, built by the Douglas Company of Santa Monica. The fuselage was made in three detachable sections of steel tubing and divided into an engine section, a middle section, and a rear section. The wings were of standard box beam and built-up rib construction. The upper wing was made in three panels, while the lower wing was made in two. These wings could be folded so that they required but small storage and shipping space. A vertical fin and a horizontal stabilizer were made of standard I-beam and built-up rib construction, while the elevator and rudder were of steel tubing. The axles were of alloy steel tubing, heat-treated after fabrication. For the struts steel tubes were used, streamlined with wood, and the water landing gear consisted of wooden floats of built-up wood construction; the top covering was of three-ply veneer and the bottom of two-ply mahogany.

These world cruisers were biplanes and were designed to serve interchangeably as land and seaplanes, depending on the landing gear. The cruiser, when fitted as a seaplane, weighed, empty, 5100 pounds, and could carry a load of men, equipment, gasoline, fuel oil, etc., of 2615 pounds, making its gross weight 7715 pounds. As a land plane with the landing gear shown in the accompanying plate it weighed, empty, 4300 pounds. With the same load mentioned it would weigh 6915 pounds, so that it would have faster speed. In either case there would be a gasoline capacity of 450 gallons. As a seaplane there would be a wing loading of 10.9 pounds per square foot, and as a land plane of 9.7 pounds per square foot. As a seaplane the load would amount to 18.3 pounds for each horse power, and as a land plane 16.3 pounds per horse power.

The Liberty engine was of the usual 400-horse power type. The wing span for both the upper and lower wings was 50 feet, while the span of the airplane with the wings folded was 20 feet 2 inches. The height over all was 13 feet 7 inches, and the length over all was 35 feet 6 inches. When rigged as a seaplane the world cruiser could attain a normal altitude of 7000 feet and fly at a normal maximum speed of 100

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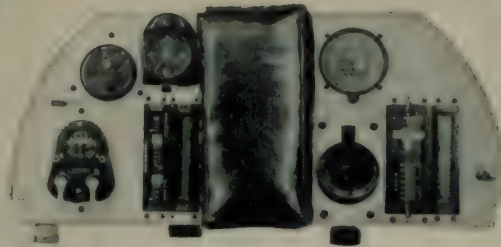
Drift Indicator



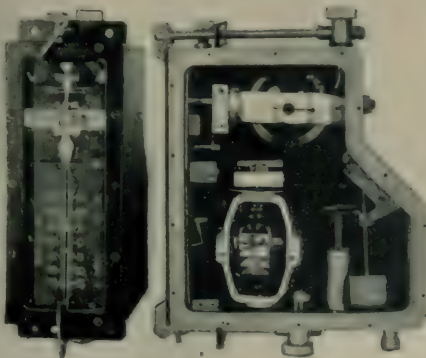
Compass



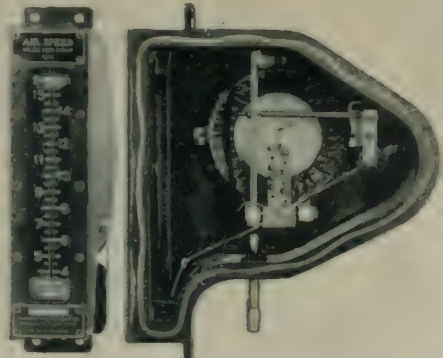
Sextant



Airplane Instrument Board



Flight Indicator



Airspeed Indicator

OFFICIAL PHOTOGRAPHS, UNITED STATES ARMY AIR SERVICE

AIRPLANE INSTRUMENTS

As used on the United States Army Air Service Airplanes in the Around-the-World Flight, 1924

miles per hour, with a landing speed of 35 miles an hour. With the lighter equipment of a land plane it could climb to 10,000 feet, fly 103 miles an hour, and land at a speed of 53 miles per hour. For the round-the-world flight 15 extra Liberty engines were distributed along the route, and 200 per cent replacements in the airplanes were made available. Where long over-water flights were scheduled, 14 extra sets of pontoons were held in readiness. The first part of the flight was made to Seattle with incidental stops en route, and on April 6, the four world cruisers officially started from Seattle flying to Prince Rupert, B. C. On April 10 they proceeded to Sitka, Alaska, and on April 13 they flew directly to Seward. Three of the ships flying from Seward reached Chignik, a distance of 450 miles, but Major Martin's plane failed to arrive, and the expedition was temporarily checked. Bad weather and other difficulties also delayed the flight in Alaska. On May 10 word was received that Major Martin and Sergeant Harvey had safely reached Port Moller, an isolated point on the Bering Sea shore of the Alaskan Peninsula. They had crashed into a mountain in a fog at 12.30 A.M. on April 30, on their way from Chignik to Dutch Harbor. The ship was a total wreck, but the aviators were able to reach safety and were brought back to the United States on May 9.

The remaining three cruisers, under the command of Lieut. Lowell H. Smith, flew on May 9 from Nazan to Chicagoff on the Island of Attu, a distance of 530 miles, which marked the completion of the first of the seven divisions into which the grand journey of 27,000 miles was divided. On June 3 Lieutenant Smith, who with the squadron had successfully reached Japan, was designated permanent commander of the flight, on the personal request of Maj. Frederick L. Martin, who had returned to the United States after the accident to his plane in the Alaskan mountains. On June 26 the American aviators were at Calcutta, where wheels were substituted for floats, motors changed, and new wings fitted. The squadron had accomplished some 12,000 miles, or almost half way around the world. Leaving Calcutta on July 1, they flew across India and on to Constantinople. On July 13, they left Bucharest, and with a stop for luncheon at Budapest, reached Vienna at 3 P.M. Leaving Vienna the following day, they arrived at Paris in time to participate in the observance of the French national holiday commemorating the Fall of the Bastille. London was reached on July 16. The following day Brough was reached, and after repairs departure was made for Kirkwall. On August 2, Lieutenant Nelson made Hornafjord, but Lieutenant Wade was forced down by motor trouble and his plane wrecked.

British World Flight. The British world flight began on March 25 under the command of squadron leader Maj. A. Stuart Maclaren, R.A.F., with flight officer W. N. Plenberlieth as pilot. The airship *Vulture* was selected to make the trip. On April 23 Major Maclaren reached Karachi, India, completing the first of the five divisions into which the British globe circling route was divided. The total distance flown was 4890 miles, and Major Maclaren, by long-distance fast flying, was able to make up his schedule, notwithstanding two weeks lost at Corfu for replacement of engine.

Reaching Calcutta, Major Maclaren proceeded to Akyab in Burma, where he arrived on May

21, but on May 24, he crashed in the harbor of Akyab when he was about to proceed to Rangoon. This accident probably would have led to the abandonment of the flight, but a spare airplane which had been sent to Hakodate, Japan, was forwarded to Akyab by two American destroyers and made it possible for Maclaren on June 25 to resume his flight, the next stage of which took him to Rangoon, Burma. Leaving here on June 28 he flew to Bangkok, Siam, whence on the following day he proceeded to Haiphong in French Indo-China. Hong-Kong was reached on June 30, and on July 3, after a stop at Foochow, Shanghai was made. On July 4, Major Maclaren flew across the Eastern Sea to Kagoshima, Japan, and on July 6, he made Kushimoto after a forced landing at Susami to refuel. He landed in Lake Kasumi near Tokyo on July 7. On July 13 Major Maclaren left Kasumigara and reached Minato. Proceeding by several stages, West Kamchatka was reached on August 1, but leaving here the plane was wrecked on the following day and the flight abandoned, as no more planes were available.

French Expedition. The French Paris-to-Tokyo expedition, which consisted of Lieut. Peltier d'Oisy, pilot, and Sergeant Vesin, mechanic, left Paris on April 24, arriving in Agri, India, on May 3, and flew thence to Calcutta, making the 850 miles in 6½ hours. This gave a flying time from Paris to Calcutta of 51 hours and 55 minutes, and a total elapsed time, for 6300 miles distance, of 12 days. Hanoi, the capital of French Indo-China, was reached on May 13, and a new 400-horse power engine was substituted, notwithstanding the fact that the original engine had served the fliers without any trouble for 900 miles and doubtless would have held out until Japan was reached. On May 18 their departure was made from Hanoi, and 620 miles to Canton, in southern China, was accomplished in 5½ hours, most of the time in heavy rain. Captain d'Oisy unfortunately smashed his plane on May 20 in landing at Shanghai, China, but the Chinese governor presented him with a Breguet plane in which he flew to Peking, a distance of 650 miles. From Peking, Captain d'Oisy proceeded to Mukden in Manchuria, and on the following day he flew from Mukden to Pingyang in northern Korea, and then crossing the Korean Strait on June 8, reached Japan. The flight terminated at Tokyo. It was notable as the first trip of the kind, extending from Paris, France, to Tokyo, Japan, a distance of 11,000 miles.

Air Mail. One of the earliest suggested applications of the airplane was to the transportation of mail and small packages where time was an important consideration. This was attempted spasmodically before the War, and during that conflict airplanes were employed to transmit dispatches and various articles or small freight. In the United States during the War, there was inaugurated, on May 15, 1918, a regular air mail service between Washington and New York, which functioned for a year with a performance of 92.73 per cent, carrying 7,720,840 letters with revenues from the sale of airplane mail stamps amounting to \$159,700 as against a cost of service of \$137,900.06. This air mail was started by the United States army aviators, but on Aug. 10, 1918, it was turned over to the Post Office Department, by which all such activities were subsequently conducted. On May 15, 1919, the Cleveland-Chicago air route was established,

and on July 1 of the same year New York and Cleveland were connected, the combined service making possible a substantial reduction of the time of transmission for letters between these centres, enabling them to catch mail trains, or advancing them over mail-train time. On July 18, 1919, the rate on airplane mail was reduced to \$.02 an ounce, the regular first class rate; from that time, the air mail was on the same basis as other means of transportation. In Europe also a beginning was made in aerial mail service, and during the British railway strike of 1919, mail was carried by airplane. The first regular French aerial postal service was inaugurated, Nov. 10, 1919, when mail was transported to England from Bourget, near Paris, and service was maintained between that place and Hounslow near London. On longer and shorter routes air mail lines were established.

On Sept. 8, 1920, the first transcontinental mail left Mineola Field near New York City, reaching Marina Field near San Francisco on September 11. This was made possible by the establishment of definite routes or stages with dépôts at the change points, and while through mail was not carried as a regular thing, the ordinary mail was advanced wherever possible.

In 1923 United States mails were carried under contract between Seattle and Victoria, B. C., on Puget Sound; from New Orleans, La., along the coast by the Gulf Coast Air Line; and in Alaska between Fairbanks and McGrath, where the airplane was given a thorough and successful test in competition with dog sleds for the transportation of local mails.

The transcontinental mail service at first was not a through service but aimed to advance the railway mail over the various stages and thus cut down the actual time of transportation materially. So regular and reliable was this service that in the week ending Aug. 25, 1923, tests were made showing the practicability of a direct 28 hour service between the Atlantic and Pacific coasts by relays of mail planes flying both day and night over a distance of 2680 miles. These night flights, which made continuous movement of the mails possible, were made on the specially equipped and lighted airway between Chicago and Cheyenne, and it was shown conclusively that direct service between New York and San Francisco could be maintained as soon as authorized by Congress, which action came in the following year. The experience and developments of the United States postal air service demonstrated that in commercial flying all meteorological obstacles except fog had been overcome.

Under authority provided by Congress in the spring of 1924 the Postoffice Department was empowered to establish a transcontinental mail which would permit direct transportation from the Atlantic to the Pacific Coast. For this service there was established a graded charge ranging from \$.08 to \$.24, the country being divided into zones, as from New York to Chicago, Chicago to Cheyenne, and Cheyenne to San Francisco. The airplanes used in the test flights of 1923 to determine the feasibility of a regular through mail service from coast to coast used night flying for this service along with special planes of new types. The illuminated airways were available for regular mail work, which was begun on July 1, 1924, on a basis indicated in the accompanying plate.

STATISTICS OF U. S. AIR MAIL

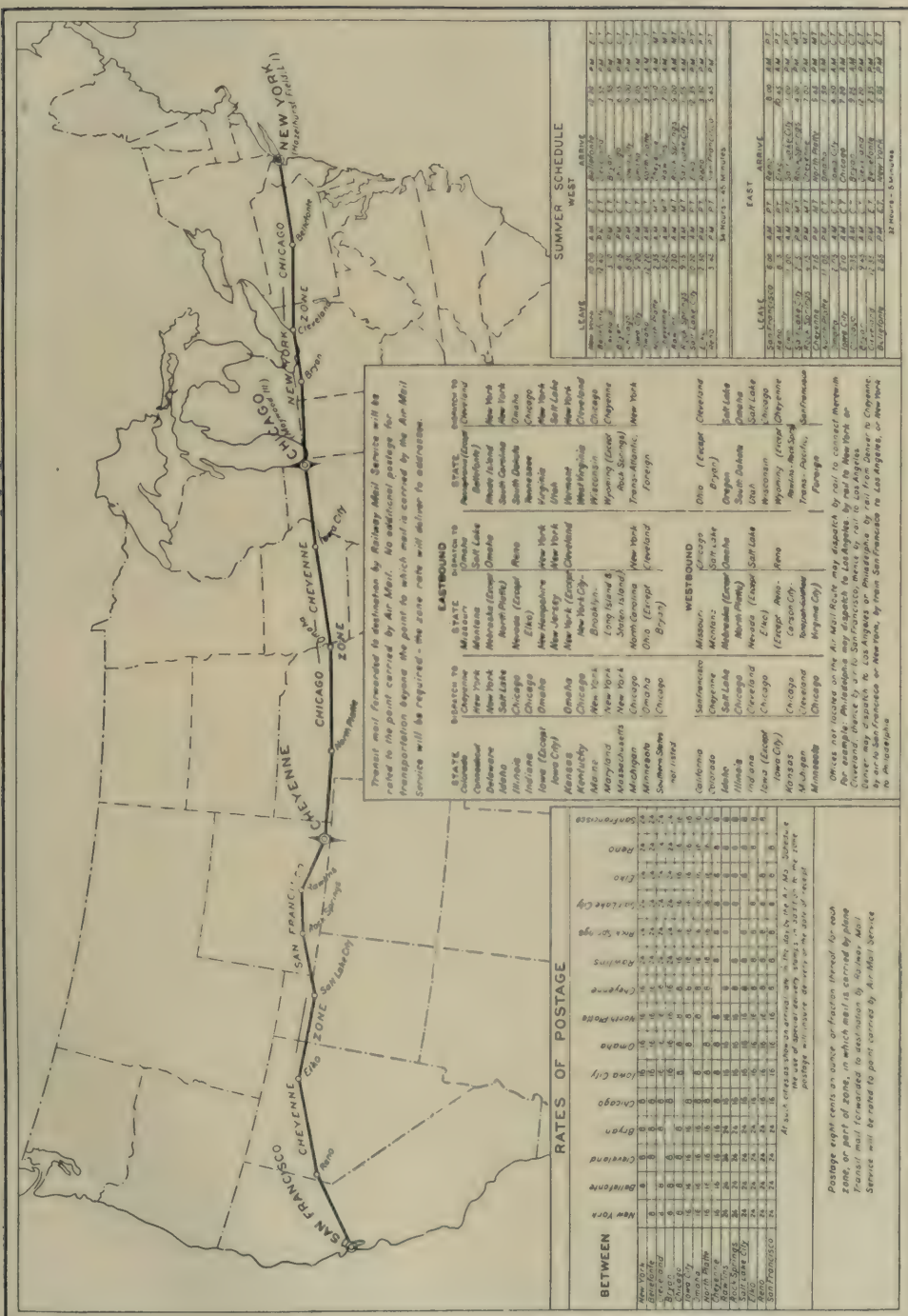
	1923	1918-1923 (inclusive)
Trips scheduled	8,072	33,060
Trips defaulted	225	2,157
Trips attempted	7,847	30,903
Trips incompletd	111	984
Trips in fog, storm, etc.	3,745	12,118
Trips in clear weather	4,102	18,806
Miles scheduled	1,603,110	6,717,422
Miles flown with mail	1,545,280	6,168,395
Miles, testing and ferry	325,142	983,850
Total miles flown	1,870,422	7,152,245
Percentage of performance	96.37	91.82
Number of letters carried	65,295,920	225,769,520
Cost of service	\$1,910,422.54 *	\$6,204,643
Forced landings:		
Mechanical	175	1,549
Other	527	7,041

* Includes experimental flying at night.

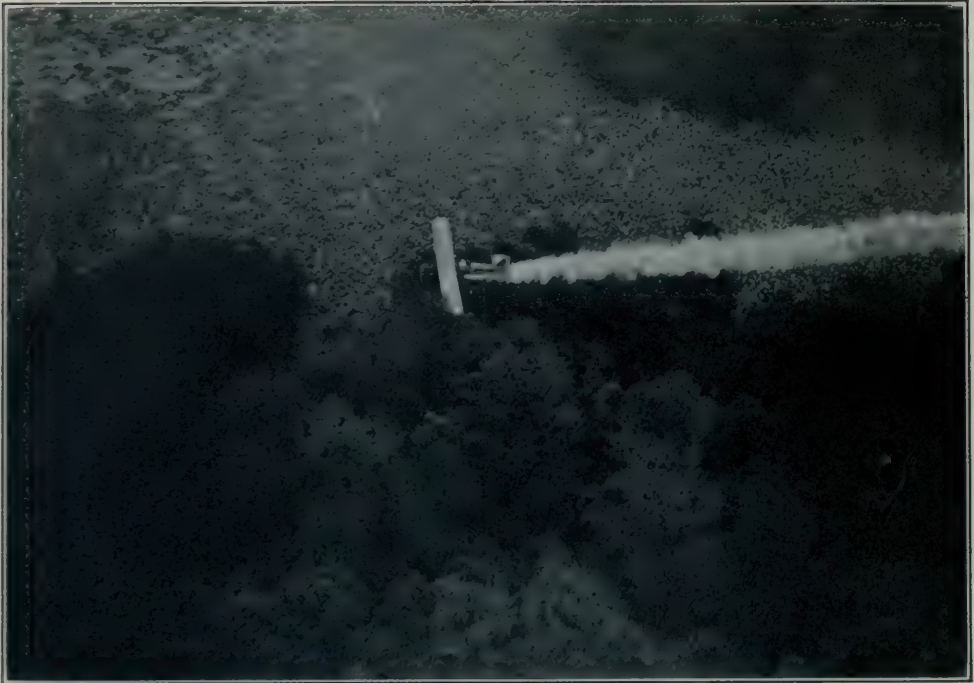
Aerial Photography. During the War the observers in airplanes flying over the enemy lines very early proceeded to take photographs which gave an adequate representation of the terrain below. These photographs were very valuable both to the high commands and to the fire control officers of the various batteries, and it did not take long to develop the work on a systematic basis as a means of adding to the information contained on the military maps. After the close of hostilities it was realized that photography from airplanes had valuable scientific and commercial applications, and accordingly a number of the government bureaus proceeded to employ airplanes and photographers in coast and topographical surveys and mapping for rapid reconnaissance examinations of new country. It was found also that photographs made from airplanes afforded an extraordinary picture of a wide range of territory, and in addition to maps and topographic studies such photographs of water fronts, terminals, factory sites, and other similar objects for industrial uses in connection with engineering and construction purposes were in increasing demand. Substantial improvements were made in the apparatus, and a new film magazine was designed which permitted aerial enlargements on a more efficient basis. There was also developed in 1922 what was known as a hypersensitized panchromatic film several times faster than the film first used, and this contributed to the success and character of the pictures. One of the best of recent airplane views is shown in the plate accompanying the article NEW YORK.

The government coast surveys after some comprehensive tests reported that shore lines could be mapped accurately and expeditiously and shoals and sunken obstructions readily detected by such means. The United States Coast Survey employed photographic surveying on the New Jersey coast, at the mouth of the Mississippi River, on the Olympic Peninsula in Washington, and elsewhere. A map of Guantanamo Bay was prepared for the United States Hydrographic Office, while extensive aerial surveys were made in connection with conservation and irrigation projects. In Canada a reconnaissance survey of considerable accuracy was carried on at slight expense and with considerable speed on the boundary between northern Manitoba and Saskatchewan. Similar surveys also were made in India, while in new country generally such work

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OFFICIAL PHOTOGRAPH, UNITED STATES ARMY AIR SERVICE

Spraying Swamps from an Airplane to kill Mosquitoes



OFFICIAL PHOTOGRAPH, UNITED STATES ARMY AIR SERVICE

Airplane Spraying Cotton to Kill Boll Weevil

USE OF AIRPLANES IN AGRICULTURE

has proved useful and economical. Furthermore on a smaller scale topographic surveys or aerial photographs are now made of cities or suburban districts; these show the landmarks and divisions with great faithfulness and accuracy and aid materially in any scheme of city planning. For city mapping aerial surveying found constantly increased use; and in 1923, 620 square miles of Greater New York were mapped photographically, while in addition extensive surveys of similar nature were made in connection with the port developments.

The advertising value of photographs and maps made from the air was early recognized, especially in connection with the sale of real estate and land development, to afford an adequate idea of the character of large industrial plants and extensive tracts of lands. Quite different from this, was the advertising known as "sky writing." Here aviators would discharge smoke-producing compounds from flying planes so as to make letters in the sky, spelling the name of some product to which public attention was to be called. Aircraft were also used to carry aloft at night illuminated signs attached to the under side of the wings.

Other Applications. In the United States the various government agents were quite willing to make extensive experiments with the airplanes for various purposes when the machines could be placed at their disposal. The Department of Agriculture carried on some notable experiments to combat various insect pests, in which powdered calcium arsenate was distributed over cotton plants from an airplane flying at heights of 25 to 50 feet. This dusting of the cotton plants with the calcium arsenate worked effectively to destroy the boll weevil and was found very practical. (See PLANTS, DISEASES OF.) The gypsy moth was attacked in somewhat similar experiments carried on with a motor balloon, while in the Philippines a plague of locusts was handled in the same manner. Not only in surveys but in crop reporting, aircraft were used extensively and afforded a rapid and convenient method of obtaining information as to the extent and condition of crops. The patrol of the forests by airplanes during the dry season, as in some of the Pacific States, proved a very efficient way to detect incipient fires; a report by radio telephone would immediately bring the matter to the attention of the nearest forest ranger or fire fighting force.

International Aeronautic Federation. On Oct. 14, 1905, the International Aeronautic Federation (Fédération Aéronautique Internationale, F.A.I.) was formed, for the purpose of recording aeronautic performances throughout the world and soon became the sole international authority in aeronautic sport. The authority of this body in aeronautic sport and technical matters was recognized and duly enforced by national aero clubs or aeronautic associations of the following countries in 1924: Argentina, Austria, Belgium, Brazil, Chile, China, Czechoslovakia, Denmark, Finland, France, Great Britain and Ireland, Italy, Japan, the Netherlands, Norway, Poland, Portugal, Rumania, Serb-Croat-Slovene Kingdom, Spain, Sweden, Switzerland, Uruguay, and the United States. The headquarters of the F.A.I. are in Paris, France. Its representative in the United States is the National Aeronautic Association.

National Aeronautic Association. On Oct.

12, 1922, the National Aeronautic Association was formed at Detroit, principally to "foster, encourage and advance the science of aeronautics and all kindred and allied sciences." This national body maintained its headquarters at Washington, D. C., and took over the function formerly exercised by the Aero Club of America as the national representative of the International Aeronautic Federation, transmitting to the headquarters of that body for approval records and other matters requiring international sanction.

Aeronautic Chamber of Commerce. In 1921 there was also established with headquarters in New York City the Aeronautic Chamber of Commerce of America, made up of persons, firms, and corporations engaged in the business of manufacturing, buying, selling, and dealing in aircraft motors and aircraft parts and accessories of every kind, and to advance in general aeronautical industry and commerce. In addition to various activities of a purely commercial nature, this organization in 1919 began the publication of *Aircraft Year Books*, authoritative annuals which soon established themselves as invaluable to the student of aeronautical progress and to which this summary is indebted.

Bibliography. Since 1914 the literature of Aeronautics has been increased by a number of notable works dealing with theory and practice. Both military aeronautics and the engineering and constructive sides are treated in the following representative books: Loening, *Military Aeroplanes* (Boston, 3d ed., 1916); Muller, *Manual of Military Aviation* (Menasha, Wis., 1918); Pagé, *Aviation Engines* (New York, 2d ed., 1919); Rathbun, *Aeroplane Construction and Operation* (Chicago, 1919); United States Navy, Bureau of Navigation, *Courses of Instruction and Required Qualifications of Personnel for the Air Service of the Navy* (Washington, 1916); Fales, *Learning to Fly in the United States Army* (New York, 1917); Hayward, *Practical Aviation* (Chicago, 1919); Shaw, *A Textbook of Aeronautics* (London, 1919); Williams, *The Dynamics of the Airplane* (New York, 1921); Chadwick, *Aviation Engines* (New York, 1919); Chatley, *A Textbook of Aeronautical Engineering* (3d ed., London, 1921); Wilson, *Aeronautics* (New York, 1920); Cowley, *Aeronautics in Theory and Experiment* (2d ed., London, 1920); Wiener, *Flieger Kraftlehre* (Leipzig, 1920); Vivian and Marsh, *A History of Aeronautics* (London, 1921); Mitchell, *Our Air Force* (New York, 1921); Raleigh, *War in the Air* (vol. i, Oxford, 1922); Sykes, *Aviation in Peace and War* (London, 1922); Fuchs and Hopf, "Aerodynamik" in *Handbuch der Flugzeugkunde Band 2* (Berlin, 1922); Hurt and Laidler, *Elementary Aeronautical Science* (Oxford, 1923). An important technical work based on sound experimentation was the record of the Göttinger Aerodynamic Laboratory, *Ergebnisse der Aerodynamischen Versuchsanstalt zu Göttinger*, edited by Dr. L. Prandtl in collaboration with C. Wieselsberger and Dr. A. Betz (2 vols., Munich and Berlin.)

Much valuable material is to be found in the *Technical Notes* of the National Advisory Committee for Aeronautics, published from time to time by that body at Washington, D. C.

Annuals. *Aircraft Year Books* annual beginning with 1919 (New York). A valuable summary of the world's progress and invaluable

in its discussions of American developments; Jane, *All the World's Aircraft* (London).

Periodicals. *International Aéronautics* (New York); *Aviation* (New York); *Aéronautical Digest* (New York); *Society of Automotive Engineers Journal* (New York); *U. S. Air Service* (Washington, D. C.); *National Aéronautical Assn. Review* (Washington, D. C.); *The Royal Aéronautical Society Journal* (London); *Flight* (London); *The Aéroplane* (London); *L'Aéronautique* (Paris); *L'Aéroplane* (Paris); *Bulletin du Fédération Aéronautique Internationale* (Paris); *La Technique Aéronautique* (Paris); *L'Indicateur Aérien* (Paris); *Revue de l'Industrie Automobile et Aéronautique* (Paris); *Technique Automobile et Aérienne* (Paris); *Revue juridique internationale de la locomotive aérienne* (Paris); *L'Air* (Paris); *La Conquête de l'Air* (Brussels); *Luftfahrt* (Berlin); *Zeitschrift für Flugtechnik und Motorluftschiffahrt* (Berlin); *Illustrierte Flug-Woche* (Leipzig); *Wissenschaftlichen Gesellschaft für Luftfahrt, Berichte und Abhandlungen* (Munich); *Flugsport* (Frankfurt). See INTERNAL COMBUSTION ENGINES; PHYSICS; STRATEGY AND TACTICS.

ÆSTHETICS. In this as in most other sciences of man, the empirical and the metaphysical are so intermingled that scarcely a writer can be found who does not at one point or another confound the two. The modern tendency is to reject metaphysical interpretations and to concentrate upon the positive scientific aspects of problems, but more often than not this praiseworthy approach, because it is unaided by any philosophic analysis of the concepts involved, results in metaphysical dogmas baptized in the name of science. All of these contain much empirical truth; but this truth, when generalized out of its proper context, becomes an obstacle to further truth. With this word of caution, a survey may be attempted of the flux of æsthetic theories since the beginning of the War. In this period the philosophic school was represented by Bosanquet and Croce. Both of these men, with somewhat varying viewpoints, made the idea of the beautiful into a *drapeau* or standard around which to orient much if not all of the activity of life. Bosanquet stressed chiefly the Greek notion of contemplation, in which the finite being finds a brief but ineffable union with the eternal and the absolute. Croce's conception reflected more the dynamic and active aspect of æsthetic experience; he made all art and even the enjoyment of art consist in the expression of an intuition. This intuition, it may be explained, is really nothing more than the act of judgment or perception in so far as it affirms, perceives or creates a unity. The æsthetic experience, according to both Bosanquet and Croce, is created by the perceiving subject; created entirely, according to Croce; created by the mind in an act of union with a reality which he does not completely control, in the more Platonic conception of the British philosopher.

The philosophic view of æsthetics deliberately ignores the more empirical problems as to what makes a specific object beautiful. This line of attack has been taken up by the psychologists and sociologists of æsthetics. In psychology the effort was made for a long time to run down the æsthetic experience by experimentally confronting the state of mind with the laboratory stimulus which a subject was so indiscreet as to call beautiful. This method yielded no results of

any consequence. Out of this approach, the notion of empathy, what the Germans call *Einfühlung* or sympathetic attribution of qualities to an object, alone has survived. Researches into the psychology of æsthetics have been continued along more literary, less rigidly experimental lines. Among those who worked in this field may be named Langfield, Marshall, and C. K. Ogden.

The sociological approach to æsthetics was prevalent in the writings of the French æstheticians. What they attempted to do was to treat æsthetic phenomena in much the same way that modern scholarship treats moral and religious customs, as a function of the changing society. This approach has yielded more results in connection with literature and architecture than with the fine arts. We come here to the question of *motifs*, which are the carriers, as it were, of the æsthetic emotion. There can be no doubt that these *motifs* are responsive to social changes. A corollary more or less improperly deduced from this fact is that art and literature should be used as vehicles for social and moral propaganda. This view was largely championed by political radicals and others interested in morally reforming or revolutionizing society. In Soviet Russia, it may be noted, the revolutionary conception of art and culture was carried to an extreme. The attempt was made to create a special culture representative of the proletariat—the so-called *proletkult*. The absurdity of the programme became apparent even to such men as Trotsky, who in 1923 threw all his influence against the movement. In times of social stress, it is also to be expected that art would be used as an agent for the conservation of values. This tendency was manifested in practically all countries. In America the group headed by Irving Babbitt, Paul Elmer More, and Stuart P. Sherman expounded a certain variety of classical humanism, which was to serve as a bulwark against the subversive influences of social romanticism. In France the jealous courting of the muses by rival social factions was to be seen in the clash of the *Action Française* group with the writers of advanced opinions affiliated with the *Clarté* movement. From a reaction against the attempts to drag æsthetics into the politics of the right and the politics of the left developed a recrudescence of the ivory tower conception of art. The *Creed of an Æsthete* was loudly proclaimed in England and America by such men as Clive Bell and Leo Stein. Such manifestoes were met by the iconoclastic fire of Bernard Shaw, who knew better than most radicals how to synthesize art and social idealism without disobeying the dictates of good sense. An interesting sidelight on the philosophic aspects of this problem is provided in a prize memoir submitted by Charles Lalo to the French Academy of Moral and Political Science. To the question whether art can emancipate itself from morality, M. Lalo replied that they ought to live together in Platonic friendship. The union is difficult, but it is also necessary and unavoidable.

No exposition of modern æsthetics can be regarded as complete without a discussion of psychoanalysis. The doctrines of psychoanalysis contain gleanings from a number of philosophies. In their emphasis on the will to live and the expression of the unconscious they are linked up with Nietzsche, von Hartmann, Schopenhauer, and their various intellectual ancestors. But besides these conscious philosophical elements,

there is in psychoanalysis a subconscious tendency, to use a Freudian term, to view all things from the point of view of the psychiatrist. The therapeutic value of art was recognized as early as the days of Aristotle; in a vaguer manner the relation of art to the pathological expressions of the sex instinct was also perceived. The distinct and daring originality of psychoanalysis lies in the fusion of these scattered intuitions into a more or less coherent system. Art, according to Pfister's version of psychoanalytic doctrine, is the expression or sublimation of inhibited tendencies. By the act of objectification, the artist gets relief from his emotional sufferings. This theory at once accounts for the prevalent preoccupation of art, particularly the literary arts, with sexual themes; for there is no doubt that in civilized society, it is the sex instinct rather than the food and shelter instinct which because of its imperiousness must needs be restrained.

From the point of view of the psychiatrist, who must take the biological categories for granted, it is inevitable that art should be regarded as a biological safety-valve. But this is obviously not the whole story. The instincts and tendencies which the psychiatrist accepts as given, the philosopher would call into question. Freud himself, when in his philosophic moments he transforms all tendencies into derivatives of the great *Libido*, becomes a metaphysician, and as such must take all the risks of metaphysics. The *Libido* cannot have a concrete sexual signification; it becomes the *Eros* of Plato, the *will to live* of Schopenhauer, the *intellectual love of God* of Spinoza. But these conceptions are beyond the realm of empirical science, although they make the shortcomings of that science comprehensible.

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AFFLECK, SIR JAMES ORMISTON (1840-1922). A distinguished consulting physician and extramural teacher of clinical medicine of Edinburgh. He was educated at Edinburgh University and associated during most of his medical career with the Edinburgh Royal Infirmary and the Longmore Home for Incurables, of which he was co-founder. He was an authority on eruptive fevers. Besides being an ex-

aminer in medicine at Edinburgh University, he was medical editor of the ninth edition of the *Encyclopædia Britannica*. He was a Fellow of the Royal College of Physicians of Edinburgh (1875) and was knighted in 1911.

AFGHANISTAN. An independent monarchy of Central Asia bounded by British India on the South and East, Persia on the West, and Russian territory on the North. The southern boundaries, long undetermined, were fixed by a convention with Great Britain in 1921. The total area is estimated at 245,000 square miles; the population at 6,380,500. The dominant racial element was the Afghan, which embraced Islam, and the leading languages were Persian and Pushtu. The capital, Kabul, had an estimated population of 150,000. The other large cities were Kandahar (31,500) and Herat (20,000). The activities of the Afghans continued to be centred in the plains and valleys, and agricultural and grazing products were the chief support of the country. Copper and lead were reputed to be found in the northern districts, though no extensive mining was carried on. Gold mines were worked under the British at Kandahar. The trade was chiefly carried on with India and Bokhara. The exports into India included timber, fruits and vegetables, grain, silk, cattle, hides, tobacco, asafœtida, and particularly wool. The articles imported from India included cotton goods, indigo and other dyes, sugar, hardware, and silver treasure. In 1917-18 the Indian statistics reported for this trade exports into India of £1,147,000; imports from India, £1,258,000; for 1920-21, exports, £1,328,500; imports, £1,543,200; for 1921-22, exports, £809,500; imports, £1,353,700. No large improvements were made in the modes of transportation, and Afghans still resorted to camel and horseback. Intercourse was somewhat furthered by the establishment of telephone communication between Kabul and Kandahar, Jaka and Jalalabad. Under the Amir Habibulla, motor roads were constructed for short stretches, principally from Kabul to Kandahar, and from Kabul to Dakka.

In the period 1914-24, Afghanistan played a part in Central Asiatic affairs that seemed hardly warranted by its isolation geographically and its backward state economically. Its position between Russia and India and the fact that it remained one of the few countries still preserving the spirit of militant Islam enhanced this importance. Afghanistan, during the decade, was thus courted assiduously by Russia, Great Britain, and Turkey in turn. The friendly relations that the British government of India had maintained with Afghanistan since 1907 served the Allies in good stead during the War. With the outbreak of hostilities in 1914 the British succeeded in securing a pledge from the Amir Habibulla Khan, that his country would observe a strict neutrality. The Amir's position became increasingly difficult with Turkey's entrance on the side of Germany for attempts were made by German and Turkish officers and Indian nationalists to preach a Holy War. The Amir successfully kept the Afghans aloof from the struggle, and as a result of his activities in checking the unruly frontier tribes he earned the lasting gratitude of the British Indian government. Unfortunately for Great Britain's peace, Habibulla was assassinated on Feb. 20, 1919. His successor, Amanullah Khan (the third son of the late Amir), at once proclaimed the

external independence of the country and attempted to establish relations with the Soviet government at Moscow. An Afghan army was dispatched to the Indian frontier in May, 1919, and but for the prompt action of the British might have caused serious disaffection among Indian Moslems. Fighting with irregular Afghan troops continued until the signing of peace in August, 1919. As a result of the Anglo-Afghan treaty, Afghans were denied the privilege of importing arms through India; the Amir's demand for the payment of the arrears of the national subsidy was refused; and the subsidy was entirely discontinued. On the other hand the treaty freed Afghanistan from its dependence upon the British government for its external policy, and left the country free in both its domestic and international relations. The awakening interest of Soviet Russia in eastern affairs served further to complicate matters. A Soviet mission from Moscow arrived at Kabul in January, 1920, and negotiated a treaty which caused the British Indian government grave concern. This document, signed at Moscow on Feb. 28, 1921, provided for the establishment of five Russian consulates in Afghanistan, several of them to be near the Indian frontier; it recognized the independence of Bokhara and Khiva, and promised the Amir a yearly subsidy of one million gold rubles to replace the discontinued British grant. The Russians also pledged themselves to construct a telegraph along the line of Kusha-Herat-Kandahar-Kabul. This new Afghan temper was further encouraged during this period by the activities of the Turkish Nationalists, who signed with Afghanistan at Moscow (Mar. 1, 1921) an offensive-defensive treaty; by the penetration of Bolshevik propaganda into Persia, by the political disorders in India, the reappearance of a Pan-Turanian propaganda, especially in 1923, and by the ever-recurring question of the political independence of Islam under the Turkish Algir. Djemal Pasha, former Turkish minister, on his arrival at Kabul in November, 1920, was accorded a friendly reception, and his aid was employed in the construction of a powerful military establishment. All these evidences of a changed attitude on the part of Afghanistan that could bode no good for Britain's security in India caused the dispatch of a British mission under Sir Henry Dobbs to the Amir in 1921. The resultant Anglo-Afghan Treaty of Nov. 22, 1921, did not succeed in offsetting the gains that Russia had made. Afghanistan was permitted once more to import arms by way of India and was again guaranteed its freedom and independence. Nothing was said of the former subsidy or the Russian grant. Nor did the Amir indicate any desire to relinquish his policy of neutrality. To aid in the commercial development of the country, Great Britain signed with Afghanistan a trade convention, June, 1923, granting favored transportation and customs rights. The same conciliatory attitude was shown in the tactful protest which the British government sent in December, 1923, when brigands on the border accounted for the slaying of several English nationals.

In 1921 a constitution for Afghanistan was promulgated by the Amir, though the form of government continued autocratic. The Amir reserved for himself the place of prime minister and in fact invested himself with most of the legislative and executive authority. Under the

promptings of European influence compulsory education was decreed, and in January, 1921, slavery was abolished. During the period, hand in hand with the greater nationalistic consciousness went a steady march toward westernization. Roads were built, agricultural methods improved, education and administration were reformed. The faith of Afghans in their own ability was shown by the opening of diplomatic relations with Russia, Turkey, Persia, China, France, and Italy; by the strengthening of the frontier guards, the inauguration of a modern discipline in the army, and the breaking of ground in 1924 for a new capital city. Foreign engineers, too, notably Italians and Germans, were invited in 1924 to take charge of road construction and the building of a railway from Kabul to Daruaman.

AFRICA. A continent of the eastern hemisphere with an estimated area of 11,500,000 square miles, exclusive of islands. Detailed accounts of African developments in the period 1914-24, political, geographic, and economic, will be found under the heads of the separate political divisions. See ABYSSINIA, ALGERIA, EGYPT, MOROCCO, TUNIS, SOUTH AFRICA, etc.

Explorations. During this period, French exploration parties carried on an intensive work in the only region still practically unknown to Europeans, the Sahara. In the eastern Sahara and in the Libyan Desert the expedition under Col. Jean Tilho (1912-17) succeeded in clearing up many doubtful points in hydrography and orography. Some of the achievements of the Tilho expedition were the demonstration of the absence of any connection between Lake Chad and the Nile Basin; the exploration of the Tibesti and Endi mountains through the penetration of a region of 1200 miles previously unvisited, and the discovery of a mountain formation in the Libyan Desert. Exact longitude and latitude determinations of many places were fixed by wireless communication with the Eiffel Tower, and surveys were completed for more than 6000 miles. Similarly Mr. W. J. H. King and Mrs. R. Forbes carried on explorations in the Libyan Desert. In 1919, Captain Augiéras, one of the best known of the African explorers, made public his researches in the western Sahara. He clearly indicated the extent of the central plateau lying between 6° and 9° W. long. and 28° to 31° N. lat. French research was also prosecuted vigorously in the little known Atlas region. Captain Augiéras, in 1920, crossed the southwestern Sahara of Morocco and as a result was able to make many corrections in the surveys of the region, particularly in the Draa plateau. In 1921 Commandant Lauzanne crossed the western Sahara by a journey of 1000 miles, and opened up a new route between western French Africa and Algeria. In 1923, Hassanein Bey crossed unexplored parts of the Libyan Desert, laying his route from Sollum to Siva, Jarabub, Jalo, Kufara, Hawari, across the oases of Arkenu and Oswenat, to the capital of Darfur. In 1922, 1923, and 1924, particularly, French energies redoubled, so that these years saw at work the following expeditions: the irrigation problems of the Niger Valley under Proust, Valude, and Audoin; the collection of fauna and flora of the mountains of the Sahara under Babault; Tunisian ornithology under Balzac; fauna and flora of Central Africa under Bruneau de Laborie. In the Nile Basin, English parties explored the Sobat river system, the country be-

tween Bahr-el-Jebel and Lake Rudolf, and the divide between the Congo and Nile Rivers. In Central Africa, boundary commissions representing the British, Belgian, and Portuguese governments, surveyed the Congo-Zambezi watershed (1911-14), for the more exact determination of frontiers. A French-British commission set to work in 1922 on the determination of the Darfur-Wadai boundary. War operations added much to the knowledge of the whole continent, not only ethnologically but geographically; for this, the airplane was used to advantage. In 1920 a British aviator, flying over the Nile Basin, discovered a hitherto unknown range of volcanic hills north of Khartoum. It is interesting to note that the end of the War saw an awakened interest in scientific and economic research apart from pure geographical exploration. The activities of the French in the Sahara have been alluded to. A British expedition (1919-20) under the Rev. John Roscoe carried on extensive ethnographical investigations in the Uganda. Biological expeditions also figured prominently. A Smithsonian Institute party was maintained in Central and South Africa, covering the Transvaal, Kafue River valley, Lake Tanganyika, and the Budongo forest, for the collection of fauna and flora. One investigator (Mr. L. H. Shantz) gathered 1600 specimens of plants, including forage and nut plants, fruits and vegetables, for introduction into the United States. Similarly, in 1921, Prince William of Sweden in explorations in the regions south and southwest of Uganda, collected 1000 mammals, 2000 birds, and more than 6000 insects. Italian research workers discovered in Eritrea, near the Abyssinian frontier, important bodies of chloride of potash. Finally, in 1922-24, of the many expeditions at work, may be noted the investigation of the ætiology of the tribes in the Mongalla district by an Anglo-Egyptian group and the exploration, for geographical and zoological purposes, of the Central Sahara by the British and Rothchild Museums.

Communications. Hand in hand with the geographical researches went the extension of the means of communication. An Atlantic-Indian Ocean route by water and rail was completed in 1914-15, so that it became possible to travel from west to east by water along the Congo, thence by rail from Kakala on the Upper Congo to Albertville on the west shore of Lake Tanganyika, across the lake by water, and finally by rail from Kigoma to Dar es Salaam on the Indian Ocean. An east-west route along South Africa was similarly completed in 1915 so that Walfish Bay and Delegoa Bay became linked. Along the Cape to Cairo route the progress made was from Ndola on the Belgian Congo frontier to Bukama, a distance of 442 miles (1909-18), and extension of this line along the Lualaba River to a point better adapted for large vessels. Thus it was possible to travel from Cairo to the Cape by rail and water almost completely, except for two breaks of 300 miles, one from Tabora to Mwanza on the Victoria Nyanza, the other between Nimule and Refaj along the Upper Nile. The territorial changes after the War brought the Cape-to-Cairo line wholly within British territory, so that it was evident that the next few years would see the work pressed to completion. Two other general schemes need mention. Railroads were started by the French from Dakar

(Senegal), Konakry (French Guinea), Abidjan (Ivory Coast), and Katonu (Dahomey), with the purpose of pushing all of them into the French Sudan and then uniting all the lines by a single railroad running from west to east. The work was delayed during the War, and the French were slow up to 1924 in taking it up again. The 1924 announcement of a north and south Saharan railway project was even more ambitious. After a spirited domestic controversy the French government announced its acceptance of the Pabatier route which called for a railway line from Arzeu and Oran in Algeria through Tosaye on the Niger to Wagadagu, the capital of Haute Volta in the "Loop" of the Niger. Of this, 112 miles were already built across the Atlas range to Raz-el-Mao; the scheme called for the construction of 2090 miles more at a cost between 1,400,000,000 and 1,700,000,000 francs. (For local railroad construction see under the headings of the separate African countries and territories.) A further development was the use of the airplane as a means of communication and transport. In 1920 two British aviators flew from Cairo to Cape Town, a distance of 5206 miles, in 72 hours of flying time. In the same year a French plane flew across the Sahara from Algiers to Dakar. An interesting experiment was undertaken in December, 1922, when an expedition of five motor cars with caterpillar attachments made a successful journey to about 2000 miles across the Sahara from Tugurt (Algeria) to Timbuktu (on the Niger). The whole trip took only 20 days.

History. The map of Africa, in the period 1914-24, was subjected to many changes as a result of the War. Shortly after the outbreak of the hostilities in Europe, Belgium inquired of France and Great Britain whether they intended to maintain the neutrality of territories in the conventional basin of the Congo, in accordance with the General Act of the Berlin Conference, of Feb. 26, 1885; the German government, likewise, proposed the maintenance of neutrality in this region, on the ground that solidarity of the white race was necessary to preserve European ascendancy in Africa. Great Britain and France, having already begun hostilities against the German colonies, rebuffed the German offer of neutrality, and proceeded, with some aid from the Belgian Congo, to conquer the German possessions. British forces from the Gold Coast and French from Dahomey mastered Togoland in August, 1914, German Southwest Africa was successfully invaded in September, 1914, and occupied before July, 1915, by British South African troops. French and British columns, convergently penetrating Kamerun, completed the conquest of that colony in the spring of 1916, after encountering stubborn resistance. German East Africa, resolutely defended by a small German garrison supplemented by native contingents, was not swept clear of German forces until November, 1917, and then only after an ambitious plan of invasion, designed by General Smuts, had been carried out by British, South African, Indian, and native troops and coöperating Belgian forces. During the War France and Great Britain by secret agreements arranged in advance the partition of the German colonies, and by the Treaty of London (1915) they promised Italy an extension of territory in Africa if they should succeed in carrying out their designs. The Treaty of Ver-

sailles (1919) required Germany to surrender all overseas possessions to the principal allied and associated powers, transferred all German public property in the colonies to the new possessors, exacted reparation for damage done to French nationals by German encroachments in French Equatorial Africa before the War, and compelled Germany to relinquish all former treaty rights in the French protectorate of Morocco. The Treaty further provided that Togoland, Kamerun, and German East Africa should be Class B mandates, with safeguards of native rights and of the open door, whereas German Southwest Africa should belong to Class C, to be administered as an integral part of the mandatory; but the distribution of these mandates was left to the allied powers. A preliminary division of the territories was effected by the Supreme Council on May 7, 1919, as follows: German East Africa to Great Britain; German Southwest Africa to the Union of South Africa; Togoland and Kamerun to be disposed of by Great Britain and France. Subsequently the districts of Ruanda and Urundi, in the northwestern part of East Africa, were assigned to Belgium as mandatory; and the remaining nineteen-twentieths of East Africa, under the new name of Tanganyika Territory, became a British mandate. Of the Cameroons (former Kamerun), about five-sixths went to France, and only a small strip along the Nigerian border to Britain. Togoland was split, France taking almost two-thirds and Britain a little more than one-third. The mandate for German Southwest Africa (now Southwest Africa Protectorate) was formally approved by the Council of the League on Dec. 17, 1920; the Class B mandates for the other German Colonies, divided as described, were delayed until July 20, 1922. Other minor adjustments were made. Portugal recovered a district known as the Kionga triangle, which had been included in German East Africa. In order to insure an unbroken route for the Cape to Cairo Railway, Belgium transferred to Britain a strip of Ruanda-Urundi. Moreover, in fulfillment of the Treaty of London by which Italy had been promised compensation for Anglo-French gains, territorial concessions were made to Italy. Italy had desired territorial additions in French Somaliland (particularly Jibuti); the extension of Tripoli to Lake Chad; rectifications in the Libyan Desert in the neighborhood of the oasis of Jarabaib; and the addition of territory along the Juba River. France ceded to Italy the Ghadames and Trummo districts on the western border of Italian Libya; further than this France would not go. Egypt, at Britain's behest, transferred a long, narrow strip, the Jarabaib region, to extend the eastern frontier of Libya. Great Britain expressed herself in 1919 as willing to make concessions to Italy by additions to Italian Somaliland, but the Italian demand for more territory left the question open. In 1924 Ramsay MacDonald declared for the English government that it, like the former Baldwin government, planned to link the disposition of Jubaland with that of the Dodecanese, and inasmuch as Italy had received the latter by the treaty of Lausanne (1923), there was little likelihood of any favorable settlement being reached, at least as far as Italy was concerned. But in June, an amicable settlement was reached when the 1919 Milner-Scialoja line was accepted. Late in 1923 Italian ambitions encountered another set-

back in the discussions over the status of Tangiers (q.v.). Among other territorial changes were the settlement of the boundary between Wadai and Darfur in 1921 by France and Great Britain and the independence of Egypt. Egypt in December, 1914, first became a British Protectorate, and then, on Feb. 28, 1922, gained its independence under its own king and legislative assembly. The disposition of the Anglo-Egyptian Sudan still remained a source of contention between Britain and Egypt in 1924. Thus 1919-24 saw the elimination of the German territories, covering an area of 1,030,000 square miles, and the re-partitioning of Africa along the following lines:

Countries	Area square miles
Great Britain, (not including Egypt) ..	4,014,000
France	4,245,000
Italy	591,000
Spain	129,000
Belgium	910,000
Portugal	927,000
Egypt	350,000
Abyssinia	350,000
Liberia	40,000

Like other parts of the world after the War, Africa became the scene of nationalistic aspirations, which threatened white supremacy. Of the Egyptians' successful fight for native sovereignty an account is given under EGYPT; the contest between Indians and British in the Kenya Colony is recounted under KENYA; the Union of South Africa's determination to check the economic and political aspirations of the Negroes and Indians (largely the work of General Smuts) is told under SOUTH AFRICA, UNION OF. As far as the Europeans were concerned, a more disquieting movement was that of the Negroes of the continent to gain a fuller hearing for their demands for racial equality. In 1919, 1921, and 1923, representatives of Negro groups in America and Africa, more particularly from the latter, met in Paris, London, and Lisbon, under the aegis of the Pan-African Congress, and there set out a charter of liberties for their people. Their purpose was plainly the development of Africa for the benefit of Africans, and not merely for the profit of the Europeans. They sought political, educational and economic equality, the restoration of native lands, e.g., in Kenya, Rhodesia, and South Africa; the curbing of commercial exploitation, in the Belgian Congo; release from the hold of large industrial monopolies, in Portuguese East Africa, where a British-financed company rendered nugatory the good intentions of the liberal Portuguese code; and the appointment by the League of Nations of direct diplomatic representatives in the mandated territories with powers to investigate and report. It was too early to ascertain whether the movement was gaining strength. In the 1921 Congress 30 countries were represented as against only 13 in the 1923 Congress. But its implications indicated a serious challenge to the purposes of European imperialism. The cry of Africa for the whites was being met by that of Africa for the Africans.

AFRICA, EARLY CIVILIZATION OF. See ETHNOGRAPHY.

AGAR, FREDERICK ALFRED (1872-). An American clergyman, born in London, England. He studied at the Louisville Theological Seminary and was ordained Baptist minister in 1893. He was medical missionary to the Congo Free State (1893-4) and after holding various pastorates he became efficiency and methods secretary of the Northern Baptist Convention in 1913. He is a specialist in church methods and is author of *Church Finance* (1915), *Dead or Alive* (1916), *Help Those Women* (1917), *Personality and Possessions* (1917), *Democracy and the Church* (1918), *Church Officers* (1918), *The Stewardship of Life* (1919), *Modern Money Methods* (American Baptist Publication Company, 1921), and several pamphlets.

AGEE, ALVA (1858-). An American agricultural educator, born at Cheshire, Ohio. He attended Marietta College and the University of Wooster. From 1907 to 1912 he was in charge of agricultural extension work at the Pennsylvania State College and from 1912 to 1918 performed the same service and was professor of soil fertility at Rutgers College. In 1890 he became associate editor of the *National Stockman and Farmer* and contributed many articles on agriculture to periodicals. From 1916 he was secretary of agriculture for the New Jersey State Department of Agriculture. He wrote *Essentials of Soil Fertility, Crops and Methods for Soil Improvement, and Right Use of Lime in Soil Improvement*.

AGEE, FANNIE HEASLIP LEA (1884-). An American author, born at New Orleans and educated at Tulane University. She has been a frequent contributor to *Harper's Monthly, Century, Scribner's, Collier's Weekly, Woman's Home Companion*, etc., and is the author of *Quicksands* (1911), *The Jaconetta Stories* (1912), *Stoily Ann* (1914), *Chloe Malone* (1916), and other volumes.

AGER, WALDEMAR (THEODOR) (1869-). An editor and author, born in Fredrikstad, Norway, and educated in the common schools. He came to America in 1885. He joined the Fremad Publishing Company, Eau Claire, Wis., in 1892, and in 1903 was appointed manager and editor of *Reform*. He was also made secretary of the Norwegian Society of America and editor of its quarterly. He is the author of *Kristus for Pilatus* (1911), *Paa veien til smeltepotten* (Eau Claire, Wis., 1917), and short stories and histories in Norwegian. He is also known as a lecturer.

AGNES SCOTT COLLEGE. An institution for women at Decatur, Ga., founded in 1889. The student enrollment increased from 225 in 1914 to 500 in 1923-24, the number of members of the faculty from 35 to 55, and the library from 4000 to 11,000 volumes. The endowment in 1924 was \$850,000, with pledges of \$200,000 payable within the two years following, as compared with an endowment of \$175,000 in 1914; and the income in 1923-24 was approximately \$225,000, in contrast with \$100,000 at the beginning of the decade. The land holdings of the college were more than doubled, and the buildings were increased about 50 per cent. An extensive building programme was also projected. President, James Ross McCain, A.B., LL.B., A.M., Ph.D.

AGNEW, WILLIAM HENRY (1881-). An American clergyman and educator born in Westphalia, Kan., and educated at St. Louis University. He was ordained priest in the Roman Catholic Church in 1915 and was appointed dean of the department of Science and Mathematics at Loyola University in 1921. He has been at various times chaplain in hospitals in Illinois and New York and in the Blackwell's Island workhouse. He is a well-known lecturer in religious and educational institutions. He was at one time editor of *The Queen's Work*.

AGRICULTURAL CREDIT. This term has come into prominence in the years 1914-24 in several distinct senses, among which may be recognized: rural credit (mortgage bond loans); marketing credit (loans for the sale and carrying of farm products); and productive credit (loans made for farmers' expenses during the period of putting in and har-

vesting crops). Due partly to the growth of an agrarian movement in many quarters and partly to the unsatisfactory position of the farmer as the result of the changes in prices during and since the War, the problem of furnishing the farmer with an adequate mechanism for supplying these different kinds of credit has assumed the position of a political issue in several countries and particularly in the United States.

Rural Credit. By rural credit is meant the extension of loans to working farmers for the purpose primarily of improving their land and of equipping them with suitable farm buildings and in some cases with the more permanent and lasting types of machinery. Since the farmer has usually little or nothing upon which to base his application for credit except the title to his land, this form of agricultural credit becomes a system of advancing money upon farm mortgage. Since farm mortgages are costly and difficult to supervise and crop failures suspend interest payments and sometimes necessitate the surrender of title to the land, mortgage banking has been developed in connection with agricultural operations and has been worked out on the cooperative principle, which is intended to put behind the loan the protection of a joint guarantee derived from claims upon a considerable number of pieces of property. This plan of cooperative mortgage banking was first developed in Germany and came into definite existence about 1775, continuing in various forms since that date. Parallel systems have been introduced into nearly all of the European countries and some Oriental states with varying success. The typical form of the plan is found in an organization of cooperative groups or associations whose members' applications for loans are passed on by their neighbors or associates in the group. Under the German plan, the next step is the issue of a bond or obligation which is jointly binding on all members of the group and their lands, and which the recipient, the applicant for the loan, then sells to as good advantage as he can. Mortgage banks have been established for the purpose of assisting in this marketing process. Under other variations of the scheme, the recipient obtains his loan in money, mortgaging his land to the cooperative association, which is organized with a small capital. The association then sells the mortgage to a land bank which places it and a series of other mortgages given by contemporary borrowers in a pool or trust fund. Bonds against these mortgages are sold to investors; thus the mortgages serve as collateral to protect the bonds.

Federal Farm Loan Act. The Federal Farm Loan Act adopted in 1916 by Congress is based upon the last described form of the cooperative mortgage system. Farm loan associations are formed in designated areas under conditions prescribed in the law, and their members are borrowers only. The borrowers submit applications for loans under specified conditions and restrictions as to size, security, and valuation of the land. When such loans are approved by the association after careful appraisal of the property, the mortgages are transferred to a Federal land bank. Twelve of these banks have been organized in districts covering the whole of the continental United States. They sell bonds issued in series against the mortgages which they have thus purchased. All bonds are

guaranteed by the twelve banks. The Federal Farm Loan Board, an appointive body in the Treasury at Washington, supervises the operations of the loan associations and the banks, and assents to or rejects applications for the issue of bonds. During the period from 1916 to early in 1924, about 4500 farm loan organizations were formed, and under the coöperative principle the capital of the land banks was increased with the loan associations, which take out capital in proportion as they sell mortgages to the land banks. Thus a total of about \$750,000,000 of bonds has been placed in the hands of the public by the twelve banks. Under the Federal Farm Loan Act provision was also made for institutions known as Joint Stock Land Banks. These were to operate in somewhat the same way as the Federal land banks, except that the former were originally founded with government capital and were steadily overseen by the government. The joint stock land banks were to be organized with private capital and were to make mortgage loans direct to farmers, instead of following the procedure as in the case of the farm land banks, purchasing the mortgages from local loan associations, which obtained them from the farm borrowers who were their members. The joint stock land banks early in 1924 numbered about sixty. The total issues of bonds put out by them up to the close of 1923 was about \$300,000,000. In general, the effect of the farm loan act was undoubtedly to reduce the average rate of interest on first-class landed security by 5 to 7 per cent, according to location; and it also tended to establish a comparatively high degree of uniformity between different parts of the country.

Intermediate Credit Banks. Because farm land banks and joint stock land banks were strictly limited to mortgage security, i.e. first mortgages on farm lands, and were not authorized to make any extensions of funds for conducting agricultural business, sharp demand arose in the United States in the years 1920-22 for some system of banking which would provide for loans running up to two or three years in maturity protected by ordinary paper or chattel mortgages. Such loans were especially designed to meet the requirements of the cattle and wool raising industries and to some extent for the use of fruit growers and others who required period loans of a duration greater than could be obtained from the ordinary bank and shorter than those contemplated by the land mortgage act. On Mar. 4, 1923, Congress accordingly provided for the creation of twelve intermediate credit banks to be operated in connection or as departments of the twelve land banks. Each was to have a capital of not more than \$5,000,000, the actual amount to be determined by the Secretary of the Treasury and paid in by him out of any funds in the Treasury not otherwise appropriated. Each bank was to be allowed to do business with ordinary banks and with loan associations and corporate lenders of various kinds. It was to be permitted to place its securities in trust, to issue tax exempt debentures, and to sell these to the public in an amount not to exceed twelve times its capital stock. Such debentures were to be purchasable by Federal Reserve Banks. In lieu of issuing debentures, the intermediate banks might make acceptances against commodities in warehouses; and such acceptances might be discounted with Federal Reserve Banks, so as to give the farm-

er access to the commercial banking funds of the country under specified conditions. In 1923 these banks were organized with a capital of \$1,500,000 each.

War Finance Corporation. During the War a War Finance Corporation was formed whose purpose was to make loans to hard pressed enterprises which might be unable to obtain banking accommodation through ordinary channels. The concern had a nominal capital of \$500,000,000 paid out of the Treasury. It did a limited amount of business during the War, but after the close of the struggle it was largely liquidated and practically closed under the Administration of Secretary of the Treasury Houston. The Harding Administration which came into office in 1921 expanded and revived the operations of the concern and devoted it largely to agricultural relief with direct loans to banks and under certain conditions to corporations, for the purpose of promoting export trade and enabling banks with frozen assets to obtain assistance on a long term basis on a larger scale than they otherwise could. The War Finance Corporation was extended from time to time, with operations in its most active year amounting to about \$465,000,000 of loans. When the intermediate credit banks were organized, it was supposed that they would take over the business of the War Finance Corporation, but they did not prove able to do so, owing to the less flexible conditions under which they operated. The result was successive extensions of the life of the corporation to Dec. 31, 1924.

Federal Reserve Operations. None of the long term or intermediate mortgage banking enterprises already referred to has any bearing on the question of currently financing the farmers' crops. For many years, this matter had presented serious difficulties in the United States, largely because so great a proportion of American agriculture is of a seasonal nature. Cotton, for example, which comes to maturity and is practically all gathered in by the middle of November, must be financed over the period during which it is to be consumed either at home or in the course of the exporting period. That is to say, funds must be provided from some source with which to pay harvesting and producing expenses, and other obligations incurred by the farmer during the growing season. If he sells the cotton, he is able to pay his expenses out of the proceeds so far as they go. Observation, however, has shown that in general the lowest prices of the year prevail for some weeks immediately after the peak of the harvesting season. Hence there was a desire to put the farmer into a position to carry his crop until it could be gradually sold at a price up to the average. This gave rise to the establishment of Federal warehouses and also to the adoption of State warehouse systems operating under the uniform warehouse law. It also led to the creation of coöperative marketing associations whose function is to receive the cotton from their members, store it, and carry it until favorable opportunity for selling presents itself. In order to carry the crop in this way, the farmer or the coöperative association must be able to obtain satisfactory accommodation at the banks, and in order to insure such accommodation, the Federal Reserve Act made provision for an unusually long period of credit on farm paper, six months instead of three, and also contemplated the use

of the resources of the system so far as needed for the orderly marketing of crops. Under the administration of the Federal Reserve Board, this idea of orderly marketing came to signify the holding of the crop during the consumption period, with the understanding that it should all be placed on the market prior to the advent of a new crop. What is said here of cotton applies also to other staples and is a general characterization of the crop-moving problem at large. The working of the Federal Reserve system in connection with short term farm paper has been very satisfactory, enabling the agriculturist to get at low rates all of the funds to which he could be considered reasonably entitled.

Agrarian Discontent. Very decided agrarian discontent has prevailed in the United States for several years past. One reason for it was the artificially high prices that were fixed for foodstuffs during the War. These tended to encourage farmers to bring too much land under cultivation for certain crops and to neglect the diversification of certain products. They also tended to encourage a speculative movement and inflated level of values in the farming community, with the result that many cultivators purchased or in some way took over land at valuations which could not thereafter be maintained. After the close of the War, the fixed prices for agricultural products were terminated and a considerable slump in farm prices and values set in. This reaction was by many ascribed to deflation, an effort on the part of the banks and especially of the Federal Reserve system to curtail the amount of credit going to the farmer. One outcome of this discontent was the so-called agricultural inquiry of 1921, conducted by a joint committee representing the House and Senate. The findings of the committee exonerated the system for its discount policy but blamed it for allowing expansion to occur as rapidly as it had, notwithstanding that the inevitable result was reaction and deflation. Dissatisfaction continued throughout the northwest and some parts of the Middle West, and during the years 1922-23 a considerable movement of population away from the farms occurred, with many foreclosures and defaults in mortgage loans and an unusual volume of bank failures in the farming regions. These troubles continued to be attributed to poor or inadequate credit, and the result was steady agitation in Congress and out of it for some sort of relief. One result of the agitation was the Intermediate Credits Act of March 4, 1923, already described.

Farm Cooperation. Perhaps the most practical development in the field of agricultural credit and at the same time the most helpful measure from the standpoint of the farmer himself was the development of coöperative credit associations and the coöperative marketing associations already incidentally mentioned. There was a rapid growth of both classes of institutions in the cotton and fruit growing regions and to some extent in the grain sections as well. It was asserted that the effect of coöperation in the cotton regions was to save the farmer an amount equal to about \$20 per bale of 500 pounds either in reduced marketing expenses or in actually higher prices.

The method of the coöperative association is to exact from its members an agreement to keep a specified amount of land under cultivation

for a certain kind of crop over a given period of years or at all events to cultivate no other crop on that land, thus assuring a steady supply of the product in question. The farmer agrees to deliver his output through the association and to abide by its rules, which provide for grading, holding, and selling the product under conditions determined by the board of directors and other authorities. The association then provides for financing and carrying the combined output furnished by its members. This financing has been done in two principal ways; by direct loan at banks with warehouse receipts representing the title to the cotton as collateral, and by acceptances furnished by banks with which arrangements have previously been made. The acceptances are protected by warehouse receipts in the same way and then marketed by the association, or in some cases by the accepting bank. The best of these agreements provides also for regular marketing of the warehoused crop at a specified rate per month and reduction of the outstanding acceptances in corresponding amount. This method has provided an economical and apparently very safe form of financing. Altogether the coöperative association seems to furnish the key to a difficult problem of agricultural marketing.

Future of Farm Credit. The discussion of the 1920's in the United States and elsewhere confirmed the opinion that sound farm credit can be based only on careful adjustment of acreage to demand and that the holding or storage of surplus products merely intensifies the problem of prices at a later date, even though it may temporarily advance them. Although a great number of bills were urged in Congress with a view to providing for government subsidies to farmers of specified classes or for the formation of agricultural purchasing corporations designed to fix the prices of farm products by buying at a specified rate, no legislation of the sort had been enacted up to July, 1924. The passage of such laws had become the basis of a movement represented by the so-called farm bloc in the Senate and by similar organizations in foreign legislative bodies. Improvement of marketing methods and facilities and elimination of middlemen's charges both for selling and financing appeared to offer the best solution of the problem. See FINANCE AND BANKING.

AGRICULTURAL EDUCATION. During the decade 1913-23 agricultural education in the United States broadened greatly, in research, graduate and undergraduate work in colleges, courses in secondary and elementary schools and extension work. A larger measure of public funds was devoted to these enterprises than previously, and a considerable number of private institutions were devoted to the work. The interest of the farming folk in agricultural education was sharpened and found new expression through their organizations. The American system was profoundly strengthened in this period by the operation of the Smith-Lever Coöperative Extension Act of May 8, 1914 (see AGRICULTURAL EXTENSION WORK), and the Smith-Hughes Vocational Education Act of Feb. 23, 1917. The United States Department of Agriculture and the agricultural experiment stations (q.v.), which with few exceptions were departments of the agricultural colleges, supplied more largely the new information on

which improvement in the subject-matter of agricultural teaching was based.

The Agricultural Colleges. In 1924 instruction in agriculture was given in 52 land-grant colleges for white students in the 48 States, Alaska, Hawaii and Porto Rico, 25 of these in connection with State universities. It was also featured in 17 institutions for negroes in the Southern States. In 1921 instructors in agriculture in the white colleges numbered 2032 men and 96 women. The total number of students of agriculture in all courses was 32,186 men and 3183 women, of whom 751 men and 71 women were in graduate courses, 14,676 men and 487 women in four-year undergraduate courses, and 14,997 men and 1996 women in subcollegiate work, including short courses, summer schools and correspondence courses. In 1910 these colleges had only 8859 students in regular college courses in agriculture. In the land-grant college institutions for negroes, in 1921, there were 11,527 students, of whom 853 were in collegiate work and 847 in agricultural courses. In the white colleges the expenditures for resident instruction in agriculture in 1921 totalled about \$9,500,000.

The Federal appropriations for instruction in the land-grant colleges were increased under the provision in the Vocational Education Act for teacher-training and the Federal acts for Rehabilitation of Veterans of the World War. But by far the greatest increase of revenue came to these colleges through State appropriations for buildings, equipment and current expenses. The agricultural divisions of these colleges received a good portion of these funds. Many large buildings for agricultural work were erected and well equipped. Additional farms, livestock, machinery, libraries, etc., were purchased. The number and variety of courses were greatly increased. The courses in agricultural production under the heads of agronomy, horticulture, forestry, animal husbandry and dairying were strengthened in various ways, but chief emphasis was increasingly placed on the development of courses in rural engineering and in rural economics and sociology.

The Graduate School of Agriculture under the auspices of the Land-Grant College Association was held in 1914 at the University of Missouri and in 1916 at the Massachusetts Agricultural College, after which it was discontinued. This was largely due to the development of regular graduate courses leading to advanced degrees at most of the agricultural colleges and particularly at universities and the stronger colleges. In the undergraduate work special attention has been paid to better organization of the curriculum, the adoption of a group system of electives, provisions to meet the needs of individual students according to their interests and capabilities, promotion of better teaching, and recognition of the importance of expert supervision of the educational work as a whole by the appointment of directors of resident teaching or similar officers. College authorities generally agreed that during the first two years in college, students should be required to take general basic courses, including a technical knowledge of what the farmer needs to know in order to carry on his work intelligently. The specialization through group courses could then be undertaken at the beginning of the junior year.

In 1922 all the land-grant colleges had de-

partments offering courses in general psychology, educational psychology, methods of teaching and other professional studies. A number of them had courses in methods of teaching agriculture. The training of teachers of agriculture for the secondary schools under the Smith-Hughes Vocational Education Act was committed to the land-grant colleges. They had also become interested in the professional training of the college teachers. The Land-Grant College Association, through its Committee on Instruction in Agriculture, Home Economics and Mechanic Arts, urged that instructors in the technical department pursue graduate work in education and study the problems of teaching in their respective fields. Heads of departments were asked to guide young teachers and give them opportunity to teach a variety of subjects and to commit the teaching of introductory and basic subjects to experienced and successful teachers. The association also has adopted a recommendation that beginning with 1925 candidates for teaching positions in the colleges be required to have professional training.

The School of Agriculture for the American Expeditionary Force. In 1919 a unique educational enterprise was undertaken for the benefit of the American soldiers in France. This was planned and inaugurated by the Young Men's Christian Association, and afterwards was taken over by the Army Education Commission. This plan included a college of agriculture located at Beaune which enrolled 6000 students and a nearby farm school at Allery with 2600 more. Thorough extension work courses in agriculture were carried to thousands of soldiers in practically every regiment. Numerous trips to French farms and forests supplemented the classroom work. In charge was President K. L. Butterfield of the Massachusetts Agricultural College, with whom were associated a large number of the ablest agricultural educators from the colleges throughout the United States. More than 150 were selected from the army, representing 40 agricultural colleges.

Agricultural Training for Disabled Ex-Service Men. Under the Vocational Rehabilitation Act of June 27, 1918, the Federal Board for Vocational Education included agriculture in its programme for training disabled ex-service men. In 1921 the rehabilitation work was transferred to the Veterans' Bureau. Up to June 30, 1921, about 15,000 men took advantage of such training. They were distributed among the agricultural colleges and schools. Some of them could join the regular classes, but for the most part their general education was too limited to permit this and special instruction had to be given them. During the fiscal year 1922-23 more than 11,000 men were given training in agriculture. Of these, about 2000 were pursuing college courses leading to a degree, about 4000 were taking shorter college courses and about 5000 were in special practical courses. Thousands of farms and other agricultural enterprises were utilized as placement and project training opportunities for men on the job. In 1923 there were over 5000 men in institutional training and about the same number in training on the job. The latter method proved more effective, especially for men of limited education, and their health was improved.

Secondary Education in Agriculture. In 1923 there were 170 special agricultural schools, and agriculture was being taught in about 4500 high schools. About 3000 of these schools received Federal and State funds under the provisions of the Smith-Hughes Vocational Education Act of Feb. 23, 1917. This act was administered by the Federal Board for Vocational Education, which had a division for agricultural education, and by State boards in all the States. Plans for the work in agriculture, as in other subjects, were initiated in the States and approved by the Federal Board as the basis for allotment of Federal funds. The instruction was for students from 14 years of age and might include work in all-day or evening schools or in other part-time courses. Supervised practice work in agriculture during six months of each year was required of all students.

The Federal funds for vocational instruction in agriculture increased from \$547,027 in 1918 to \$1,759,219 in 1923 and were offset by more than this amount of State and local funds. The Federal fund will reach its maximum in 1926, when it will aggregate \$3,021,987. In 1918 vocational agriculture was taught in 609 schools by 895 teachers to 15,453 pupils and in 1923 in 2673 schools by 3012 teachers to 71,298 pupils. A report of the Federal Board showed that of 8340 students who had received one or more years of such instruction, 4888 were engaged in farming. Experience showed the advantage of connecting the Smith-Hughes work in agriculture with the local high schools because thus the pupils lived at home and as a rule carried on their practice work on the home farm. This also made the school a factor in improving the agriculture of the local community. The agricultural instruction in the Smith-Hughes schools was largely conducted on a project basis. This led to an attempt by the Federal Board, in cooperation with the division of agricultural instruction in the Department of Agriculture, to make job analyses of the different agricultural enterprises and several publications were issued showing how such analyses may be used in the teaching of agricultural subjects.

Elementary Agricultural Education. 1923 and 1924 saw considerable progress in the teaching of agriculture in the rural elementary schools. The former year, 28 States had laws requiring elementary agriculture to be taught in the rural schools, and several others encouraged such teaching. In about 20 States elementary agriculture and nature study were taught effectively in many rural schools, especially consolidated schools. A number of the State departments of education published outline courses in elementary agriculture for the use of teachers, partly by cooperation with the agricultural colleges and the United States Department of Agriculture. The agricultural colleges, through summer schools and in other ways, were helping to train teachers for this work. These colleges and the United States Department of Agriculture were also aiding the rural teachers by the distribution of publications, lantern slides and other illustrative material and by personal services of the State and county extension agents. The boys' and girls' clubs organized by the extension agents are in many cases closely associated with the rural schools. Many normal schools and high schools have courses through which teachers are trained for

work in agriculture and nature study in the rural schools.

Foreign Countries. Institutions for agricultural education increased in number and variety throughout the world, including colleges, secondary and practical schools and special schools for horticulture, forestry, dairying, poultry, etc. In the European countries the regular work of the agricultural institutions was greatly abridged during the War, but at that time and afterward, special arrangements were made for the instruction of disabled soldiers in several countries. In Great Britain the Development Commission under the law of 1909, in cooperation with the Ministry of Agriculture and Fisheries, greatly stimulated agricultural education and research, through the establishment of centres of research at the Rothamsted Experiment Station, and at Cambridge, Oxford, and other universities and colleges, promotion of the resident teaching at these and other institutions, assistance to local authorities in maintaining short courses of 10 to 12 weeks (called farm institutes) by itinerant teachers and broadening of the extension work through county representatives and other expert advisory officers. For this work Parliament had made large grants of money to supplement local funds.

In Canada, agricultural colleges and the teaching of agriculture in many high, consolidated and elementary schools were maintained in all the provinces under direction of the provincial departments of agriculture and education, aided by the Dominion Department of Agriculture, which beginning with Mar. 31, 1914, had an appropriation of \$10,000,000 for 10 years to be distributed among the provinces according to population for education and research. In 1917 the Agricultural Instruction Act, providing for district extension agents, made special arrangements for instruction of convalescent soldiers by these agents. At St. Joseph, Trinidad, the West Indian Agricultural College was opened for students, Oct. 16, 1922. It was designed as a centre for research and education in tropical agriculture. The Imperial Department of Agriculture for the West Indies was transferred from Barbados and located at this college.

In Belgium a royal decree of Apr. 8, 1920, reorganized the higher agricultural education. The course for a bachelor's degree was to occupy four years, but a license in agricultural science could be obtained on completion of a two years' course. A higher normal institute of farm management has been established at Laeken. In France the law of Aug. 21, 1912, reorganized the departmental and communal system of agricultural education and provided a bureau of agricultural services for each department. Laws enacted in 1918 and 1920 further systematized agricultural education and provided better opportunities for specialization in different branches of agriculture, the training of teachers, winter courses for farmers, continuation courses for boys and girls leaving the primary schools and agricultural instruction for women.

In Denmark, agricultural education was given in the Royal Danish Agricultural College at Copenhagen, at which the regular course occupied two years, with additional special courses covering two more years; and in 22 agricultural schools, with nine-month courses and special shorter courses lasting from a few days to several weeks. In Norway there were the high school of agriculture, with a three-years' course; the

State Training School for Teachers to Small Holders, with a two-years' course; and 41 county or district agricultural schools, with courses of six to eighteen months and several schools of forestry, horticulture and dairying.

In China an educational survey in 1916 showed the great need of more practical education, and that year the National Association of Vocational Education was formed. The National Alliance of Provincial Educational Associations also favored vocational education. This movement greatly stimulated progress in agricultural education in colleges and secondary and primary schools. In 1919 there were seven colleges with 1550 students and two missionary colleges at Canton and Nanking, with 225 students; 54 secondary schools with 640 teachers and 5998 students; and 240 primary schools with 622 teachers and 9784 students.

An interesting development of agricultural education was connected with missionary colleges and schools in several countries. Many mission boards were promoting this side of their work, and young men were being trained in colleges in the United States and elsewhere for it. A survey in Africa by the African Education Commission showed the importance of correlating missionary enterprises with the agricultural and community life of the African peoples, through practical instruction and extension work in connection with mission schools.

AGRICULTURAL EXPERIMENT STATIONS. The work of the experiment stations in the United States and Europe found unusual application during the emergency period of the War, and their officials and experts were called upon for a variety of unusual advisory service. Many of the men were drafted into war activities, while others in large numbers took positions in the industries. The drain upon the station forces was therefore a very heavy one, and for a time research suffered a temporary setback. The more important lines of investigation were, however, kept alive, and after the Armistice the forces gradually returned and State appropriations were increased to some extent. In the United States there were, in 1924, 61 separate stations, some of the States maintaining more than a single station. In addition to the main stations many branch stations were maintained for typical regions or the study of special branches of agriculture, and coöperation with the United States Department of Agriculture increased extensively. Experiment stations were maintained by the Federal government in Alaska, Hawaii, Porto Rico, Virgin Islands, and Guam, and stations were also maintained in the Philippines under the Insular Government. A system of forest experiment stations was inaugurated under the United States Department of Agriculture in 1922-23, quite largely in coöperation with the State experiment stations. (See FORESTRY). In addition to these public agencies, the Thompson Institute for Plant Research, supported privately, was opened at Yonkers, N. Y., in 1921. In the same year the Food Research Institute was established at Stanford University, California, with funds supplied by the Carnegie Corporation of New York, for the study of both the scientific and economic aspects of food supply and use.

The total funds of the agricultural experiment stations in the United States for 1923 aggregated approximately \$9,500,000. This compares with a little over \$5,000,000 in 1914, much of the ap-

parent increase, however, being absorbed by the increased cost of services and supplies. The stations employed 2260 persons in connection with their research and administrative activities. About half of these were members of the teaching staffs of the agricultural colleges. During the year they issued over 900 publications, which were distributed to regular mailing lists aggregating about 900,000 names, in addition to many copies sent in response to special requests. A considerable part of the technical research was published in scientific journals, which served to increase materially the volume of published matter. The stations were carrying a total of more than 5000 separate projects in 1923, covering practically every phase of the agricultural industry and varying from quite practical experiments to abstract inquiries on the frontiers of science. The growing interest in economic problems of agriculture was reflected in an expansion in that field as far as funds permitted, to include studies of production costs, marketing and distribution of products, farm management, agricultural coöperation, and the like. Among other new developments was the subject of horticultural manufactures, dealing with canning, preserving and drying of fruits and vegetables, and the utilization of residues or by-products in various ways. Another new line in the western States was work in range management and the handling of stock under range conditions. In most of the States the field of the station work has expanded on new lines, and it has become increasingly technical in order to meet the type of problem and the demand for accurate information.

In Great Britain the repeal of the war-time measure known as the Corn Production Act was accompanied by the granting of £1,000,000 for agricultural education and research, about half of which has been allocated to research and advisory work among various institutions. A new agency known as the Rowett Research Institute, for work in animal nutrition especially, was organized at the North of Scotland College of Agriculture, contributions coming mainly from private sources. In Canada, the Dominion government was compelled to withdraw its assistance to the agricultural institutions in the Provinces in 1923, which was expected to result in serious curtailment of agricultural investigation.

Despite the financial stress in France, an appropriation of 2,000,000 francs was made for experimental work in 1921, and an Institute of Agricultural Research was established under the Ministry of Agriculture, to which the existing stations and laboratories hitherto administered by the Department were assigned, with authority to establish other stations and make grants for research. This reorganization brought under the Institute 88 stations and laboratories with a total personnel of 236. A central station with regional stations for the improvement of crop plants was more recently provided for, and eight additional central stations with regional branches to deal with the principal divisions of agriculture. The foundation thus was laid for a comprehensive system of agricultural research in France, utilizing the existing structure as far as possible and materially supplementing it. The State of Minas Geraes, Brazil, inaugurated a new institution for agricultural instruction and investigation, located at Vicosa; Colombia and Salvador each provided for a series of stations, and Venezuela opened a station for agriculture and forestry at Caracas. An institute of agri-

cultural research in Palestine, with a system of local stations, was planned under the Zionist movement.

Necrology. A number of scientists prominent in the work of the experiment stations died during the decade. Among these were Dr. H. P. Armsby, Director of the Institute of Animal Nutrition at Pennsylvania State College; Dr. E. W. Hilgard, for many years director of the experiment station in California; Dr. J. H. Kastle, Director of the Kentucky Experiment Station; Prof. F. Nobbe, founder of the experiment station for plant physiology at Tharandt, Saxony, and of the first seed control station in 1869; Dr. Cyril G. Hopkins, head of the Department of Agronomy in the Illinois University and Experiment Station; Dr. William Frear, head of the Department of Experimental Chemistry and Vice-director of the Pennsylvania Experiment Station; Dr. J. C. Whitten, Specialist in Horticulture at the California College of Agriculture and Experiment Station; Dr. F. W. Woll, Professor of Animal Nutrition in the same institution and an agricultural writer; Prof. S. A. Beach of the Iowa State College and Experiment Station, a national authority on fruit growing.

In addition to the changes brought about by death, a number of the leading station directors retired, among them Dr. W. H. Jordan of the Geneva Experiment Station in New York, Prof. Charles E. Thorne of the Ohio Station, Dr. Charles D. Woods of the Maine Station, Dr. W. P. Brooks of the Massachusetts Station, Dean E. Davenport of the Illinois College and Station, Dr. E. H. Jenkins of the Connecticut Stations, and Dean Thomas F. Hunt of the California College and Station. Dr. A. C. True, long Director of the Office of Experiment Stations in the United States Department of Agriculture and more recently Director of the States Relations Service, retired from administrative duties, continuing his study of the history of agricultural education and research.

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AGRICULTURAL EXTENSION WORK.

Agricultural extension work includes whatever instruction on subjects related to agriculture and country life is given by educational institutions to persons other than resident students. Most of this work is done away from the institutions, but it may include meetings or short courses held there. In the United States, courses at the institutions exceeding two weeks in duration are usually not classed as extension work. Most of the agricultural extension work in the United States is done coöperatively by the State agricultural colleges and the United States Department of Agriculture under the terms of the Smith-Lever Extension Act of 1914 and related Federal and State legislation. This act brought about a combination of three more or less distinct lines of work previously conducted by agricultural in-

stitutions: (1) farmers' institutes (see article in *NEW INTERNATIONAL ENCYCLOPEDIA*), (2) farm demonstration work (see article in *NEW INTERNATIONAL ENCYCLOPEDIA*) and (3) the correspondence and short courses, lectures at farmers' meetings, exhibits at fairs, competitive judging of live stock and other products, etc., carried on by the agricultural college.

From their beginning the agricultural colleges and the Department of Agriculture disseminated agricultural information among the farming people through correspondence, distribution of publications, and addresses at meetings by members of their staffs. The colleges gradually enlarged the scope of their extension work, particularly in the decade beginning about 1905, when extension divisions were organized. During this period the work was considerably influenced by the general movement of university extension, of which it was often considered a part. In 1908 the colleges, through their Association, began to ask Federal aid for extension work and several bills were introduced in Congress. Finally a bill introduced by Hoke Smith of Georgia in the Senate and Asbury F. Lever of South Carolina in the House was passed, and was approved by President Wilson, May 8, 1914. This act provides for agricultural extension work to be carried on by the land-grant colleges in coöperation with the United States Department of Agriculture and in accordance with plans annually submitted by the colleges and approved by the Secretary of Agriculture.

"Coöperative agricultural extension work shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications, and otherwise; and this work shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the State agricultural college or colleges receiving the benefits of this act."

To each State \$10,000 annually was permanently appropriated, and additional sums beginning with \$600,000 in 1914 and increasing by \$500,000 for seven years thereafter, after which \$4,100,000 annually was to be permanently appropriated. Since 1920 supplementary funds were added by Congress. To receive the additional sums the States were required to offset them with equal amounts, provided by States, county, college, local authority or individual contributions within the State.

"No portion of said moneys shall be applied, directly or indirectly, to the purchase, erection, preservation, or repair of any building or buildings, or the purchase or rental of land, or in college-course teaching, lectures in colleges, promoting agricultural trains, or any other purpose not specified in this act, and not more than five per centum of each annual appropriation shall be applied to the printing and distribution of publications."

Soon after the passage of this act the Department and the colleges generally entered into a formal agreement, through a "memorandum of understanding," under which the Department agreed to conduct all its extension work through the college, provided the college created an extension division and put at its head a director who would be the joint representative of the college and the Department and have charge of all the coöperative agricultural extension in the State. For the Department's business necessitated by this act, a committee was at first organ-

ized, but on July 1, 1915, when the States Relations Service was created, general supervision was given to the director of that service, under whom were put two extension offices transferred from the Bureau of Plant Industry, one for 15 Southern States and the other for the 33 northern and western States. In 1920 the two offices were combined and in 1923 when the States Relations Service was abolished, the Coöperative Extension Office became a part of the new Extension Service, which contains also the Office of Exhibits and the Motion Picture Laboratory. The Extension Office administers the Smith-Lever funds and direct appropriations to the Department for farmers' coöperative demonstration work, which are used mainly in connection with the Smith-Lever work in the States but also for the maintenance of the Washington Office. Representatives of the different bureaus of the Department also do extension work in the States, under the supervision of the Extension Service.

In the States the college organization consists of the extension director, leaders of county agricultural, home economics and club agents, and extension specialists in the various branches of agriculture and home economics, together with the men and women agents located in the counties. This nation-wide system of practical education for the farming people had hardly become well organized when the War brought to it unusual responsibilities. To aid in stimulating agricultural production and food conservation the States Relations Service was given \$4,348,400 in 1917 and \$6,100,000 in 1918 to supplement the regular extension funds. In war-time the extension organization was pushed forward very rapidly until over 2400 counties had agricultural agents and about 1700 counties and 200 cities had home demonstration agents. About 2,000,000 boys and girls were enrolled in clubs. The supervising officers, extension specialists and clerks in headquarters at the colleges and the department were also greatly increased in numbers. At one time about 7000 persons were included in the coöperative extension forces, which were accomplishing a great work in aiding the farmers to produce an adequate food supply and our people generally to conserve this supply. To accomplish this task it was necessary to organize the farming people more thoroughly. The extension forces, therefore, were very active in promoting the older organizations and forming new ones. In the Northern and Western States special advantage was taken of an organization called the farm bureau. This was originally a division in the Chamber of Commerce of Binghamton, N. Y., but was soon taken over by the farmers in that State, who organized county farm bureaus to work with the State agricultural college and Department of Agriculture in extension enterprises. This movement spread to other States and in war-time the extension agents were active in organizing farm bureaus in many counties.

After the War, when economic conditions aroused the farmers to the importance of coöperative marketing and legislation relating to agriculture, the farm bureaus expanded their work beyond the educational field and formed State federations and a national federation called the American Farm Bureau Federation. The farm bureaus spread into almost all of the States and became one of the strongest and most influential of our farm organizations. It was then necessary to readjust the relations of the extension

forces to the farm bureaus and to confine these forces to educational work broadly defined. When the war emergency funds were withdrawn, the number of extension workers materially decreased, though the expense of the work greatly increased and the farmers were in a very difficult situation. The people retained their interest in extension work and the number of county extension workers again increased. The emphasis in the agricultural work shifted from production to economics, particularly coöperative marketing.

In 1923, out of 3044 counties reporting agricultural products, 2097 had men county extension agents; 846 had women agents. The men included 56 directors and State leaders, 109 assistant State leaders, 2177 white county agents and assistants and 179 colored local agents. The women agents were 43 State leaders, 75 assistant State leaders, 838 white county agents and 103 colored local agents. The men and women agents did much work with children but there were also special agents for boys' and girls' clubs, as follows: State leaders 41, assistant State leaders 59, county leaders 153. In addition, there were about 750 extension specialists and several hundred clerical assistants, making a total extension force of nearly 5000. Over 600,000 boys and girls were enrolled in clubs. The total funds allotted for coöperative extension work in the United States in 1923-24 were approximately \$19,149,450, of which \$7,194,450 were Federal funds, including \$5,588,000 under terms of the Smith-Lever Act, \$1,284,450 for farmers' coöperative demonstration work, and \$30,000 for work by bureaus of the Department of Agriculture. From sources within the States \$11,955,000 were contributed, of which \$5,324,000 were State and college funds, \$5,743,000 county funds, and \$888,000 from farm organizations and other sources. In Alaska, Guam, Hawaii, Porto Rico, and the Virgin Islands, extension work was conducted by the Federal experiment stations.

Foreign Countries. Many countries had more or less elaborate systems of agricultural extension work, usually under the general supervision of departments of agriculture and often connected with agricultural colleges and schools. In England and Wales extension work was conducted through County Agricultural Councils, with approval of the Ministry of Agriculture, and aided with Government funds by the Development Commission. The work is done by agricultural organizers, itinerant lecturers, and specialists from agricultural colleges and the Ministry. A similar organization existed in Ireland. In Scotland the work was done through the universities. In Canada a large number of extension agents were employed under the supervision of the provincial departments of agriculture. Similar work was done in Australia, New Zealand and the Union of South Africa. In France under the Ministry of Agriculture were inspectors-general, directors of agricultural services and their staffs in the several departments (counties) and extension specialists. A similar system existed in Belgium. The Belgian Peasants' League, with over 90,000 members, also carried on much work. In Denmark, the Department of Agriculture, Royal Agricultural Society and local agricultural associations joined in the work. In Italy there were over 300 itinerant teachers of agriculture. The government and agricultural societies conducted the work in Norway, Sweden, Holland and Germany. There was or-

ganized work in Spain, Switzerland, Bulgaria, India, Burma, British West Indies, Chile, Argentina and other South American countries.

AGRICULTURE. The decade from 1914-24 was one of unusual significance for agriculture. The War brought it into a prominence in the countries of Europe and America which it had never before had in modern times, and the period following the Armistice was marked by a sharp reversal of prosperity in that industry and an unexpected change of public attitude towards it. The periods during and following the War represented the two extremes of stimulation and depression, from both of which the stability and the condition of farming in general suffered severely. The depression in the United States was the greatest agriculture had ever known, and in varying degrees it was in evidence in most other countries. But if the decade presented these remarkable contrasts, in America at least it also marked a new epoch in farming. The economic aspects of the industry began to receive much attention. Statistics were gathered on the cost per unit of production, the labor return of the farmer, and the factors affecting prices received by him and decreasing his share of the returns. Official standards were established for leading products, regulatory measures enacted to preserve competition and to prevent unfair price manipulation, coöperation in marketing and distribution and in buying farm supplies was given great impetus, and in general the organization of the farming people to promote their welfare and to make themselves heard in State and national legislative bodies assumed unprecedented proportions. There was a movement also towards greater adaptation of agriculture to the special conditions of localities, an attempt to shape production of large staples more definitely to actual needs, to reduce narrow specialization, and develop greater diversification as being economically and agriculturally safer and more advantageous. In no previous decade was there so much legislation looking to the interests of agriculture, some of these measures marking a decidedly new departure in national legislation and in recognition of the people living by the land.

Agriculture During the War. In most of the leading countries agriculture was well prepared to meet the unusual demands upon it. In 1913 the world crop of wheat was equal to or greater than any of record, and the oat crop ranked among the largest ever grown. In the United States the season of 1914 was notable for producing the highest total value of crops and animal products which had been recorded in the country's history, estimated at \$9,872,936,000, a part being accounted for by the rise in prices which had already set in. The wheat crop was the largest of record to that time and the cotton crop the second largest. There was a wheat surplus of about 290,000,000 bushels, mostly available for export, exceeding the amount of any previous year, including flour. The total production of the six leading cereals (including corn) was estimated at approximately 5,000,000,000 bushels or nearly half a billion bushels in excess of 1913. Compared with this, the aggregate shortage in the wheat crop of the world for 1914 was placed at approximately 386,000,000 bushels, that in Europe alone amounting to 323,000,000 bushels. The shortage in Germany was offset to the extent of about one-half by the surplus of rye production. Most

of the leading countries of Europe had been giving special attention for years to the promotion of food production. France was noted for the large number of its small farms and its thrifty agricultural class, more than half of whom were landowners.

For years Germany had pursued a policy of encouraging and safeguarding industry, leading the world in its agricultural investigation, instruction, and favorable consideration for the industry. The growing of food was looked upon as a measure for the common good and was a part of its campaign for supremacy. At the outbreak of the War Germany was producing about 82 per cent of its requirements in edible grains (including flour), 93 per cent of its meats, 92 per cent of its dairy products, 67 per cent of its poultry, and 99 per cent of its vegetables—about 88 per cent of the total food requirements of that country. France was producing about 93 per cent of the required edible grain, 98 per cent of meats, 80 per cent of poultry, and slightly more than it consumed of dairy products, vegetables, and fruits. Austria-Hungary was almost entirely self-sustaining in food supplies, while Russia was a surplus producer of food stuffs, exporting about 19 per cent of its production of edible grains. Great Britain, on the other hand, had allowed its agriculture to languish, and along with an attitude of neglect or unfavorable action, had developed the policy of purchasing its food in large measure abroad. It grew only 27 per cent of the required food grains, 53 per cent of the meats, 62 per cent of the dairy products, and 58 per cent of the poultry consumed—in other words, only about half of the food required. Prior to the outbreak of the war two-thirds of the total farm area was in permanent grass and only one-third in cultivated crops, whereas in Germany the proportion was exactly the reverse. It was said that British agriculture fed with home-grown food a third more people and employed a third more labor in 1870 than it did in 1913, because in the meantime the country had so largely turned from cultivated crops to grass farming. The war soon served to demonstrate the inadequate state of British agriculture.

At the outset all of the European countries took steps to conserve their food supplies, to increase production of the most necessary staples, and to adapt the production to the military needs and requirements of the people. The feeding of bread grains to live stock was largely restricted or prohibited. The amount of grain used for brewing and distilling was cut down, and closer milling of cereals was required, the addition of substitutes being first permitted and later enjoined. Non-essential crops like tobacco were prohibited and bulb growing and hop growing were much reduced. With the development of the aeroplane flax growing became a war necessity, and in Great Britain particularly it was stimulated and placed under strict regulation. In Germany the whole question of production was systematized and brought under Government regulation, and in France organization was carried to a high degree. Laws in the latter country permitted neglected land to be taken over by the commune. The Government subsidized the purchase of expensive labor-saving machinery by coöperative societies or communes, and bounties were offered and prices guaranteed for essential products. In most of the warring countries labor soon became scarce, owing to the

extension of the draft, and women began to take the place of men in farm work. The seriousness of Great Britain's position was intensified when the submarines became active. That country declined, however, to guarantee the price of wheat, but made patriotic appeals to farmers and landowners to plow up their grass land and pastures and increase the acreage under wheat. This met with much objection in the absence of a well defined permanent policy towards agriculture. Later such a change in farming was enjoined, and acts passed, enabling the taking over of such land and placing a penalty on neglect of owners to practice good farming.

The world wheat crop of 1915 was much the largest ever produced. Great Britain shared in this, its wheat crop being the largest in many years, but in spite of this, three-fourths of its wheat supply had to be imported. In that year the United Kingdom imported agricultural products valued at \$1,342,000,000, while France bought food products costing \$492,000,000. The United States produced the greatest wheat crop ever raised, passing the billion-bushel mark for the first time and representing about one-fourth of the entire world's production. This was in response to the appeal from Europe and to increasing prices. The export of wheat to Europe, which was less than 100,000,000 bushels before the War, jumped to two and three times that amount. In 1916 the crops of wheat, barley, oats, and maize in the Northern Hemisphere were decidedly less than in 1915, causing prices to rise and anxiety to increase. With the continuance of the War the preëminent position of agriculture in the welfare of the countries involved became more unmistakable, and its importance was conceded as second only to that of the military activities. With thousands of acres devastated, relations with other countries interrupted, and a vast number of farmers and farm laborers drafted into the army, not only unusual demands but unusual conditions had to be met. Extreme measures were taken to make the countries as far as possible reliant on their own food production.

To overcome its disadvantage Great Britain made most urgent appeals and adopted numerous measures to readjust the systems of farming. War committees and borough war societies sought to assist the farmers in the matter of information, labor, seed, fertilizers, etc., and attention was turned to the cultivation of land not ordinarily employed in agriculture, such as parks and pleasure grounds, the use of woodland for raising pigs, etc. Farmers were urged to shorten the period of grass and clover in rotations and to reduce the acreage of bare fallow. There was widespread effort to prevent the depletion of live stock in the warring countries, especially the work animals, milch cows, and breeding stock. In view of a tendency in Great Britain to dispose of cows on account of shortage of labor, the Board of Agriculture made every effort to help dairymen to retain indispensable laborers, and women were trained for milking. Scarcity of gasoline (petrol) for tractors and other machines, high prices of fertilizers and the scarcity and cost of seeds were other handicaps. Forage was unusually high and was requisitioned in large amounts by the armies. Farmers felt that the well-nigh impossible was being urged upon them. Prisoners of war, to whom there was at first objection, were success-

fully used in France and England and generally found to be submissive. In 1917 Great Britain enacted a comprehensive measure known as the Corn Production Act, guaranteeing prices of wheat for a period of six years, establishing prices for oats and barley, and fixing a minimum wage for agricultural labor. A live agricultural policy was put into effect in that country under the Defense of the Realm Act, enabling the taking over of waste lands and commons and compelling the breaking up of grass land and the use of the cultivated land in accordance with the needs of the country. It was estimated that in 1917 an additional million acres were put under the plow in that country.

When the United States entered the War in 1917, renewed efforts were given to increasing production of the essentials, for home use and for the Allies. The Selective Service Law made agriculture one of the industries for which exemption could be claimed. The United States Food Administration fixed the price of the 1917 wheat crop at \$2.20 per bushel for Number 1 hard, and a Federal Grain Corporation was formed which took over the purchase of wheat for export and for the larger flour mills. The price had risen to \$3.18 and the fixing of a price which was represented as little above the actual cost of production under war prices raised considerable opposition, but was accepted as a patriotic measure. While the wheat crop of 1917 was light, the aggregate of all cereals in the United States was approximately a billion bushels, over the average of the previous five years. In most of the Allied countries the production of cereals fell off materially, showing that Europe was fast declining in food-producing power. Restrictions on the use of any material suitable for human food became more stringent. Horses were placed on rations and even the feeding of game and migratory birds was prohibited. Shortage of tonnage and increased risk practically eliminated from the market such surplus grain-producing countries as India, Australia, and Argentina. This laid the heavier burden on the United States and Canada. The latter country had made a remarkable showing, and in 1918 responded with the largest areas on record in that country for all food crops except corn. In the United States a carefully considered agricultural programme was laid out, the first of its kind in America, in which special emphasis was laid upon the wheat crop, with the aim of a billion bushels. The necessary acreage was apportioned among the States and the duty of meeting the apportionment and assisting the farmers was assigned to the County extension agents, State Councils of Defense, and other agencies. The President in a message to the farmers called upon them for a supreme effort, and Congress appropriated \$2,500,000 to be used as a revolving fund in supplying farmers with suitable seed in certain sections of shortage, the fund being administered by the Department of Agriculture.

The response to this nation-wide campaign is better shown by acreage figures than by yields, as the season was adverse over considerable sections. The acreage in wheat exceeded the previous record by 3,500,000 acres, and the production, while it did not reach the billion-bushel goal, amounted to 917,100,000 bushels, the largest amount ever raised except in the record year of 1915, exceeding the preceding five-year average by nearly 107,000,000 bushels. Equally striking

were the results in producing large supplies of other crops, meat, and dairy products. The labor situation became even more acute, with the extension of the draft and the large opportunities offered by other industries. Organized effort was made to meet the shortage. A Boys' Working Reserve was organized, students were recruited to work on the farms during their vacation, colleges lengthened the summer vacation, and a Women's Land Army went into training. Business men, clerks, and factory operatives worked on the farms after regular hours and in their vacations to gather in the world's bread crops without loss. On the whole the results furnished a new evidence of the remarkable resourcefulness of American agriculture.

Under stress of the emergency Great Britain redoubled its efforts and added another 2,000,000 acres to its tilled area, the increase in wheat being 752,000 acres. The labor situation became increasingly acute, and unusual and part-time labor had to be resorted to. More than 300,000 whole-time and part-time women workers were reported to be engaged on the land in the United Kingdom. The acreage in wheat, barley, and oats in that year was the highest ever recorded in British agriculture and that in potatoes the largest since 1872. The harvest was not only greater than in any previous year, but the yields per acre were equal to the best recorded. It was estimated that the production would provide forty weeks' supply of bread stuffs for the entire population of the United Kingdom at the prevailing scale of milling and consumption, a remarkable achievement for a country which only a few years before imported its food stuffs in such large measure. The estimate, moreover, takes no account of food produced on allotments, of which there were fully 800,000 more in England and Wales than in 1916. France likewise made strenuous efforts to extend its food production in 1918, but by reason of its reduced man power had about reached its maximum. While the wheat crop was larger and of better quality than in the preceding year, production had dwindled with the continuance of the war and even with the 1918 increase was much below the normal for that country. The potato situation was particularly grave, the crop being not over two-thirds of the ten-year average.

A systematic campaign like that of the previous year was prosecuted in the United States in the fall of 1918, with the objective of a great liberty wheat harvest for 1919. The response was an acreage 13,000,000 acres greater than any previously recorded. Although the season was not favorable for the spring-sown crop, wheat production amounted to 941,000,000 bushels, considerably in advance of the 1918 crop and the second largest in history. The total area sown to leading cereals in the crop of 1919 was 33,000,000 acres greater than the pre-war average for 1910-14 and produced 635,000,000 bushels more than that average. At prevailing prices the value of all crops in the United States in 1919 was estimated at \$15,873,000,000, compared with the pre-war average of \$5,827,000,000. This was due in part to the higher prices but also represented the increased response to the appeal for food. The world crops as estimated by the International Institute of Agriculture, while large, were not over 70 per cent of food requirements in the European countries. There was a decided decrease in the area devoted to cereals

and potatoes in Great Britain, with a consequent decrease in production. There were corresponding decreases in livestock, with a disquieting prospect for milk and a falling off of young stock and sheep. The Armistice, therefore, found Europe largely dependent on imported food, with enormously increased demand. The large part which agriculture had had in determining the result of the war was everywhere conceded, and in Great Britain especially a more definite and favorable agricultural policy promised, with the appointment of a Royal Commission under the Ministry of Reconstruction.

Agriculture Following the War. After the Armistice the United States Department of Agriculture, realizing the possible dangers of overproduction as a result of the opening up of the channels of trade and the resumption of farming in Europe, recommended a reduction in the wheat area of about 15 per cent and advised safe farming. The season was unfavorable, the labor shortage continued, amounting to approximately 37 per cent, and wages rose to an appalling point. This, with the continued high cost of fertilizers, machinery and supplies, all of which had greatly increased since 1914, made the hazard unusually large. Altogether the American farmers had to meet the most difficult situation in 1920 they had ever experienced. In spite of this the harvest was the largest of record, with a single exception. It met a falling market, however, in the late summer and autumn, with the worst slump in the history of grain prices. This threw the farmers and the banks supporting them into panic and resulted in the most severe agricultural depression the country had ever known. While Europe was still in need of outside food, difficulties of transportation, unfavorable exchange, and inability of the countries to buy worked against export. Moreover, Canada and British India, two prominent exporting countries, had a combined wheat crop 195,000,000 bushels greater than in 1919.

While agriculture shared a general business depression in America, no other industry was affected so soon or so seriously. Farmers had not been allowed to profit by the war emergency as other industries had. Prices had been held down by price limitation of the Food Administration and by agreement. Farmers had produced their crops at maximum costs, and the inflation in land prices had necessitated many buyers' executing heavy mortgages. Agriculture was one of the very first industries to be affected by deflation, which in its case was sudden and precipitate, not gradual and regulated as in most other industries. The unusually heavy harvest of 1920, produced at maximum costs, was worth \$3,000,000,000 less than the smaller crop of 1919. Live stock and its products likewise declined to an extent causing serious loss to producers. The total value of animal products in 1920 was about \$200,000,000 less than in 1919.

Congress, called upon for relief, revived the War Finance Corporation to aid local banks in carrying farmers and marketing crops, and passed an emergency tariff favorable to agriculture. Price conditions continued in 1921, with production far in excess of domestic needs, high freight rates, inability of Europe to buy, and general business depression. Wheat fell below \$1 a bushel, with its purchasing power less than the low price of 49 cents in 1894. Corn on the farms of the corn belt was lower than for 25 years. It was estimated that one-fourth

of the farmers of the country were facing bankruptcy or had been wiped out. Similarly land rents, which had doubled, trebled, and increased even more in the prosperous years of the war, caused many renters to lose not only their labor but their savings. The purchasing power of the principal farm crops became lower than ever before, and that of the major grain crops was little more than half the average for the five pre-war years. The farmers' wages were reduced to about the pre-war level, while the wages of workers in other lines remained near the war level. At the close of the year the cost of getting farm products to market frequently exceeded the amount the farmer himself received in return. The situation attracted such attention that Congress appointed a Joint Congressional Commission of Agricultural Inquiry, which in the winter of 1921-22 made a series of illuminating reports, and urged the necessity for the formulation of a definite programme looking to the permanent development of agriculture, with a view to relating it to the various agencies of distribution in such a way as to avoid duplication, waste, and loss in reaching the consumer.

The severe agricultural depression continued in 1922 with little abatement, while the cumulative effect noticeably increased and there was great discouragement on the part of the farming people. In most farming States taxes on farms had more than doubled since before the War. In the Central Western States these absorbed one-third of the farm income, as compared with less than one-tenth in 1913. Early in the year President Harding called a National Agricultural Conference at Washington, the first of the kind ever held in this country, with representatives from the principal farm organizations, agricultural institutions, and various lines of industry directly related to agriculture. This gave opportunity for a broadminded consideration of the situation and the outlining of remedial measures. The recommendations and the measures urged were notable for their sound constructive character. Favorable action was taken on many of them. The revival of the War Finance Corporation, making available more than \$350,000,000 for agricultural financing, saved thousands of farmers from bankruptcy and many banks in the agricultural regions from passing into the hands of receivers, besides restoring confidence and having a salient effect upon interest rates. The provision for greatly increased mortgage loans by the farm land banks and joint stock land banks enabled farmers in large numbers to refund their obligations and place them on a deferred payment basis. Unusual attention was given to aiding the marketing of farm products. A tariff law more favorable to agriculture was enacted; the Packers and Stockyards Act placed all packing houses, stockyards, and similar agencies under government supervision, giving assurance of open competitive conditions; and an act was passed extending government supervision over grain exchanges dealing in futures, in the effort to control another practice believed to be disadvantageous to agriculture. During this period the Farm Bloc in Congress became active and a source of great power, overriding party lines and giving the farmers' interest unprecedented force.

Although there were some marks of improvement in 1923 over the three previous years, the wheat situation became even worse, and it was only by comparison that the situation as a whole

appeared better. The 1923 wheat crop, nearly three-fourths as large as that of 1919, had a value of only \$726,000,000, compared with \$2,080,000,000 in 1919. The aggregate value of crops and live stock products, however, was estimated at \$12,204,000,000, nearly a billion more than in 1922. It was also greater than in 1921 or for any year prior to 1917. The index of the purchasing power of farm crops as a group was 75 as compared with 64 in 1922. Many farmers, however, had been reduced to the breaking point by the low price of wheat and the shrinkage in value of range cattle. Thousands went bankrupt and many more were impoverished. Statistics of fifteen wheat and corn producing States showed that 9.5 per cent of the farmers had lost their farms, while an additional 15 per cent were saved only by the leniency of their creditors. These continued four years of distress resulted in increasing unrest and dissatisfaction over the whole country and a drift to the towns and cities. Of the many remedies suggested and pressed with vigor, a common one was the guarantee of prices for wheat, which did not find favor. The country banks of the Northwest were given support by the banking interests of the country, but proposals for a \$50,000,000 loan to farmers of the Northwest to enable greater diversification was defeated in Congress after much agitation. The President raised the tariff on wheat 12 cents a bushel, bringing it up to 42 cents, to meet the competition of Canada. It was made clear, however, that the United States could not successfully compete with Canada in wheat selling in European markets, owing to cheaper production and more advantageous shipping facilities.

The wheat acreage declined from the peak of 75,000,000 acres in 1919 to 58,000,000 acres in 1923, only 11,000,000 acres above the pre-war average. The area sown in the fall of 1923 indicated a further decline of some 6,000,000 acres, which was still regarded as in excess of domestic needs. The unfavorable exchange and diminished ability of Europe to buy, taken in connection with the competition of other countries for the European market, emphasized the need of readjustment. The exports of wheat fell off from upwards of 293,000,000 bushels in 1921 and 208,000,000 bushels in 1922 to a little less than 155,000,000 bushels in 1923. There was also a considerable decline in exports of flour. Statistics collected by the U. S. Department of Agriculture in 1922 from over the country showed the average cost of producing a bushel of wheat to be \$1.23, while the average price received by farmers was \$1.11, and of oats 53 cents as compared with 48 cents.

While there was great revival of agricultural production in the countries of Europe, farming was in an abnormal condition in several localities and suffered depression. The wheat growers of Australia had had their market cut off by shortage of tonnage and wheat was accumulating in large quantities. The Government afforded relief by guaranteeing \$1 a bushel, later prepared for bulk storage and shipment, and administered the elevator system. Arrangements were made to finance the wheat pool, the Government advancing farmers three shillings per bushel f.o.b. Aid was also extended to the pastoral industry by a subsidy of ¼d. a pound on beef. The Argentine live stock industry was reported in the most serious condition in its history, due to the slump in foreign demand, depreciation in the

value of grazing lands and threatened loss of herds through insufficient pasturage. South Africa, faced with a large cattle surplus and very low prices, had a government-provided bounty equivalent to one cent per pound on exported beef and \$.005 on live stock.

The cultivated area in Great Britain began to decline almost immediately after the War. Landowners, who had suffered severely during the War and were not permitted to raise rents although taxes went up, were under greater obligation to handle their land productively. Demands from tenants increased. Labor became scarce and wages advanced. Many large estates were broken up and sold. It was repeatedly urged from the lesson of the War that the use to which land was put was not a private concern of owners and occupiers, but had become a matter of vital interest to the nation. However, the recommendations of the Royal Commission were not enacted into law, and the essential features of a compromise passed in 1920, continuing a portion of the Corn Production Act and otherwise providing for greater security in arable farming, were repealed the following year, causing great disappointment and sharp criticism. In 1920 the acreage under wheat in England and Wales was only 70,000 acres more than in 1914, with an equal falling off in oats. In ten years the urban population had increased about 2,000,000, while rural districts declined about 50,000. The last payments under the guaranteed minimum grain prices, originated in 1917, were made in 1922. The maintenance of this guarantee during six years cost the country approximately £14,000,000. The plight of British farmers in 1923 was well-nigh desperate. In that year 400,000 acres of plowed land were laid down in grass. The war-time increase in cultivated acreage disappeared, and wages of agricultural labor became so low as to afford only the scantiest livelihood. Despite this, the net returns on large estates was only about 1 per cent. The depression was fast approaching that of the 80's. There was strong opposition to protective tariff, because of the large amount of unemployment in the industries and the demand for cheap food. An Agricultural Tribunal made a further report with recommendations, and finally, near the close of the year, an agricultural subsidy of £1 an acre was provided on arable land, including market gardens, fruit, and hops, contingent on the farmers' paying labor a wage of not less than 30 shillings a week. An Agricultural Credits Act was passed, and a reduction was effected in freight rates.

France recovered quite rapidly after the War. In less than two years after the Armistice nearly 50 per cent of the devastated land had been cleared and put under cultivation, and in a short time practically the entire area had been restored. Early assistance given farmers in that area was extended to those who wished to acquire farm land to replace that too seriously damaged for occupancy. By 1923 reconstruction had reached a point where wheat production was about 90 per cent of the pre-war figure. French millers were still required to mill closely and to incorporate from 8 to 10 per cent of substitutes in flour. As in several other European countries, rural depopulation became something of a problem. Many farmers and laborers were attracted to the towns by higher wages. Devastated lands in the Belgian war zone

were taken over by the government, restored and turned back to the original owners in good condition, with payment of 5 per cent interest on pre-war value while in government hands. Italy continued for several years to fix the price for wheat, and paid premiums for grain produced in the southern provinces or wheat produced in excess of that raised in 1918, the effort being to minimize importation.

Production in Germany recovered quite rapidly, but agricultural labor became a problem and live stock numbers were short. Farmers were slow to accept the Government Food Commission price for grain, and there was conflict of interest between city and rural population. Consequently food shortage continued into 1924. The three main aspects in connection with this were (1) the breakdown in currency, causing a collapse of distribution, (2) inability of merchants to finance the full annual margin of imports necessary to make up the usual deficit in domestic production, and (3) widespread unemployment, as a result of which millions of workers in urban and manufacturing districts were unable to purchase sufficient food, even if it were in the market. Russian agriculture recovered slowly, owing to the disorganized condition of the country and the indefinite land policy which contributed to distrust and uncertainty. Crop production in lines in which the country was formerly a leader and a large exporter decreased tremendously, while in many sections famine conditions prevailed. By 1923 the grain area was reported at about 80 per cent of the pre-war figures for the present Russian territory, but only small quantities were available for export. Besides the local confiscation of the land in Soviet Russia, there were various measures for breaking up large estates in Germany, Austria, Hungary, Poland, Rumania, and Czechoslovakia.

Census of Agriculture. The census of 1920 showed a total farm area in the United States of 955,883,715 acres, as compared with 878,798,325 acres in 1910, an increase of 8.8 per cent. There were 503,073,007 acres of improved land in farms in 1920, as compared with 478,451,750 acres in 1910, an increase of 5.1 per cent. The increase in total acreage was therefore somewhat larger than in improved farm land. There was a decrease of 12 per cent in farm woodland. The total number of farms in 1920 was 6,448,343, an increase of 1.4 per cent in the decade. The average size of the farms was 148.2 acres, of which 78 acres were improved land, a small increase in each case over 1910. The aggregate value of all farm property in 1920 was reported as \$77,924,100,338, representing an increase of over 90 per cent in the decade. This large increase, however, was less than that between 1900 and 1910, which amounted to over 100 per cent. The chief increase was in land, which rose from \$34,801,125,697 in 1910 to \$66,334,309,556 in 1920, the average value per acre being \$32.40 in 1910 and \$57.36 in 1920.

For the first time in the country's history the urban population exceeded that in rural territory, and the growth of the former had been at a considerably more rapid rate; i.e. over 12,000,000 in urban and only a million and a half in rural territory. Thus, while the increase in total population was nearly 15 per cent during the decade and the growth in urban population was 28.8 per cent, the increase in rural territory was only 3.2 per cent, and in the purely

country districts an actual decrease of over a quarter of a million was recorded. This change in the trend of population from the country to town and city caused no little comment. Agriculture was not keeping up with the growth of total population, considered from the standpoint of rural population, number of farms or acreage of improved land in farms. It was calculated that more than 4,000,000 people were diverted from agriculture to other industries in the growth of the 20-year period, 1900-20. This drift from the farms to the cities, due to larger urban opportunities, continued through the years of severe agricultural depression, 1920-23. It was estimated that fully a million more persons had moved from the land. This change could hardly fail to affect production, even with the increased efficiency of the American farmer. The peak of production per capita of inhabitants was reached about 1906 or 1907, and although the decrease since then had been slow it bade fair to be more evident with the shift of rural population. Meanwhile, for the first time in history the value of imports of agricultural products into the United States exceeded the value of exports. These imports consisted mainly of tea, coffee, sugar, tropical fruits, and nuts. In the fiscal year 1923 these imports, including forest products, were valued at \$2,135,000,000 compared with exports valued at \$1,927,000,000. This adverse showing was in part due to the low prices of export products and the high prices of imports.

Position of the United States in World Agriculture. Of the four countries which have stood preëminent in agricultural production, i.e. the United States, Russia, China, and India, the United States was the only one producing a surplus for export. It is the largest producer of corn, it is much the largest wheat producing country of the world, and since the decline in Russia it leads in the other cereals except rye and rice. No other country approaches it in cotton or tobacco. Nearly 70 per cent of the world's crop of corn, 60 per cent of the cotton, 50 per cent of the tobacco, and approximately one-fourth of the total cereal supply is raised in the United States. This is done with the labor of about one-fourth of the gainfully employed population, whereas 85 per cent of the population of Russia has been classed as agricultural and three-fourths of the people of China and of India derive their support from agriculture. The large share of the world's staple crops contributed by the United States is grown with less than 4 per cent of the farmers and farm laborers of the world, showing the high efficiency of the American farmer. The increase in productivity of the American farm is estimated at fully 15 per cent in the past decade. There has also been a very marked upward trend in yield per acre in recent years. The United States also leads all nations in exports of agricultural products. Since the war the value of its agricultural exports has exceeded the combined value of those from all other nations in the world, and yet these exports amount to only one-eighth of its production. Four countries now furnish about 90 per cent of the world's surplus of agricultural products, i.e. the United States, Canada, Argentina, and Australia, with the United States contributing approximately half. Its four great surplus agricultural products are cotton, wheat, corn, and hogs.

Farm Organization. The farming people

made remarkable efforts during the decade to protect their economic interests, promote their welfare and improve their general condition through organization. The American Farm Bureau Federation, formed by the federation of the State farm bureaus, based in turn on the County bureaus organized to promote extension work, became the largest and most powerful national organization, with a membership of approximately a million. Under its leadership various cooperative ventures were launched and agricultural legislation promoted. The period of depression stimulated efforts toward organization, especially for the purpose of cooperation in buying and selling products. The United States Census reported that in 1919 more than 1,000,000 farmers marketed cooperatively products valued at \$722,000,000, while supplies to the value of \$84,000,000 were purchased through cooperative buying associations. Grain, milk, cream, butter, fruit, and truck crops were the most prominent products handled by marketing associations. Organization later spread to other branches, notably cotton and tobacco, for which large marketing organizations were formed. According to the Department of Agriculture more than \$2,000,000,000 of business was done by farmer organizations in 1923, a large percentage of it in selling farm products. Grain organizations did a total business of \$490,000,000, dairy organizations \$300,000,000, live stock shipping associations \$220,000,000, fruit and vegetable associations \$280,000,000, cotton cooperatives \$100,000,000, and tobacco organizations \$132,000,000. It was estimated that 10,000 cooperative organizations were in operation.

Many failures of cooperative enterprises have been traced to such causes as falling prices, inadequate financing, poor management, and too small volume of business in proportion to the overhead. Study has developed the essentials of successful organization and cooperation and is aiding the movement greatly. Many obstacles have been placed in the way of such organization because of its interference with existing business methods, and it was much hampered by prosecutions under the Sherman Law, but its legality was assured by an act in 1922 specifically recognizing the right of farmers to associate for purposes of marketing their products. In Great Britain the Ministry of Agriculture has stimulated cooperative societies for the marketing of products by the offer of loans to assist in financing their operation.

Standardization of Farm Products. Cooperative marketing, selling by contract, and warehousing have been greatly promoted through the establishment of Federal standards for agricultural products. Such standards, authorized by Congress, include cereals, cotton, hay, tobacco, and live stock, wool, and many of the most important fruits and vegetables. The cotton standards have been adopted by the leading cotton exchanges of Europe for American cotton. The warehouse act, stabilizing the receipts for products stored in licensed warehouses, necessitated such standards, as did also the inauguration by the Department of Agriculture of shipping-point inspection of fruits and vegetables. Great benefit has been derived from this system of standards, although in their making they have been subject to sharp criticism. Their use has done away with many of the controversies between shipper and buyer which formerly arose,

PRODUCTION BY COUNTRIES IN 1922 AND 1923 OF WHEAT, RYE, OATS, BARLEY AND MAIZE IN BUSHELS AND OF COTTON IN BALES

	Wheat		Rye		Oats		Barley		Maize		Cotton	
	1923	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923	1922
United States	785,731,000	867,598,000	63,023,000	103,362,000	1,299,823,000	1,215,803,000	198,155,000	182,068,000	3,054,395,000	2,906,020,000	9,761,817	7,953,641
Canada	474,200,000	399,786,000	23,157,000	32,373,000	531,378,000	491,339,000	80,357,000	71,865,000	16,050,000	14,309,000		
Argentina	195,844,000	180,641,000	2,141,000		54,633,000	2,852,000	5,380,000	4,556,000	1,796,000	2,050,000		
Chile	25,000,000	23,423,000	63,000	57,000	3,029,000	3,973,000	7,656,000	11,161,000	150,085,000	156,056,000		16,130
Uruguay	3,674,000	9,944,000			1,722,000	2,069,000	28,000	42,000	4,730,000			
Austria	8,826,000	6,092,000	15,321,000	12,990,000	24,977,000	15,999,000	7,486,000	5,190,000	3,703,000			
Hungary	31,470,000	31,471,000	31,470,000	21,432,000	23,268,000	20,876,000	24,196,000	32,493,000	54,060,000			
Czechoslovakia	52,275,000	46,683,000	86,255,000		64,519,000	55,317,000	42,144,000	10,587,000	8,995,000			
Belgium	12,590,000	10,615,000	19,148,000	18,334,000	36,335,000	35,783,000	4,323,000	3,143,000				
Bulgaria	36,224,000	27,923,000	6,840,000	7,204,000	10,033,000	9,370,000	12,252,000	11,941,000				
Denmark	8,819,000	9,249,000	13,735,000	13,999,000	68,895,000	58,403,000	33,934,000	30,433,000	21,568,000	15,170,000	3,600	1,840
Estonia	777,000	500,000	6,510,000	3,682,000	7,942,000	10,057,000	4,091,000	6,670,000				
Finland	472,000	297,000	7,776,000		26,997,000	23,193,000	4,928,000	4,537,000				
France	290,455,000	243,313,000	36,177,000	37,613,000	377,470,000	253,243,000	46,394,000	39,534,000	11,820,000	13,621,000		
Germany	103,603,000	71,933,000	276,810,000	206,051,000	411,689,000	279,643,000	109,311,000	73,837,000				
Greece	13,336,000	9,333,000	2,609,000	2,315,000	3,963,000	3,964,000	7,101,000	7,101,000	82,565,000	70,217,000	4,603	
Italy	224,840,000	161,641,000	6,320,000	5,562,000	36,514,000	39,463,000	10,103,000	8,253,000				
Latvia	1,640,000	958,000	10,735,000	6,759,000	16,412,000	18,171,000	7,500,000	6,770,000				
Lithuania	2,965,000	3,271,000	24,171,000	23,764,000	22,686,000	28,942,000	8,440,000	10,724,000				
Netherlands	6,678,000	6,161,000	15,086,000	16,533,000	23,942,000	17,817,000	12,212,000	13,830,000				
Norway	587,000	643,000	740,000	862,000	10,884,000	13,380,000	81,966,000	59,559,000	3,819,000	2,720,000		
Poland	53,381,000	42,274,000	252,428,000	193,428,000	182,959,000	12,669,000		3,141,000				
Portugal	12,964,000	9,782,000	5,340,000	5,189,000					17,347,000	113,730,000	55,000	43,000
Rumania	102,311,000	82,582,000	9,446,000	9,022,000	68,894,000	84,130,000	68,615,000	91,551,000				
Russia	157,112,000	125,469,000	27,515,000	26,252,000		355,664,000						
Spain	11,082,000	9,381,000	24,323,000	26,252,000	36,989,000	31,214,000	91,731,000	77,533,000	23,450,000	26,832,000		
Sweden	5,452,000	3,572,000	6,162,000	1,659,000	69,149,000	78,953,000	11,245,000	13,280,000				
Switzerland	6,000,000	6,000,000			3,059,000	2,466,000	570,000	491,000	162,000	181,300		
United Kingdom	61,894,000	48,250,000	5,795,000	4,433,000	198,000,000	196,122,000		57,923,000				
Yugo-Slavia	369,264,000	365,352,000			18,272,000	14,327,000	14,327,000	140,135,000				
British India	26,483,000	27,615,000			13,436,000	81,369,000	81,369,000	87,137,000	4,247,000	858	798	
Japan	35,611,000	18,232,000			5,570,000	46,316,000	46,316,000	89,805,000				
Algeria	40,654,000	36,648,000			792,000	11,376,000	11,376,000	11,306,000	152,800	270,400	272	293
Egypt	9,921,000	3,674,000			15,184,000	11,025,000	11,025,000	1,837,000				
Tunis	109,460,000	129,089,000			6,339,000	6,339,000		6,339,000				
Australia	8,395,000	10,565,000			610,000	1,151,000		1,151,000	488,000	501,000	7,531	2,720
New Zealand												
Union of South Africa	8,419,000	7,613,000			8,103,000			1,282,000			3,138	1,778
Mexico		13,626,000						3,887,000	68,260,000	178,243		147,302

and the system of inspection maintained has given a large measure of protection.

Production by Countries. See accompanying table on p. 43.

New Literature. The following may be noted among the more important of the recent books on Agriculture and Agricultural Subjects: L. H. Bailey, *Cyclopædia of Farm Crops* (New York, 1922); *Cyclopædia of Farm Animals* (New York, 1922); H. J. Waters, *The Essentials of Agriculture* (Boston and London, 1915); A. H. H. Matthews, *Fifty Years of Agricultural Politics, 1865-1915* (London, 1915); A. D. Hall, *Agriculture After the War* (Oxford, 1916); B. H. Hibbard, *Effects of the Great War upon Agriculture in the United States and Great Britain* (Washington, 1919); H. C. Taylor, *Agricultural Economics* (New York and London, 1919); J. M. Gillette, *Constructive Rural Sociology* (New York, 1916); J. E. Boyle, *Agricultural Economics* (Philadelphia and London, 1921); C. S. Duncan, *Marketing, Its Problems and Methods* (New York and London, 1920); O. B. Jesness, *The Cooperative Marketing of Farm Products* (Philadelphia and London, 1923); Helen Douglas Irvine, *The Making of Rural Europe* (London, 1923); H. L. Shantz and C. F. Marbut, *The Vegetation and Soils of America* (New York, 1923); L. Carrier, *The Beginnings of Agriculture in America* (New York, 1923); J. Shaefer, *The History of Agriculture in Wisconsin* (State Historical Society, Madison, 1922); G. F. Warren, *Prices of Farm Products in the United States* (United States Department of Agriculture, Bulletin 999, 1921); G. F. Warren, *Prices of Farm Products in New York* (covering 132 years) (New York, Cornell Experiment Station, Bulletin 416, 1923); J. T. Stewart, *Engineering on the Farm* (Chicago, 1923). See AGRICULTURAL EDUCATION.

AGRICULTURE, INTERNATIONAL INSTITUTE OF. The Institute, located at Rome, Italy, numbered 64 nations as adhering members in 1924. The United States had a larger number of votes than any other nation. The Institute continued its work with difficulty during the War, but maintained its organization and has since made notable progress. David Lubin, its originator and for many years the United States representative, died early in 1919. English has been added to French as one of the official languages of the Institute. The reporting service to the United States was greatly improved. The condition and estimates for important crops and live stock from the various countries reporting were cabled promptly. This information is broadcasted from the United States Department of Agriculture by radio, telegraph, and press release, so that the farmer may have the information as soon as the trader. This has gone a long way toward realizing the underlying purpose of its founders.

AGRICULTURE, UNITED STATES DEPARTMENT OF. This Department, established as a separate branch of the Government in 1862, has grown to be one of the large central agencies, working not only for the interests of the agricultural industry, but for those of the public welfare generally. The range of its service extends from food production and health to weather prediction, means of communication, and education. The chief functions of the Department may be classed as administration, service including information, regulation relating to the carrying out of various laws, and

research. In recent years the variety of its activities has been greatly enlarged and its work extended. It conducts research and inquiry in nearly every phase of crop and live stock production and distribution, is carrying out a systematic soil survey, and is actively studying the broad economic problems in the field of agriculture. It is supervising the greatest road building programme ever undertaken in history, by far the most extensive system for aiding farmers and their families directly through agricultural extension, and a nationwide system of agricultural experiment stations. It also is administering the National Forests, comprising upwards of 157,000,000 acres of land, and it is enforcing more than 30 regulatory laws for the health, safety, and general welfare of the public. Among the latter may be mentioned those relating to the inspection of foods and drugs, the inspection of live stock and their products after slaughter for food consumption, import and export of animals and control of interstate movement; laws regulating the importation of foreign birds and animals, interstate trade in game and protection of migratory and insectivorous birds, the inspection and quarantine of diseased or infested plants, road construction in coöperation with the States, cotton and grain standards, trade in grain futures, Federal licensing of warehouses, and control of stockyards and packing-houses.

Edwin T. Meredith of Iowa succeeded David F. Houston as Secretary of Agriculture in February, 1920, and in turn was succeeded by Henry C. Wallace of Iowa on March 4, 1921. In addition to the Secretary, there is one Assistant Secretary, and Directors of Scientific Work, Regulatory Work, and Extension, respectively. The organization includes the Weather Bureau, the Forest Service, the Bureaus of Animal Industry, Plant Industry, Chemistry, Soils, Entomology, Biological Survey, Public Roads, Agricultural Economics, and Home Economics; the Office of Experiment Stations, Agricultural Extension Service, fixed Nitrogen Research Laboratory, Library, and several smaller units. The Bureau of Home Economics was established as a separate unit July 1, 1923.

The personnel of the Department numbered more than 20,000 persons in 1924. Its funds for the fiscal year ended June 30, 1924, aggregated \$69,536,653, including \$32,300,000 for road building. In 1923 the Department issued over 1500 separate publications, about half of which were new, the remainder being reprints. The total number of copies issued was about 36,000,000. Included in these publications were periodicals entitled *Journal of Agricultural Research*, *Monthly Weather Review*, *Experiment Station Record*, *Crops and Markets*, and *The Official Record*, a house organ; upwards of 600 *Farmers' Bulletins*, an *Annual Report* of the Secretary, and the *Yearbook*. In addition to the above a large number of articles were prepared for publication outside, in trade, scientific, and popular periodicals. The Department has an extensive and varied correspondence, and maintains a press service for the dissemination of matter of immediate interest.

AHERN, MARY EILEEN (?-). An American librarian and organizer, born near Indianapolis, Ind., and educated at the Spencer (Ind.) High School, the Central Normal College of Indiana, and the Library School of the Armour Institute of Technology, Chicago. After beginning

her career as a public school teacher in Indiana, she held the offices of Assistant State Librarian of Indiana (1889-93) and of State Librarian (1893-5). In 1889 she organized the Indiana Library Association and was its secretary from 1889-96. She was organizer (1896) and secretary (1896-1907) of the library department of the National Education Association. In 1919 she was publicity agent of the American Library Association in France. She has lectured in schools and before clubs, and since 1896 she has been editor of *Public Libraries*. She is a contributor to library and educational journals.

AHMED FUAD PASHA. See **FUAD I.**

AHMED MIRZA (1898-). A Shah of Persia (see **VOL. I**). He was crowned in 1914, but the government of Persia was under the control of the cabinet, whose most powerful member was Reza Khan (q.v.).

AICARD, JEAN (1848-1921), French poet and novelist (see **VOL. I**). After 1914 he published several volumes of war poetry and two novels, *Arlette des Mayons* (1917) and *Gaspard de Besse* (1919). The last named work, in two volumes (*Gaspard de Besse, Raconté aux Poilus de France*, and *Gaspard de Besse, ses Dernières Aventures*) portrays a sort of Provençal Robin Hood, a man of the people who takes a truly Gallic pleasure in life and leads an existence which is care-free if hardly virtuous. He died in Paris, May 13, 1921.

AIKEN, CONRAD (POTTER). (1889-). American poet, born at Savannah, Ga., and educated at Harvard. After the appearance of his first volume, *Earth Triumphant and Other Tales* (1914), he became an important figure in the American poetical renaissance of the decade 1914-24, producing almost a dozen works in that period. Always an individualist, in his poetry, Mr. Aiken followed no contemporary beaten track. His work possesses a metaphysical quality, concerning itself with the consciousness of man rather than with the external world, and for this reason his manner is often obscure. Yet he has written poetry rich in color, varied in incident, and musical in technique and content, as in *Priapus and the Pool* (1921). Though the narrative poem is his favorite form, as in *The Jig of Forslin* (1916), *The House of Dust* (1920), and *Punch, The Immortal Liar* (1921), he has also written lyrics of a high order, particularly in *Turns and Movies* (1916). Mr. Aiken set forth his æsthetic credo lucidly and provocatively in a volume of critical essays, *Scepticisms* (1919). The title of this work and of two others, *Nocturne of Remembered Spring* (1917), and *The Charnel Rose* (1918), give something of the implications of his philosophical attitude. He has also written for *The Dial* short stories similar in manner and phrasing to his poetry. In 1923 he published *The Pilgrimage of Festus*, a narrative poem, which he called "a cerebral adventure."

AIKINS, SIR JAMES (ALBERT MANNING) (1851-). Canadian lawyer and administrator, born in the County of Peel, Upper Canada. He was educated at Upper Canada College and the University of Toronto. He was a member of Parliament from Brandon, Canada, 1911-15. As director of the Imperial Bank of Canada he took a prominent part in the financial affairs of the Dominion. He was counsel of the Canadian Pacific Railway Company at Winnipeg, 1881-1911; president of the Canadian Bar Association, 1914-21; president of the Confer-

ence of Commissioners on Uniformity of Laws and later Lieutenant-Governor of Manitoba. From 1887 to 1916 he was Honorary Bursar and Member of Council, University of Winnipeg, and later Honorary Lieutenant-Colonel of the 90th Regiment Winnipeg Rifles and Honorary Colonel of the 99th Regiment Manitoba Rangers.

AINSWORTH, WILLIAM NEWMAN (1872-). An American Methodist Episcopal bishop, born at Camilla, Ga., and educated at Emory College, Ga. He was ordained in the ministry of the Methodist Episcopal Church of the South in 1891 and served as pastor in various churches in the South until 1909, when he became president of Wesleyan Female College, Macon, Ga., for three years. He took up his duties again as pastor in 1913 and was elected bishop in 1918.

AIR BOMBS. See **BOMBING OF VESSELS, BY AIRCRAFT.**

AIRCRAFT. See **AÉRONAUTICS.**

AIRCRAFT CARRIER. See **VESSEL, NAVAL; SHIPBUILDING; etc.**

AIRCRAFT GUNS. See **SMALL ARMS.**

AIR DEFENSE. See **BOMBING OF VESSELS, BY AIRCRAFT; NAVIES.**

AIRPLANE. See **AÉRONAUTICS.**

AIRSHIP, NAVAL, U. S. See **NAVIES, United States.**

AISHTON, RICHARD HENRY (1860-). An American railway official, born at Evanston, Ill., and educated in the public schools. He entered the railroad service in 1878 as axman in the engineering corps of the Chicago and Northwestern Railway. After holding various other positions in the same company, he became assistant superintendent in 1895, superintendent in 1897, general superintendent in 1899, assistant general manager in 1902, and general manager of lines east of the Missouri in 1906. This last position he held until 1910. From 1910 to 1914 he was vice-president in charge of operation and maintenance, and from 1916 to 1920, president. He was director of the Western Division of Railways under the United States government from 1918 to 1920. In the latter year he became president of the American Railway Association.

AISNE, BATTLES OF THE. See **WAR IN EUROPE, Western Front.**

AITCHISON, CLYDE B. (1875-). An Interstate Commerce Commissioner. He was born at Clinton, Iowa, and educated at Hastings College (Nebraska) and the University of Oregon. He was admitted to the bar in 1896, and to the Supreme Court of the United States in 1908. From 1896 to 1903 he practiced in Iowa, going to Portland, Ore., in the latter year. In 1905-6 he was secretary of the commission to revise tax and revenue laws in Oregon. From 1907 to 1916 he was a member of the Railroad Commission of Oregon and of its successor, the Public Service Commission. He was solicitor for the National Association of Railway Commissioners in 1916-17; in the latter year he became a member of the Interstate Commerce Commission and served as chairman, 1919-20. He is author of *An Annotation of Iowa Decisions* (1902).

AITCHISON, JOHN YOUNG (1868-). An American Baptist clergyman, born at Cascade, Iowa, and educated at Central College, Pella, Iowa, Des Moines College, and the Divinity School of the University of Chicago. He was

ordained in the Baptist ministry in 1896 and held various pastorates in the Middle West from 1894 to 1909. He was secretary of the American Baptist Home Missionary Society of Chicago, 1912-16, and home secretary of the American Baptist Foreign Missionary Society from 1916-19. In 1919 he became director general of the Board of Promotion of the Northern Baptist Convention, which proposed to raise \$100,000,000 to advance the work of the church.

AITKEN, ROBERT INGERSOLL (1878-). An American sculptor (see Vol. I). In 1915 he received the medal of honor of the Architectural League of New York for sculpture and the silver medal for sculpture at the Panama-Pacific International Exposition in the same year. He was commissioned captain in the United States army and assigned to Machine Gun Company, 306th Infantry. Since the War he has designed and executed a number of war memorials, chief of which is the one at Kansas City, Mo., in process of erection in 1924.

AKELEY, CARL ETHAN (1864-). An American inventor and taxidermist. He began his work with the Field Museum in Chicago in 1895 and with the American Museum of Natural History in New York City in 1909. During the War he served with the United States army as consulting engineer and also in the Emergency Fleet Corporation as special assistant in the concrete department. He invented the cement gun, the Akeley camera, etc. He studied big game in Africa, making several trips there for that purpose.

AKINS, ZOE (1886-). An American playwright and poet born at Humansville, Mo., and educated at home and in private schools. Beginning as a contributor to magazines, she attained considerable success as a playwright. Most of her plays have been very successfully produced. She published *A Book of First Poems* (London, 1912), and *Cake Upon the Waters*, a novel (1919), as well as short stories in popular magazines. Among her many dramatic works are *Papa* (1914); *The Magical City* (1916); *Déclassée*, produced in New York City in 1919 with Ethel Barrymore; *Foot-loose* (an adaptation), produced in New York City with Emily Stevens in 1920; *Daddy's Gone A-Hunting*, 1921, with Marjorie Rambeau; *The Varying Shore*, 1921, with Elsie Ferguson; *Greatness*, otherwise *The Texas Nightingale*, produced at the Empire Theatre in 1922, with Jobyna Howland; *A Royal Fandango* (1923), with Ethel Barrymore; *The Moon-Flowers* (1924), with Elsie Ferguson; and others.

AKRON. A manufacturing city of Ohio. The area increased from 7254 acres in 1915 to 16,120 acres in 1921; the population rose approximately 200 per cent, from 69,067 in 1910 to 208,435 in 1920. The city adopted a new charter of the commission manager type in 1920, but reverted to its old form in 1924. A city planning commission was appointed, and a comprehensive zoning ordinance was adopted, Aug 15, 1922. In 1915 a new municipal water system was established which represented an investment up to 1924 of about \$11,000,000. It included a reservoir in the Cuyahoga River with storage capacity of 2,385,200,000 gallons, a complete purification system, and a pumping station. North Hill viaduct over the Cuyahoga River was opened in 1922. Elimination of the railroad grade crossings on the main lines of the Pennsylvania, Erie, and Baltimore and

Ohio Railroads through the city was started in 1924.

AKRON, MUNICIPAL UNIVERSITY OF. A coeducational institution at Akron, Ohio, founded in 1872 as Buchtel College, taken over by the city, and re-named in 1914. Buchtel College was retained as the name of the college of liberal arts of the university, which also comprised in 1924 a college of engineering, a school of home economics, and Teachers' College. The number of day students enrolled increased from 198 in 1914 to 878 in the year 1923-24, with 330 in the summer session of 1923; there were also 954 students in the night classes in 1923-24. The number of faculty members, including librarians and registrars, increased from 23 to 62 in the same period; the number of catalogued volumes in the library, exclusive of pamphlets and public documents, increased from 10,000 to 18,000; the productive funds from \$750,000 to \$975,000; and the total yearly income from \$115,000 to \$228,000. In 1920 bonds were issued to the amount of \$150,000 for the enlargement of the engineering laboratory, and in 1923 the alumni raised \$35,000 for the erection of a stadium seating 8000 persons. Teachers' College was erected in 1921 in cooperation with the Akron Board of Education. President, Parke Rexford Kolbe, Ph.D.

ALABAMA. The twenty-eighth of the United States in size (51,998 square miles) and the eighteenth in population; capital, Montgomery. The population increased from 2,138,093 in 1910 to 2,348,174 in 1920. The white population increased from 1,228,832 to 1,447,032; the Negro decreased from 908,282 to 900,652. The native white population rose from 1,209,876 to 1,429,370, while the relatively small foreign-born population decreased from 18,956 to 17,662. Both urban and rural populations mounted, the former from 370,431 to 509,317, the latter from 1,767,662 to 1,838,857. The populations of the largest cities increased thus: Birmingham (q.v.), from 132,685 to 178,806; Mobile, 51,521 to 60,777; Montgomery, 38,136 to 43,464.

Agriculture. In Alabama, as in the other cotton-producing States, agricultural conditions in the decade 1914-24 were affected greatly by the ravages of the cotton boll weevil, which became serious about 1912. In fact, cotton being the leading crop, the diminishing extent of cotton-raising was especially felt in this State. The boll weevil had spread through the cotton-growing area by 1915. Its effects were shown in both the production of cotton and the area devoted to it, the latter being reduced in the ten-year period about 1,000,000 acres, or nearly one-third, while the production declined about 400,000 bales, or about 35 per cent. The changed conditions are indicated by the fact that while cotton for many decades occupied from 36 to 38 per cent of all the cultivated land in Alabama, in 1920 it had dropped to 26.6 per cent. This condition led to the planting of other crops than cotton, the acreage of cereals increasing over 20 per cent and corn about 30 per cent in the decade. There was also a considerable increase in the growth of forage crops and in the raising of hogs and some other live stock.

While the population of the State increased 9.8 per cent during the decade 1910-20, the number of farms decreased 2.6 per cent, from 262,901 to 256,099, and the acreage from 20,732,312 to 19,576,856. There was, however, a slight increase in the improved land in farms,

which rose from 9,693,581 to 9,893,407 acres. The total value of farm property in the State apparently increased 86.6 per cent in the decade, or from \$370,138,429 in 1910 to \$690,848,720 in 1920; the average value per farm from \$1408 to \$2698. But it must be borne in mind in the statement of these values, and indeed in the statement of all comparative values of the decade 1914 to 1924, that the inflation of the currency in the latter part of that period is to be taken into account. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920.

The total percentage of land used for agricultural purposes in 1910 was 63.2, and in 1920, 59.7, a slight decrease. The percentage of improved farm land, however, increased from 46.8 to 50.5. Of the total of 256,099 farmers in 1920, 71,089 owned their farms, 741 were managers, and 148,269 were tenants. There was an increase in the decade of 4000 farmers and a decrease of 10,000 tenants. The white farmers in 1920 numbered 160,896, as compared with 152,258 in 1910; the colored farmers, 95,205 in 1920 and 110,443 in 1910. Of the white farmers 89,887 owned their farms, and of the colored farmers, 77,202. There was a decrease in the Negro population, 1910-20, of nearly 1 per cent, compared with an increase of nearly 10 per cent in the preceding decade, which noticeably affected the farm labor situation. The farms free from mortgage in 1920 were 64,498 and 74,504 in 1910. Those under mortgage numbered 27,854 in 1920, as compared with 27,457 in 1910. Live stock showed a considerable increase in the decade. In 1920 the total number of dairy cows was 491,163, as compared with 391,536 in 1910; swine, 1,496,893, as compared with 1,266,733. The number of sheep decreased from 109,112 to 81,968. The estimated production of the chief farm crops of 1923 was as follows: Corn, 48,108,000 bushels; oats, 4,971,000; potatoes, 3,931,000; sweet potatoes, 11,159,000; hay, 581,000 tons; cotton, 741,000 bales. Comparative figures for 1913 are as follows: Corn, 55,360,000 bushels; oats, 6,652,000 bushels; potatoes, 1,512,000 bushels; hay, 286,000 tons; cotton, 1,495,000 bales.

Mining. The important mineral products of Alabama are coal, iron ore, cement and clay products. In the decade 1914 to 1924 the mineral output remained fairly constant, although there was some fluctuation from year to year, and coal mining was hampered greatly by a protracted strike in 1921. The coal production in 1913 was 17,678,522 net tons. This fell to 15,593,422 net tons in 1914. In 1915 the output amounted to 14,927,937 net tons. In 1916 there was a considerable increase, the total coal mined in that year being 18,086,197. There was an increase of approximately 2,000,000 tons in 1917 and 1918. In 1919 the output fell again to 15,536,721 net tons. In 1920 the output remained about 16 million tons, fell to 12,570,000 tons in 1921, and in 1922 was 18,324,740 net tons. The production of iron ore in 1914 was 4,838,959 gross tons, compared with 5,215,740 tons in 1913. In 1915 the production was 5,309,354 tons, but in 1916 there was an increase of over 27 per cent, or a production of 6,747,900 tons. In 1917 there was a slight increase in value of shipments and in the quantity mined. The value of the shipments in 1918 was 14 per cent less than the previous year. There was a continued decrease in 1919, both in quantity

and in value. In 1920 the total production was 5,894,000 gross tons. In 1921 the production was 2,876,141 gross tons. In 1921 the shipments were 2,835,761 gross tons, valued at about \$5,000,000. In 1922 the production was increased to 5,234,568 gross tons. Alabama ranks third in the production of iron ore. The manufacture of coke is an important industry in the State. The production is between 3,000,000 and 5,000,000 net tons, but in 1921 it decreased sharply to 2,534,039. As a whole, the mineral production of the State increased from \$30,879,288 in 1914 to \$52,269,451 in 1921. The State ranked seventeenth in 1921 in the value of its mineral products. The census figures for 1919 show a total value of the products of all mines and quarries in the State as \$59,866,040, an increase of 145.8 per cent over the gross value reported in the census of 1909.

Manufactures. The industrial development of Alabama during the decade 1913-23 and especially in the latter part of that period was notable. The great undeveloped resources of the State were utilized by the government and by private corporations in the emergency resulting from the War. Great plate mills, costing over \$12,000,000 were constructed in Birmingham in 1917 by the Tennessee Coal, Iron and Railroad Company, and huge shipbuilding plants were erected by subsidiaries of the same company at Mobile. The Federal government undertook the development of the water power at Muscle Shoals, near Sheffield, chiefly for the purpose of recovering nitrogen from the air for the manufacture of explosives, and in October, 1917, the first atmospheric nitrogen was produced there. As development of the electric power there could not be completed in time to supply the electricity needed, it was necessary to erect a 50,000 horse power steam plant on the Warrior River, the current provided by which was carried to Muscle Shoals, a distance of nearly 100 miles, by transmission lines. The Federal Railroad Administration in 1919 decided to utilize the Warrior River for coal and iron traffic to the Gulf and Mobile, and purchased barges and equipment for the purpose. The utilization of the river for this purpose had been urged for many years, but private capital could not be induced to undertake it on a large scale. It was opened to navigation in 1920. River terminals were built at Shore Creek on the Warrior River to handle the traffic. Industrial progress in the State was hampered somewhat by coal mining strikes in 1919 and 1920. Another notable feature of water power development during 1920 was the joining of the Alabama power lines with those of Georgia, between Gaston, Ala., and Rome, Ga. By means of this connection Alabama water power is supplied for the mills of North and South Carolina during low water periods in those States, while when the rivers are low in Alabama, power from North and South Carolina is brought in. The manufacture of high grade phosphoric acid by the use of electric power was developed at Anniston in 1920. In the same year the shipbuilding plant at Mobile completed its fourteenth steel ship and ceased its war activities. In 1921 work undertaken to raise the height of the dams on the Warrior River to insure a depth of eight feet during the entire year, from Mobile to Birmingham, was completed. In the same year the Alabama Power Company began work which was finished in 1922 on its new dam

at Duncan's Riffle on the Coosa River, to develop 120,000 horse power, and also put into service another unit of the Lock 12 power plant on the Coosa River, adding 20,000 horse power.

The great power plant of Muscle Shoals was not completed by the government following the end of the War, and negotiations were carried on in 1922-3 for the purchase of this plant by Henry Ford. In September, 1923, the government granted the right to use a portion of this power to the Alabama Power Company. In October of 1923 work was resumed upon the construction of the dam across the Tennessee River on Muscle Shoals, but it was discontinued because of the lack of an appropriation by Congress.

The Fourteenth Census of Manufactures taken in 1919 indicated a vast increase in the industrial development of the State. The number of manufacturing establishments increased from 3242 in 1914 to 3654 in 1919; the number of persons engaged in manufacture from 89,053 to 120,889; the capital invested, from \$227,505,432 to \$455,592,733; and the value of products from \$178,797,633 to \$492,732,895. The chief manufacturing industries in 1919 were cotton goods, with a product valued at \$79,643,000; iron and steel works and rolling mills, \$64,980,000; iron and steel blast furnaces, \$57,018,000; and lumber and timber products, \$55,139,000. The chief manufacturing city in the State is Birmingham, which is one of the most important iron and steel manufacturing cities in the country. Mobile, during the War, was important as a shipbuilding centre. The steel ships manufactured, according to the census of 1919, amounted to \$15,909,618.

Education. Educational conditions in Alabama showed a marked improvement in the decade 1914-24, especially after 1918. A new school code was enacted by the Legislature in 1919, following a careful study of the school system of the State by representatives of the Federal Bureau of Education under the direction of the Alabama Education Commission. Considerable attention was devoted in the later years to vocational and exceptional education, the latter aimed especially at the removal of adult illiteracy. The enrollment in the elementary school grades in the decade remained practically constant. In 1913-14 the white enrollment in the elementary grades was 305,248; and in 1921, 358,743. In the elementary schools for Negroes the enrollment in 1913 was 146,602; in 1921, 164,340. According to statistics of the United States Bureau of Education, there was a total enrollment in the elementary and kindergarten schools of the State in 1919-20 of 543,507; and in the secondary schools, 35,433; or a total enrollment in that year of 569,940. The high school enrollment of white pupils increased from 15,094 in 1913 to 38,306 in 1921; Negro high school pupils, from 1210 to 1780.

Consolidation made considerable progress. In 1921 there were 245 consolidated school buildings in the State. Fourteen county training schools for Negro pupils are maintained, and summer schools for Negro teachers are conducted during the year. Illiteracy in the State showed a marked decrease from 26.2 per cent in 1910 to 20 per cent in 1920, among native whites, from 11.5 to 8.3, and among the Negroes, from 46.4 to 38.8.

Finance. For finance, see STATE FINANCES.
Political and Other Events. During the

decade 1914-24 there was no change in the political complexion of State politics in Alabama. The State remained steadfastly Democratic. Oscar W. Underwood was elected United States Senator in 1914, to succeed Joseph F. Johnston, who died in 1913. At the same election Charles Henderson was chosen Governor of the State for four years. As a result of legislation previously passed, prohibition became effective in the State on July 1, but an attempt to place the woman suffrage amendment on the State Constitution was defeated in the Legislature. In the presidential election of 1916 President Wilson received a plurality of 68,969 votes. Only minor State officers and Congressmen were elected at this time. The State, during 1917, enjoyed remarkable industrial development, much of it traceable to the War. The quadrennial elections for governor and other State officers were held in 1918. Thomas E. Kilby was nominated for governor at the primaries and John H. Bankhead for the United States Senate. Both were elected with the entire Democratic ticket. Industrial prosperity continued during this year. The Legislature in 1919 refused to ratify the Federal woman suffrage amendment but approved the prohibition amendment on January 14. The only election held during 1919 was for Representative in Congress from the seventh district, following the death of Congressman John L. Burnett. C. B. Rainey was the successful candidate. In 1920 an extra session of the Legislature was called to pass measures putting into effect the Federal woman suffrage amendment. The same conditions which previously applied to male voters were expanded to include women, and in addition the Legislature submitted to the voters the amendment to the Constitution providing that in order to register a vote the elector must be of good character and must understand the duties and responsibilities of citizenship under our form of government. This amendment was designed to bar undesirable females of the Negro race from voting. Candidates for United States Senator were nominated at primaries held that year. Senator Underwood was a candidate for reelection. Senator Bankhead died on March 1, 1920, and it was necessary to elect a successor. Former Gov. B. B. Comer served as Senator by appointment from March to November. J. Thomas Heflin, member of Congress, received the nomination and both he and Senator Underwood were elected in November. In the presidential election of 1920 James M. Cox received 163,254 votes and Warren G. Harding 74,690. In 1920-21 a bitter coal miners' strike resulted in much harm to the industries of the State. There was much disorder, but the efforts of the miners to place the mines on a closed shop basis failed. The strike was settled on Feb. 22, 1921. The semi-centennial of Birmingham was celebrated in October, 1921, when President Harding was the guest of the city. At primary elections held in 1922, W. W. Brandon was nominated for governor and was elected in the November elections. During the summer of 1922 a railroad strike led to much violence, and the State troops were called into service. Governor Brandon assumed office the second Tuesday in January, 1923, and pledged himself to continue the programme of social reform in the State which had marked the administration of Governor Kilby. The term of the latter had been notable

for providing for the future abolition of the convict lease system, the building of new and improved prisons, enlarged schools and other reform measures. No elections were held in this year.

Legislation. The Legislature of Alabama meets every four years. A proposed amendment to make the session biennial was defeated in 1916. The Legislature in the same year passed six constitutional amendments relating chiefly to taxes and the banking system of the State. The Legislature of 1919 refused to ratify the woman suffrage amendment. The same Legislature passed a workmen's compensation law, an income tax law, which was later declared unconstitutional, and a measure penalizing combinations or agreements to strike. In the same year it adopted an eight-hour day and a forty-eight-hour week for children under 16 years in all gainful occupations. An elective workmen's compensation law was also enacted. The Legislature of 1923 deferred the effective date of the new law abolishing the convict leasing system for four years. Other measures passed were chiefly of local importance.

ALABAMA, UNIVERSITY OF. A State institution at Tuscaloosa, Ala., founded in 1831. The university increased greatly in size during the decade 1914-24. The number of students trebled both in the winter and the summer sessions, with an enrollment for the year 1923-24 of 2026 as against 652 in 1913, and an enrollment in the summer of 1923 of 2056 as against 562 in the summer of 1913. The faculty increased from 89 to 143, and the number of volumes in the library from 30,600 to more than 55,000. The endowment was raised from \$545,000 to \$1,208,000. President, George H. Denny, Ph.D., LL.D.

ÅLAND ISLANDS. An archipelago made up of one large island and some 300 small ones at the entrance of the Gulf of Bothnia. Their inhabitants in 1920 numbered 26,911. From 1917 to 1921 the islands were the scene of unwonted turmoil. The work of the Russian Revolution of 1917 left its impress on the minds of the Ålanders, who, because they were bound to Sweden by ties of language, custom, and trade, proceeded to express their wish to be reunited to Sweden by a plebiscite in August, 1917. But the newly constituted state of Finland was opposed to the cession, offering as an alternative the establishment of local autonomy in the islands. It was plain, however, that Ålanders regarded union with Sweden as the only feasible plan. On the ground of self-determination they appealed to the Allied peoples in November, 1918. In February, 1919, their case was presented again before the Paris Peace Conference. But the Supreme Council denied its jurisdiction, so that in 1920 the dispute was placed before the League of Nations. A commission appointed to ascertain the state of opinion in Sweden, Finland, and the Åland Islands, reported back to the League Council in June, 1921. On June 24, the Council announced as its decision that the islands were to continue as a part of Finland but were to be neutralized with respect to military matters and also be guaranteed full local autonomy. Sweden protested but accepted the ruling, and the islands reverted to Finland.

ALASKA. The decade 1914-24 was marked by many important changes in Territorial affairs. From 1914 to 1918 Alaska suffered eco-

nomic and industrial depression incidental to the War, which materially reduced the population by drawing recruits for the army and navy and affected commerce. The census of January, 1920, numbered a population of 55,036, a decrease in ten years of 9320, of whom only one-fifth were natives. Considered generally, other discouraging conditions were few: reduction in mineral output, temporary diminution of commerce, and over-fishing of the salmon. Encouraging features were many: reorganization of government with a local legislature; enactment of progressive laws; increase of the fur-seal herds and renewal of the catch; utilization of forest resources; enlarged copper production; development of coal mines; improved roads; increase and scientific care of reindeer; land surveys; more productive farms; and especially the completion of the Alaska government railroad, extending from an ice-free port to the central mining districts of the Yukon watershed. Meanwhile education of whites and natives was widespread, and a College of Agriculture and Mining was established. The law-abiding natives improved their sanitation, built better houses and raised their standard of living. What was lacking was action by Congress, long urged and never granted, to coordinate Federal control and thus ensure future prosperity.

Population. The population decreased from 64,356 in 1910 to 55,036, one-fifth of whom were natives, in 1920. The loss of 1249 natives was due to epidemics of influenza. The great bulk of the decrease was due to enlistment in military service. During the last few years of the decade there was a steady and considerable increase of settlers.

Government. The governor, surveyor general, and judges of the four judicial districts are appointed by the President of the United States for four years. The Territory is represented in Congress by a Delegate, who has no vote. Under the Act of Congress of Aug. 24, 1912, its legislature, with limited powers, consists of a senate of eight members, two elected from each judicial district for four years, and a house of sixteen, elected likewise. Beginning in 1913, the legislature met biennially. Its laws are subject to veto by Congress. The divided and inefficient methods of Federal control of Alaskan affairs had long been recognized, but Congress for years failed to enact corrective legislation. When diminishing population, reduced mineral output, impaired transportation, and over-exploited fisheries brought matters to a crisis, Congress voted money for a government railway. Executive measures were finally taken to remedy business methods and save the situation. Upon the recommendation of a board of experts, the President authorized the creation of a permanent Inter-Departmental Commission on Alaska, with these functions: "To coordinate and bring together facts and suggestions touching matters affecting Alaska, and make recommendations for definite action . . . that duplication may be avoided and efficiency secured." As a result affairs under Federal control were being handled more efficiently in 1924. Congress remained silent, save in minor action on general land-leases, reindeer, and land-fur animals.

Local Legislation. The legislature met biennially from 1913 to 1923. None of its Acts was vetoed by Congress. Its legislation was along progressive lines; education was fostered, liquors and drugs prohibited, labor guarded as

to hours, safety, compensation and liens; road and fishery commission authorized, whereby cooperation with Federal bodies could be obtained; banks and corporations regulated, and the insane and indigent cared for.

Finances. The revenue is derived from license taxes, both Federal and Territorial. On Jan. 1, 1924, there was a balance in the treasury of \$218,345. The Federal taxes form the Alaskan Fund, of which 65 per cent is spent on roads, 25 on schools outside of incorporated towns, and 10 for relief of indigents by Federal judges. This fund received \$190,987 from licenses in 1923.

Banks. The 18 banks (3 of them national) had in 1923 a capital of \$780,000; surplus, \$607,000; and deposits, \$8,374,000.

Education. An Agricultural College and School of Mines was established. There are three classes of schools: within incorporated towns, without them, and native. In 1923 the 17 schools of the first class cost \$265,400 and had an enrollment of 2652. The 56 schools of the second class cost \$122,279, and had an enrollment of 1175 pupils. The native schools, constituting the third class, are maintained by the Federal government, under the Alaska Division of the Bureau of Education, and had an enrollment in 1923 of 4999.

Agriculture. The large areas of agricultural land in the interior valleys are being slowly occupied, as local needs make farming profitable. In the districts of Anchorage, Fairbanks and Matanuska there are 90 farms, where stock does well. The crops in order of value are barley, oats, spring wheat, winter rye, and winter wheat.

Forests and Parks. The important resources of the national forests, Tongass, 15,444,000 acres; and Chugach, 5,130,000 acres, amount to an estimated stand of 75,000,000,000 board feet. In 1923 there were cut for commercial use 31,000,000 board feet, besides large quantities free to settlers. Surveys were made at forty localities suitable for combined pulp mills and water power. Agricultural and mining lands have been largely segregated from forest areas. The administration of the national forests was improved and facilitated by the establishment of local headquarters at Juneau. See **FORESTRY**.

Commerce. Owing largely to War disturbances, Alaskan commercial shipments were seriously affected. From 1914 the volume of trade fell sharply but irregularly, with occasional increases, until 1922. The increase in 1923 over the previous year was approximately \$22,000,000, reaching a total, gold and silver shipments included, of \$83,000,000, of which \$53,000,000 was sent out from the Territory. Changes in prices in the later years somewhat affect the value of these data.

Natives. The Eskimo and Indian inhabitants were gradually taking more prominent parts in the activities of the Territory. This was especially true in southeastern Alaska, in the cannery settlements, and at other industrial centres. The efforts of the Alaska Division of the Bureau of Education to improve the condition of the natives was meeting with encouraging success. Under the direction of its agents, doctors, nurses, teachers, herdsmen, etc., modern methods of sanitation, comfortable dwellings, more gardens, better schools, and higher standards generally had been promoted in many remote villages. Efficiency in industrial training was fol-

lowed by the organization of special settlements, entirely native, and the formation of coöperative associations, which were being successfully managed. Both the Metlakatla colony on Annette Island and the Indian town of Hydaburg were modern communities, with canneries, mills, electric power, coöperative associations, etc. Noorvik, on Kotzebue Sound near the Arctic Circle, had, with other modern plants, an electric lighting system. The natives in southeastern Alaska were taking important parts in the activities of that section, as clergymen, nurses, teachers, engineers, and navigators. In 1922 there were employed in the Alaskan salmon canneries 4192 natives. The life conditions of many Eskimos in remote regions, especially those located in the marshy, unhealthy deltas of the Yukon and Kuskokwim Rivers, were still distressing. Special efforts, with prospects of success, were being made to better them.

Fisheries. From year to year the fishery industry held its position as the most productive of the Territory. It will surprise many to learn that the aggregate value of fish caught exceeds by \$42,000,000 the entire mineral output of Alaska. The total value of fishery products to Jan. 1, 1924, was \$560,231,000. In its maximum year, 1918, the industry employed 31,213 persons; its investments in 1922 aggregated \$45,208,000. The value of the annual catch increased from \$15,739,000 in 1913 to \$59,844,850 in 1918. Decreases followed to \$24,087,000 in 1922, whence it rose yearly to about \$40,450,000 in 1923. The more important catches, in order of value, are salmon, herring, halibut, and cod. Far exceeding in importance other species, the salmon is the most valuable factor in Alaskan prosperity. The number of salmon caught and their value increased from 54,651,915 fish, \$19,564,381, in 1914, to 101,454,688 fish, \$53,464,812, in 1918. Of the salmon catch 95 per cent are canned. The great catch of 1918, which counted 6,505,535 cases, 48 eight-pound cans to a case, fell off alarmingly, 60 per cent, to 2,596,826 cases in 1921. There was an increase to 4,502,000 cases in 1922 and another unimportant increase in 1923. Although it was evident that commercial over-exploitation was destroying the salmon spawning grounds, endangering the food supplies of the natives, and ruining a most valuable national asset, Congress failed, despite urgent requests, to modify the old and inadequate law regarding Alaskan fisheries. The executive departments were obliged to adopt stringent measures, as far as the Federal laws permitted. By executive orders of the President in 1922, two fisheries reservations were created, the Alaskan Peninsula and the Southwestern. Under date of Oct. 25, 1923, regulations for fisheries on these and on the Aleutian reservations were issued. Fishing by the inhabitants is permitted for personal use, but corporations can only fish when licensed and under restrictions set forth in these rules. The herring industry was steadily expanding, due largely to the introduction of the Scotch method of curing pickled herring. The maximum value of \$2,329,116 came in 1922. Oversupply, storms, and decreased productivity of fishing grounds had reduced the halibut catch, which in 1922 amounted to 11,000,000 pounds, valued at \$1,035,000. Cod fell off in quantity and value from the maximum of 1918. The 6,135,000 pounds caught in 1922 had a value of \$464,169. A revival of the whale industry in

1922 resulted in the catch of 445 animals, valued at \$409,168. See FISHERIES.

The fur-seal industry was formerly the most important in Alaska, but it had become far inferior to the fisheries and mines. The rookeries of the Pribilof Islands were estimated in 1867 to contain 4,000,000 seal. The herds were nearly exterminated by uncontrolled slaughter, and by pelagic hunting, so that by 1910 they contained only one-twentieth of the former number. By the treaty of 1912 between Great Britain, Japan, Russia, and the United States, pelagic sealing was made unlawful. Congress then enacted that the fur-seal industry should be a government monopoly, made the Pribilof Islands a closed reservation, to be governed by a commission of experts, and established a closed season so that the herds might recuperate. Under an excellent system of protection the herds were slowly but steadily increasing, their numbers rising from 294,687 in 1914 to 604,692 in 1923. During the decade the taking of seals was renewed, and about 30,000 animals were killed annually, the number varying from 25,318 in 1918 to 34,890 in 1919. The percentage of yearly increase was falling off, being in 1924 about 4.0 annually. The skins are sold at public auction, and the profits of the industry are in general \$1,000,000 a year above the cost of the service. Improved methods of taking pelts were adopted, and the fitting of the skins for the market, formerly done in England, became an American industry. The fur-seal industry gives employment to the 337 natives on the reservation.

From about 150,000 head in 1914, the reindeer increased to nearly 300,000, with a value of \$7,500,000. The enormous numbers, however, caused conflicts as to pasturage, introduced diseases and led to decadence, so that the Biological Survey had to be called upon for aid in locating suitable grazing areas, in combating diseases, and in improving herd management. Two-thirds of the deer were owned by the natives; the other third were being commercially exploited. The plan of introducing the meat of the reindeer to the markets of the Pacific Coast was successful, but its extent was strictly limited through lack of sufficient cold-storage plants on the commercial steamers. Originally introduced into the Bering Sea region, efforts were in progress in 1924 to distribute the reindeer so as to benefit the largest number of natives. Herds on the Aleutian and Pribilof Islands thrive, as also in the Matanuska Valley and in the Broad Pass region.

The destruction of the land game, which at one time was threatened, was stopped by means of closed seasons, game wardens, and custom inspections. The Bureau of Biological Survey had the matter in hand after the transfer of these duties to the Department of Agriculture, under the Act of Congress of May 31, 1920.

Minerals. The total mineral output to Jan. 1, 1924, amounted to \$518,000,000 distributed to include 1922 as follows: gold, \$335,526,000; copper, \$145,479,000; silver, \$8,834,000; coal, \$2,723,000; tin, \$938,000; lead, \$772,000; antimony, \$237,500; marble, petroleum, etc., \$3,476,000. Attaining an output of \$1,000,000 in 1892, it reached its maximum product of \$48,632,212 in 1916, and fell irregularly to \$17,000,000 in 1921. The estimated product for 1923 was \$19,000,000. For the decade the maximum annual output of gold was \$15,627,000 in 1916, after which it steadily decreased to \$6,150,000 in

1923. The decreases were primarily due to the increased cost of mining, while the value of gold remained almost unchanged. Placer mining was slowly passing as individual ventures, were replaced by dredges. The summer placer miners fell off from 4000 in 1913 to 410 in 1923. Quartz mines were increasing in number and average product. The large increase in silver values, rising from \$219,000 in 1913 to a maximum of \$1,039,000 in 1920 and only falling to \$600,000 in 1923, was due to its being almost entirely a by-product of gold and copper ores, though galena ore was being mined, in the Kantishna district.

Largely owing to the War, copper became the most valuable mineral of the Territory. In 1914, six mines produced 21,660,000 pounds, valued at \$2,852,934. Under pressure eighteen mines produced 119,655,000 pounds, worth \$29,484,291, in 1916. Although the output fell to 47,221,000 pounds in 1919, it rose to 86,000,000 in 1923. Most of the copper came from the Kennecott group and the Beatson-Bonanza mines, though some was mined at the Rush and Brown mine. From 28 tons in 1914, the production of lead exceeded 800 tons in three separate years. The maximum value was \$146,584, in 1917. The product in 1923 was worth \$60,000. Low prices had practically closed tin mines in Alaska.

Stimulated by the needs of the Alaska railroad under construction and operation, there were largely increased outputs of coal from mines along the line of the road. The product was almost entirely subbituminous and lignitic coal. The output rose from 1400 tons in 1914 to 100,000 tons in 1923. Despite constant efforts to uncover workable veins of high-grade coal in the Matanuska and the Bering River fields, no deposits of such fuels as can be profitably exported were discovered. Enormous reserves of low-grade bituminous and lignitic coal were located in various parts of the Territory, much of it easily accessible and cheaply mined. In 1922 more than 40 per cent of the coal burned in Alaska was imported. Up to 1924 the only oil produced was from the private wells in the Katalla field, which was barely sufficient to meet the local demands for gasoline. In 1922 there were imported into Alaska more than 19,000,000 gallons of oil of various kinds. Restrictions of Federal laws made impracticable the economical exploitation of petroleum fields. Under a later law, two companies began drilling in 1923 on the Alaskan Peninsula, but no success had been reported up to July, 1924. The Arctic Coast near Point Barrow was thought to be a promising field for oil, judging from seepages there observed. At the request and expense of the Navy Department experts of the Geological Survey were making an exhaustive examination of the adjacent region.

Transportation. The most important improvement in transportation was the construction by the United States of the Alaska Railroad, 543 miles in length, connecting the ice-free port of Seward with Fairbanks, the centre of the Tanana mining district. Apart from the main line the system had the following branches: Happy-Chatinka, 32 miles; Matanuska-Chickaloon, 45 miles; Healy coal mines, 4 miles. In January, 1924, there was a semiweekly train service to and from Fairbanks, which involved two days' travel with a lay-over at Curry. The Alaska Railroad serves directly the mines of the Kenai, Susitna, Matanuska, and central Yukon

districts. Traversing a rich coal region, it becomes the main source of fuel for the mines of the vast interior regions. It had already developed new mining grounds and brought farming settlers into the contiguous regions. The expenditures for the railroad amounted, up to June 30, 1923, to \$56,000,000, including systems purchased, roads built and reconstructed, and operation. As the total revenue from the road during 1923 was only \$543,521, it was evident that several years must elapse before the system became self-supporting. To replace the discontinued commercial transportation on the interior rivers, the railroad met the needs of the settlements of the lower Yukon by the establishment of a summer line of steamboats between Fairbanks and Holy Cross, where connection was made for the Norton Sound region with the launches of the Northern Commercial Company. Canadian boats in 1924 were caring for the settlers of the upper Yukon, while bringing ore to Fairbanks from the Klondike region. There had been constructed 6854 miles of roads and trails up to June 30, 1923, toward which the Federal government appropriated \$4,300,000. The main road of 410 miles, open throughout the year, is that from Valdez to Fairbanks, with a branch to Chitina. The expenditure during 1923 for construction and maintenance was \$740,000. Unfortunately road work was done under three separate departments, two Federal and one Territorial. Such aids to navigation as lights, buoys and signals were increased from 338 in 1915 to 634 in 1923.

Telegraphy. The importance of the signal corps system, with its 19 cables and 44 offices, may be gauged by its messages in 1923, whose tariffs approximated \$400,000. It had 2700 miles of cables, 840 miles of land wire, and a radio system. The governor reported: "The service rendered in the progress and development of Alaska cannot be overestimated." After 20 years' use the existing cables were inadequate for current business. New cables had been purchased and in the spring of 1924 were in process of installation. Supplementary to the army system was the Naval Communication Service, maintaining eight radio stations of great value to the public. See also LIGHTHOUSES.

ALASTRIM. See SMALLPOX.

ALBANIA. A Balkan country, whose boundaries were first fixed in 1913 and redrawn by the Council of Ambassadors on Nov. 9, 1921. Area estimated at 11,000 square miles; population, from 850,000 to 900,000. There were, according to a 1921 estimate, 584,675 Mohammedans; 158,215 Greek Catholics, and 88,987 Roman Catholics in the country. The estimated populations of the principal towns in 1921 were: Scutari, 26,000; Koritza, 22,000; Tirana, the capital, 13,000; Valona, 7000; Durazzo, 5000. Education was, of course, in its infancy. In 1921 the country possessed only one normal school, one secondary school, and about 500 primary schools.

Albania, because of its mountainous nature, possessed no real means of communication and was still a primitive pastoral and agricultural society. The leading products, cereals, olive oil, tobacco, rice, and wool, were raised for home consumption, though some exchange was carried on with the neighboring Jugo-Slav market towns to the North, and with Italy. The valleys of the South were more favorable for agricultural activities, and here it was that what prosperity

Albania could boast of was to be found. Natural resources reported capable of exploitation, but as yet little worked, were the timber lands, coal, iron pyrites, oil, asphalt, and hydro-electric power. Trade was insignificant. In 1921, exports totaled 2,189,796 gold francs, largely to Italy, Greece and Jugo-Slavia, and comprised skins, wool, dairy products, olives, olive oil, and tobacco; imports totaled 17,659,796 gold francs, covering purchases of cereals, fruits, oil, etc., from Italy, Greece, Great Britain. Because of the unfavorable trade balance a customs tariff was enacted, Feb. 5, 1922. During the War, the Austrians constructed a few narrow-gauge military railways, the most important of which was the line from Durazzo to Tirana, 23 miles. All these, however, fell into disrepair and were little used. Principal ports were San Giovanni di Medua, serving Scutari, Durazzo, and Valona. Italian boats were the only ones to call regularly. Government accounts for 1921 were expenditures, 18,797,455 gold francs; revenues, 18,500,000 gold francs, 5,000,000 in customs, and the remainder in direct taxes. There was practically no public debt. In 1914, Austria and Italy extended Prince William a credit of 10,000,000 francs; these claims were really eliminated, however, by the revenues collected by Austrians and Italians during the War occupation and retained at Vienna and Rome.

History. The conflicting aspirations of Russia and Austria left much to be desired in the Albanian settlement of 1913 as effected by the Ambassadors' Conference. It has been estimated that upward of 500,000 Albanians were separated from their homeland and apportioned among Serbia, Montenegro, and Greece. The choice of William of Wied, a German prince, as Mpret of Albania, was also a cause of much local discontent. He arrived at Durazzo, Mar. 7, 1914; stayed under the shadow of the Austrian guns in the harbor during his brief reign of six months, and fled the country for Germany on the outbreak of the War. Once more Albania was left without a unified control and at the mercy of the greater powers that surrounded it. Local chieftains dominated the scene until the conclusion of the War, though they were helpless in the face of the invading armies. For although it was neutral, Albania was a theatre of war during 1914-18. Austrian armies took possession of northern and central Albania; Italy was established at the harbor of Valona from November, 1916, on; the Serbs encroached on the northern frontier and the Greeks on the southern. By the secret Treaty of London (April, 1915), Albania had been disposed of rather baldly as part of the bargain for Italian support. The Allies in this convention recognized the Italian claim to Valona, while Italy on her side promised not to resist the possible desire of France, Great Britain, and Russia to distribute among Montenegro, Serbia, and Greece the northern and southern parts of Albania. It was, therefore, to protect her rights that Italy in June, 1917, announced a virtual protectorate over the country, and proceeded to occupy the whole of it when the Allied drive, in the autumn of 1918, banished the Austrians. Within the same year, matters were further complicated by the establishment of a republic under French protection in the neighborhood of Koritza, the presence of an Allied force at Scutari, and the threatening movements of the Serbs on the North and West. Throughout 1919

the Italians stayed on. Against the protests of Albanian leaders, Italy persisted in a policy of Italianization in the South, sending colonists and gaining control of the schools. Only the refusal of President Wilson at the Peace Conference to countenance either partition or the establishment of an Italian mandate prevented the submergence of the harassed country. Thus protected, Albanian resistance strengthened. In January, 1920, an assembly at Lushnja protested against partition; later in the year, a permanent government, strongly nationalistic in tone, established itself at Tirana and erected a regency cabinet of four, composed of a representative each of the Roman Catholics, Greek Orthodox, and the two Moslem sects, the Sunni and the Bektashi. Finally, in the middle of the year, desultory warfare began between Albanians and Italians which manifested itself first in uprisings in the coast towns and then in fighting inland. Italians were even besieged at Valona in June. The Italian adventure had proved futile, with the result that Giolitti, for Italy, signed a convention on August 2 which guaranteed the evacuation of the country and the surrender of Valona, too, except for the island of Saseno at the entrance to Valona Bay. The French had, meanwhile, left Koritza in the same year. There seemed at last a hope for a peaceful political development when, on Dec. 17, 1920, Albania applied and was admitted into the League of Nations. It was not until 1923 that Albania was cut free from international entanglements. It was plain in 1921 that admission into the League did not connote recognition of sovereignty or the frontiers of 1913. Jugo-Slavs still menaced on the North. Disquieting Greek claims were made on southern Albania or the Northern Epirus, a district containing the two important towns of Koritza and Argyrocastro and holding a population of 120,000 Greek Catholics and 80,000 or 100,000 Mohammedans, and where, in 1920, the Greeks had occupied a large strip to the Northeast of Koritza containing 26 villages. These claims were grounded on cultural sympathy and economic necessity. Albanian appeals to the League Council for intervention throughout 1921 were unavailing. The Powers insisted that the question was rightly the concern of the Council of Ambassadors. Meanwhile in the autumn, Jugo-Slavs had begun threatening military preparations in the North, and the danger of a Balkan flare-up caused Lloyd George, in November, to demand for Great Britain an immediate consideration of the whole question. Great Britain's sincerity was attested by the granting of formal *de jure* recognition to Albania. On November 5, therefore, the Council of Ambassadors announced a decision. Albania was recognized as a sovereign state; in the South, i. e. Northern Epirus, the boundary of 1913 was substantially promulgated though the Greeks were permitted to retain five of the seized villages; in the North, however, to placate Jugo-Slavia, modifications in her favor were ordered in the frontier in the Northeast of Scutari, to the West and South of Prizren, and between Dibra and Struga. Finally, a boundary commission was appointed for the delimitation of the line in question. The southern frontier was being worked on in the summer of 1923, the Greeks having given their approval by withdrawing their claims to the rest of the Northern Epirus, and it was in the course of these activities that the murder of General Tellini, on

the Council of Ambassadors' Græco-Albanian Boundary Commission, occurred at Janina, Greece, Aug. 25, 1923. (See GREECE and ITALY). By 1923, therefore, Albania's independence was assured, Italy's consistently friendly attitude since 1920 guaranteeing the result.

In internal affairs, some progress was made toward stability. Executive authority was in the hands of the Regency Cabinet, which was aided by an indirectly elected parliament of 72 members and a council of eight ministers responsible to the parliament. Steps were taken to create educational facilities, while movements toward hastening religious independence were perceptible in 1924. In 1922, the Albanian Greek Orthodox Church proclaimed its independence, and in the next year Albanian Moslems approved of the abolition of both polygamy and the veil for women. At the request of its officials in 1922, the League of Nations appointed to Albania a financial adviser who in 1923 had perfected plans for the creation of the country's first bank of issue. From Dec. 22, 1921, on, a coalition government made up of representatives of the two parties, the Progressive and Popular, and headed by Djafer Ypi as president of the Council of Ministers, was in control of affairs. This was followed by the ministry of Ahmed Zogu, December, 1922–June, 1924, under which the country remained unusually tranquil. But Albania again became a Balkan storm-centre in the spring of 1924, when a revolt, led by the liberal forces who opposed the mediæval tendencies of the government, successfully overthrew the Ahmed Zogu cabinet on June 10. In January, 1924, a constituent assembly met for the preparation of a constitution.

ALBANY. The capital of New York State. The population increased from 100,253 in 1910 to 113,344 in 1920, and to 117,375 by estimate of the Bureau of the Census for 1923. The land for several blocks between Broadway and the Hudson River, together with docks and wharfage rights, was bought by the city for a public park. Broadway and Quay Street were widened and extended. The privately owned Hudson bridge, which carried the main thoroughfare between Boston and New York, was bought by the State in 1919, and the tolls discontinued. The roadway leading up to it was widened and paved and the sharp blind turn into Broadway made easier. In 1918 and 1919, \$1,150,000 was appropriated by the Legislature to erect a new State office building. A city plan was made and zoning adopted. During the decade the city had a great industrial development. The value of its manufactured products increased from \$25,211,000 in 1914 to \$45,455,000 in 1919. Many large business buildings were erected. These included the Wellington Hotel, the Albany Journal building, the Henry Ford plant, and others. The New York Central Railroad constructed a great bridge and freight yards south of the city at a cost of \$16,000,000. Many improvements were made on the parks, especially Lincoln Park, and important street improvements effected. Great progress was made also along educational and recreational lines.

ALBEE, FRED HOUDLETT (1876–). An American orthopaedic surgeon, born in Alna, Me., and educated at Bowdoin College (A.B. 1899) and Harvard (M.D. 1903). He is widely known for his so-called bone inlay grafting operation for tuberculosis of the spine (Pott's disease),

first described by him in 1912. In 1916 he reported the results of 500 cases of "Albee's operation." In France in 1916 he was the first to use motor-driven tools in bone surgery. In 1917, after the entrance of the United States into the War, he was made a colonel of the Medical Reserve Corps, having meanwhile served as consulting surgeon in many hospitals. Among positions held by him were director of the orthopaedic clinic at the New York Post-graduate School and Hospital, and at the University of Vermont; director of the United States Army General Hospital No. 3, and consulting surgeon to the Pennsylvania Railway System. He published his monograph *Bone Graft Surgery* in 1915 and in 1919 his large treatise *Orthopaedic and Reconstructional Surgery*.

ALBERS-SCHÖNBERG, HEINRICH ERNST (1865-1921). "The acknowledged leader of German medical röntgenology," a native and resident of Hamburg, where he practiced after graduation (M.D.) at Leipzig in 1891. His original bent was toward gynecology, but on Röntgen's discovery he at once opened an X-ray laboratory, one of the first on record, and by 1897 had founded the periodical *Fortschritte an der Gebiet der Röntgenstrahlen*, followed in 1900 by *Archiv und Atlas der Normalischen und Pathologischen Anatomie in Typischen Röntgenbilde*. In 1903 appeared his textbook *Die Röntgen Technik* (5th ed., 1919). About 1902 he was appointed röntgenologist to the St. Georg Hospital, Hamburg, and a famous X-ray establishment was created in association with it. When the new University of Hamburg was established in 1919 he was appointed a professor of röntgenology, the first of the kind in Germany. He was a cofounder of the German Röntgenological Society. As a pioneer he made many discoveries not only in the physiology of the X-ray but in technical improvements of the apparatus, including the means of self-protection. He discovered the pernicious action of the rays on the genital glands. Incidentally he was a martyr to the rays, as one of the first to develop X-ray cancer as a result of exposure. Through the loss of an arm by amputation he managed to survive through many years of usefulness before finally succumbing. In addition to the magistral works mentioned above he wrote over 150 articles for periodicals. Among his minor works is a monograph on X-ray cancer (*Das Röntgencarcinom*).

ALBERT, DUKE OF WÜRTTEMBERG (1865-). A German general, born at Vienna. He was appointed general in command of the Württemberg army in 1908, and in 1913 he was appointed inspector-general of the 6th Army Inspection. He led the 4th army on the western front at the beginning of the War and in 1916 was made field-marshal-general. He became chief-in-command at the front in Alsace-Lorraine, where he remained till the end of the War. See **WAR IN EUROPE, Western Front**.

ALBERT I. King of the Belgians (see **VOL. I**). When Prince Albert ascended the throne of Belgium in 1909 he was perhaps the least known monarch of Europe, and even as King he escaped public comment. Following the invasion of Belgium by the Germans he was regarded as one of the foremost figures of the War. Rather than leave Antwerp with his ministers when the enemy was advancing through his country, he joined his troops and remained at the front throughout the War. Queen Elizabeth

remained near him, acting as a nurse in the Hôpital de l'Océan at La Panne.

ALBERTA. A province in western Canada with an area of 255,285 square miles, and a population in 1921 of 588,454, representing a gain of 214,159 or 57.2 per cent since the 1911 census. The rural population in 1921 was 62 per cent of the whole as compared with 75 per cent in 1901. As in the other prairie provinces, males continued in excess of females, the division in 1921 being 324,208 males and 264,246 females. The leading cities with their populations in 1921 were Calgary, 63,305; Edmonton, 58,821; Lethbridge, 11,097, and Medicine Hat, 9634. Immigrants from the United States steadily increased in number so that the census of 1916 recorded 91,600 settlers of American origin in Alberta.

Industry. Under the impetus of vast irrigation projects, Alberta was rapidly converted into an agricultural country, so that by 1922 at least 13 per cent of the 74,000,000 acres of arable land in the province were under crops. At the end of 1921 irrigation projects took in 5,630,000 acres, of which 1,714,000 were irrigable. The result of such activity manifested itself in the appearance of a more diversified husbandry and a greater attention to root crops and alfalfa. However, the prairie country accounted for the importance of wheat. Of the 11,316,542 acres sown in 1923, 5,958,361 were under wheat. Next in importance were oats, barley, rye, hay and clover, and potatoes. That the live stock industry did not decline, in spite of the inroads of the farmers, may be seen from the following: cattle in 1912 and 1923, 745,229 and 1,520,924; sheep, 135,075 and 239,174; swine, 278,747 and 706,681. The total yield of field crops in 1923 was valued at \$165,340,000. The importance of the subsidiary activities may be gauged from these values for 1923: animals slaughtered and sold, \$11,584,000; dairy products, \$15,534,000; wool clip, \$264,000; game and furs, \$46,000; poultry and poultry products, \$6,264,000; horticultural products, \$1,860,000. In 1921, there were 83,431 farmers in the province. Minerals made up the second source of economic wealth. The vast coal area which covers almost the entire province accounted for 95 per cent of the annual output of all the prairie provinces. In 1922, 354 mines, representing a total capital of \$53,000,000, produced 5,990,911 tons of coal for a value of \$24,351,913, more than double the output of 1912. Proportions represented were 1 per cent anthracite, 47 per cent bituminous, and 52 per cent lignite. Other mineral products included cement, natural gas, sand and gravel, bitumen, gold, and salt. The total mineral production was \$27,872,136 in 1922, an increase of \$16,000,000 over the 1912 output. Local manufactures increased during 1910-21 from 290 to 2024; capital, from \$29,518,000 to \$55,539,000; employees, from 6980 to 10,324; and value added by manufacture, from \$8,790,000 to \$29,724,000. The leading industries were flour and grist mills, door and planing mills, slaughtering and meat packing. The horse-power resources were estimated at 475,281 h.p., of which 33,067 h.p. had already been developed on the Bow River in 1921. Lumbering and fishing were also important activities.

Trade and Communications. The articles entering principally into the interprovincial trade were grain, live stock, hams, eggs, fish, butter, mining, and timber products. In 1922

there were 4680 miles of railway in the province as compared with 2545 miles in 1914. The telephone system owned by the provincial government had 100,900 miles of wire in 1922. Throughout the province 64,383 telephones and 238,733 miles of wire were in use.

Government. The province's representation in the Canadian Parliament was increased to 6 in the Senate and 12 in the House of Commons. Revenues for 1922 were \$9,324,889, against \$5,399,905 in 1913, and expenditures \$11,235,192, against \$5,275,584 in 1913. The public debt in 1921 amounted to \$59,010,256. Education made steady advances. The 142,902 pupils enrolled in 1922 were more than double the number of pupils of 1912. The University of Alberta had more than 1200 students in attendance in 1922. Total expenditures for education in 1912 were \$6,667,282; in 1921, \$12,134,488. Women were granted the franchise.

ALCHEMY, MODERN. See **PHYSICS**.

ALCOCK, SIR JOHN (1892-1919). A British airman born at Manchester who obtained his training at the Empress motor works in his native city. He was instructor of flying at Eastchurch at the outbreak of the War and was afterward chief instructor with the aeronautic squadron. On the Turkish front he won the D.S.O., for an attack on three seaplanes, and established a record for long-distance bombing flights. In 1917 the Turks took him prisoner and held him till after the Armistice. In 1919 he won the prize offered by the *London Daily Mail* for the first successful flight across the Atlantic, with Lieut. A. W. Brown. Both men were knighted for this achievement. Alcock was killed at Côté d'Evrard, north of Rouen, in France, by the crashing of his airplane.

ALCOHOL, ETHYL. See **CHEMISTRY, ORGANIC**.

ALCOHOLISM AND INSANITY. See **INSANITY**.

ALDEN, CARLOS COOLIDGE (1866-). An American lawyer born at Wilmington, Ill. He received his degrees of L.L.B. and L.L.M. at New York University and in 1893 was admitted to the bar. He practiced in New York from 1893 to 1904 and was associate professor of law in New York University, 1896-8; professor, 1898-1904. In 1904 he became dean of the Buffalo Law School. He was legal adviser to Governor Hughes in 1909 and in the next year became New York State Commissioner on Uniform State Laws. He is the editor of *A Handbook of the Code of Civil Procedure* (1901), the second edition of *Abbott's Practice and Forms* (1907), the second edition of *Abbott's Forms of Pleading* (1918), and *Handbook of Civil Practice* (1921).

ALDEN, RAYMOND MACDONALD (1873-). An American scholar and educator (see **VOL. I**). His later works include *Tennyson, How to Know Him* (1917), *Critical Essays of the Early Nineteenth Century* (1921), *Shakespeare* (1922), and *The Boy Who Found the King* (1922).

ALDERSON, VICTOR CLIFTON (1862-). An American college president born at Plymouth, Mass., and educated at Harvard University. After teaching in middle western high schools, 1885-93, he became successively professor of mathematics (1893-8), dean (1898-1900), acting president (1900-1), and dean (1901-3) of the Armour Institute of Technology, Chicago. He was president of the Colorado School of Mines from 1903 to 1913 and resumed the office

in 1917. Between 1913 and 1917 he was president (1913-15) and consulting mining engineer (1915-17) of the Winnemucca (Nev.) Mountain Mining Company. He is author of *The Oil Shale Industry* (New York, 1920) and *Oil Shale: a Résumé for 1921* (Golden, Colo., 1923).

ALDIN, CECIL C. W. (1870-). An English illustrator (see **VOL. I**) whose latest published work includes: *Old Inns; Old Manor Houses* (1924) and *The Hunting Countries of England*.

ALDINGTON, HILDA DOOLITTLE ("H. D.") (1886-). An American poet, born at Bethlehem, Penn. She entered Bryn Mawr College in 1904 and later went abroad. Her poetry placed her among the most important of the Imagists. Her works, which have appeared in many periodicals, are distinctly Hellenic in their delicacy and cold beauty. Her publications include *Oread; Pear Tree; Heat; and Lethe*.

ALDRICH, CHESTER HOLMES (1871-). An American architect, born at Providence, R. I., and educated at Columbia University and the Ecole des Beaux-Arts, Paris. He has followed his profession since 1902 in New York, as member of the firm of Delano and Aldrich, designers of many well-known public buildings and private residences. From 1917 to 1919 he was Director General of Civil Affairs of the American Red Cross Commission to Italy, and received various Italian decorations. He is a director of the Musical Art Society of New York and of the Music School Settlement, New York.

ALDRICH, MORTON ARNOLD (1874-). An American educator, born at Boston, Mass. After graduation from Harvard University in 1895, he was a student at the Universities of Berlin, Munich and Halle, obtaining the doctorate from the last named institution. He became successively instructor of economics at Harvard, assistant professor at Leland Stanford, and professor at Tulane University. Since 1914 he has been dean of the College of Commerce and Business Administration at Tulane University. As member of the American Economic Association and Secretary of the Association of Collegiate Schools of Business, Professor Aldrich has devoted himself to the practical application of economic doctrines to the needs of business administration.

ALESSANDRI, ARTURO (1869-). A president of Chile, born Dec. 21, 1869. After receiving his preliminary training in the Catholic schools, he took up the study of law at the University of Chile. When but 24 years of age he was successful as a lawyer and in 1898 was elected by the Liberal party to the Chamber of Deputies. Later he became minister of state, and held the portfolios of industry and public works. He was given important posts under nearly every administration. On Dec. 23, 1920, he took office as President of the Chilean Republic.

ALEXANDER, KING OF THE HELLENES (1893-1920). The second son of King Constantine and Queen Sophia was born on Aug. 1, 1893, and ascended the throne of Greece on June 12, 1917. His original attitude of active personal interest in his subjects and kingdom immediately won for him the loyalty of his people. The diplomatic triumphs of Venizelos, Liberalist leader, at the Peace Conference, met serious reverses with the sudden death of Alexander on Oct. 27, 1920, by blood-poisoning from

the bite of a pet monkey. The Venizelist party was defeated in the general election which followed, and the exiled King Constantine was recalled to the Greek throne.

ALEXANDER I (1858-). King of the Serbs, Croats, and Slovenes. The second son of Prince Peter Karadjorgjevic, later King of Serbia, was educated at St. Petersburg, and entered (1904) the *corps des pages* at the Czar's court. He was formally recognized as crown prince in 1909. On the outbreak of the Balkan War he had nominal command of the First Army. Because of the ill health of King Peter he was made prince regent in 1914, and was therefore commander-in-chief of the Serbian army when the War started. The Prince personally became very popular with his soldiers, whose privations and hardships he shared. When the exiled Serbian government was established at Corfu, he was warmly received on his visits to Paris and London. On Dec. 1, 1918, he was formally recognized as regent in all the Jugo-Slav provinces by delegates of the Jugo-Slav National Council in Jagret. At the instigation of the Communists and other revolutionary groups, an attack was made on his life on June 28, 1921. He succeeded his father as King of Jugo-Slavia on Aug. 16, 1921.

ALEXANDER, CARTER (1881-). An American educator, born in Paris, Mo., and educated at the University of Missouri and Columbia University. He held various positions as teacher and as superintendent of schools in Missouri from 1898 to 1908. From 1908 to 1910 he was research scholar and later fellow in education at Columbia University. He was assistant professor of educational administration at the University of Missouri (1910-13), taught successively in the summer schools of Columbia and Chicago Universities, and from 1913 to 1918 was professor of school administration and chairman of the committee on graduate work at the George Peabody College for Teachers at Nashville, Tenn. He was first assistant to the State Superintendent of Public Instruction of Wisconsin (1918-21) and in 1921 became assistant director of the Educational Finance Inquiry in New York. Besides contributing to periodicals he published *Some Present Tendencies of Teachers' Voluntary Associations* (1910), *School Statistics and Publicity* (1919), and *Publicity Campaign for Better School Support*, with W. W. Theisen (1921).

ALEXANDER, HARTLEY BURR (1875-). An American scholar and educator (see VOL. I). During the War he represented the ultra-pragmatic wing of American philosophy and sought to apply philosophizing to the everyday problems of war and peace. *Liberty and Democracy* (1918) is a collection of such contemporary essays. *Letters to Teachers* (1919) is an appeal to educators to forego the academic routine. His other works include *Mythology of All Races*, vol. x: *North American* (1916); vol. xi: *Latin American* (1920); and a volume of poetry, *Odes and Lyrics* (1921). In 1919 he served as president of the American Philosophical Association.

ALEXANDER, HUBBARD FONTER (1879-). An American ship-owner engaged in ocean transportation. He was born at Colorado Springs, Colo., and received a high school education. He began as wharf agent of Dodwell, Carlill and Company, Ltd., at Tacoma, in 1897, and in 1900 entered the Commercial Dock Company of Tacoma, of which he became president in 1901.

He was president of the Alaska Pacific Steamship Company in 1907, of the Alaska Coast Company in 1908, president of the Alaska Navigation Company in 1911, and in 1916 president of the Pacific Steamship Company (Admiral Line). Other offices which he has held are director of the Dollar Steamship Lines, director of the First National Bank of Seattle, and member of the National Foreign Trade Council, the American Bureau of Shipping, and the American Steamship Association.

ALEXANDER, JAMES STRANGE (1865-). An American banker born at Tarrytown, N. Y., and educated in the public schools. Entering the National Bank of Commerce, New York City, in 1885, he was made vice-president in 1908 and president in 1911. In 1907-08 he was treasurer of the American Express Company. He has been chairman of the board of the French-American Banking Corporation; director of the American Express Company, the American Foreign Securities Company, the Pacific Oil Company, the American Telephone and Telegraph Company, the Prudential Insurance Company of America, and the Federal Reserve Bank of New York; trustee of the American Surety Company; chairman of the executive company of the National Committee on European Finance; member of the New York Liberty Loan Committee, etc. He was a member of the New York Clearing House Committee, 1913-16 and 1919-21. He was decorated by various foreign governments.

ALEXANDER, MAITLAND (1867-). An American clergyman born in New York and educated at Princeton University, McCormick Theological Seminary in Chicago, and Princeton Theological Seminary. He was ordained in the Presbyterian ministry in 1892 and held several pastorates in New Jersey and New York (1893 to 1899). He accepted a pastorate in Pittsburgh in 1899 and became moderator of the Presbyterian General Assembly (1916).

ALEXANDER, ROBERT (1863-). An American army officer, born in Maryland. He graduated from the Army Staff College in 1910; was promoted through the grades, and reached that of colonel in 1917, after service in the Spanish-American War, the Philippines, Cuba, and Mexico. He went to France in 1917 as inspector-general, Line of Communications, was commander of the 41st Division in 1918, and of the 77th Division from August, 1918, to May, 1919. In this capacity he took part in the Oise-Aisne, Argonne-Meuse, and Marne-Aisne operations. On Aug. 4, 1921, he was appointed commander of the 3d F. A. Brigade.

ALEXANDER, SAMUEL (1859-). An English philosopher and educator (see VOL. I). With the publication of his Gifford Lectures, *Space, Time and Deity*, in two volumes (1920), he joined the ranks of the leading English philosophers. His work was hailed in many quarters as combining the sweep of the great German metaphysicians with the critical insight characteristic of the British tradition. From his point of view as a realist, Professor Alexander constructs a genuine ontological metaphysics. Space-time is his ultimate reality, and he regards the entire universe as a hierarchy of complexes of this primitive matter; new qualities evolve out of the lower complexes; it is thus that life, sensation, and mind come into being; and universals are patterns which are repeated at various places in the scale of

evolution. His conception of God is quite original. "God as actually possessing deity does not exist but as an ideal, is always becoming; but God as the whole Universe tending toward deity does exist." Unlike the American neo-Realists, Professor Alexander is opposed to behaviorism in psychology. He regards mind as a new quality and not as the neutral cross-section imagined by Prof. E. B. Holt. Professor Alexander was made Honorable Fellow of Lincoln College, Oxford, in 1918. His works since 1914 include a number of articles on mind, discussions at the Aristotelian Society, and a lecture on *Spinoza and Time* (1921). For a critical consideration, see PHILOSOPHY.

ALEXANDER, WALLACE MCKINNEY (1869-). An American sugar manufacturer born on the Island of Maui (H. I.), where he has extensive sugar plantations and refineries. He was educated at Yale University. He was appointed chairman of the commission visiting Japan (1920), chairman of the Japanese Relations Committee of California, and president of the San Francisco Chamber of Commerce (1921). He has been president of Alexander Baldwin, Ltd.; vice-president of the Matson Navigation Company, of the Hawaiian Commercial and Sugar Company, Ltd.; and of the Honolulu Consolidated Oil Company of California; and director of the California and Hawaiian Sugar Refining Company.

ALEXEYEV, MIKAIL (1857-1918). A Russian general. He entered the army in 1876 and completed his course at the General Staff College in 1890. He became a member of the Russian General Staff and in 1904 was made general. He took part in the war with Turkey and in the Russo-Japanese War. At the beginning of the War in 1914 he was chief of staff on the southwestern front, and credit for the Russian victory of that year in Galicia was given to him. In 1915 he was transferred to the northwestern front, where he had eight armies under his command. In August, 1915, he became chief of the headquarters supreme command and worked with the Emperor. A breakdown in health compelled him to resign late in 1916. After the revolution of March, 1917, he was made commander-in-chief but was dismissed in May. Kerensky called on him for assistance in September, and he was at headquarters for 12 days. Not wishing to work with Kerensky or Kornilov, he then left, and at the beginning of the Bolshevik rule he fought against it in South Russia. He died in 1918, of heart disease.

ALEY, ROBERT JUDSON (1863-). An American educator (see VOL. I). After acting as president of the University of Maine (1910-1921), he became the president of Butler College. Recently he has contributed to the *Educational Review, School and Society*, etc.

ALFALFA LEAF WEEVIL. See ENTOMOLOGY, ECONOMIC.

ALFONSO XIII (1886-). King of Spain (see VOL. I). He made tireless efforts during the War to assist refugees and to obtain information concerning prisoners and the missing. As a neutral, Spain was in a position to do a service of this sort; but recognizing that it was not a governmental duty, the King carried on the work entirely on his own initiative.

ALFRED UNIVERSITY. A nonsectarian institution at Alfred, N. Y., organized as a school in 1836 and as a university in 1857. The student enrollment increased from 447 in 1912 to

586 in 1924, the staff of instructors from 42 to 45, and the library from 25,000 to 36,000 volumes. The endowment, including buildings, equipment, etc., increased from \$500,000 to \$1,206,000. A central heating plant and a new laboratory hall were built and the Greene Block was taken over for college purposes. President, Rev. Boothe Colwell Davis, Ph.D., LL.D.

ALGERIA. A French colony and territory in North Africa. Its area is estimated variously from 222,180 to 343,000 square miles. The population according to the census of 1921 was 5,802,464, of whom the northern division contained 5,256,420, and the southern, 546,044. The population in 1911 was 5,563,828. Of the total population in 1921, Europeans numbered 831,040, against 681,772 in 1911, and the natives 4,971,424, against 4,711,276 in 1911. Frenchmen made up the majority of the European colonists, though it was estimated that Algeria contained 150,000 Spaniards and 40,000 Italians, who were attracted by the liberal land grants offered by the government. The chief towns reported the following population figures for 1921: Algiers, 206,595, an increase of 34,199 over 1911; Oran, 141,156; Constantine, 78,220; Bone, 45,171; Tlemcen, 43,090; Tizi-Ouzou, 35,171; Sidi-bel Abbès, 37,752; Blida, 36,384; Philippeville, 33,808; Sétif, 30,867. The native population, consisting of native Arabs, Berbers, Kabyles, and Mozabites, was entirely Mussulman. The chief Christian church was the Roman Catholic. Several Protestant churches and Jewish synagogues were supported by government grants.

Industry and Commerce. Agriculture continued the leading activity of the population. An enlightened government interest contributed to its continuous development. European colonists in particular were encouraged to apply themselves to scientific cultivation. Irrigation was resorted to and the Algerian bureau of agriculture did much to encourage the introduction of rust- and drought-resisting varieties of hard and soft wheat. The centres of production of cereal culture moved further and further South during the period, leaving the coast regions to the cultivation of vineyards, citrus fruits, vegetables, tobacco, etc. The leading cereal crops, wheat, barley, and oats, produced a yield of 1,008,280 metric tons in 1922 as compared with 2,317,000 tons in 1921, and 1,089,840 in 1910. Because of the hard wheat produced and the presence of many skilled Italians, the manufacture of macaroni became important during the period. Production reached 17,500 tons annually, of which 4358 tons were exported in 1921 and 1695 tons in 1922. The manufacture of flour and semolina, too, grew in importance. The cultivation of the vine, following cereals in order, yielded 5,002,112 hectoliters in 1921 and 7,473,091 in 1922 as compared with 8,413,654 in 1910. Tobacco planting showed the best advances during the decade. In 1913, 26,785 acres under cultivation yielded 10,866 metric tons; in 1921, the planting was 53,810 acres and the yield 22,512 tons. The growth in the industry was due to the encouragement given by the French Tobacco Monopoly which bought up the major part of the crop. Other products contributing to the wealth of the colony were alfa or esparto grass, palm leaf fibre, fruits, vegetables, lumber, woods, charcoal, etc. Algeria, too, furnished France with one-fourth of its

sheep consumption. Minerals, principally iron ore and phosphates, were also important. There were mined in 1922, 1,045,816 metric tons of iron ore (1,432,748 in 1913), 484,304 tons of phosphates (370,934 in 1913), 31,439 tons of zinc (118,884 in 1913), 1390 tons of petroleum (67 in 1913). After the War, efforts were made to develop a greater coal and lignite production, but with only little success. Figures for trade follow: imports for 1913, 1920, and 1922, 667,305,000, 3,072,707,000, and 2,077,089,000 francs, respectively; exports for the same years, 501,169,000, 1,355,372,000, and 1,379,491,000 francs. The balance of trade thus continued unfavorable, but this was largely written off by the income due Algerians on foreign securities and by the expenditures of tourists. Leading exports in 1922 were wine, 426,509,000 francs; sheep, 104,258,000; raw silk, 15,726,000; tobacco, 45,654,000; and cigarettes, 38,696,000. France, in 1921, took 73.93 per cent of the Algerian trade, United States 5.03 per cent, Morocco 4.4 per cent, and Great Britain 3 per cent. On Dec. 31, 1922, there were 1751 miles of railway operated by the state and 2464 miles by the Paris, Lyons, & Mediterranean Company. In 1912 there were 2049 miles in all. In 1920 a vast improvement scheme was announced, calling for the development of railways, vehicle roads, ports, schools, colonization, postal, telegraph, and telephone communications, forestation, irrigation, etc., and for this work loans up to 1,600,000,000 francs were authorized by the French law of July 23, 1921. Of this programme, by 1923, only some 400 miles of railway were in construction or projected.

Government and History. There were no important administrative changes in the colony during the period, except the extension of French citizenship in 1919 to veterans of the French army or navy, landowners, farmers, licensed traders, those capable of reading and writing French, and possessors of a French decoration. Estimated revenue for 1912 and 1922 was 151,690,315 francs and 377,864,674 francs respectively; expenditure for 1912 and 1922 was 151,669,255 francs and 377,564,649 francs. In 1912, the direct taxes on natives were suppressed. There was no external debt, and the French government met the expenses of the War and of naval establishments. The colony remained peaceful during the period 1914-24, and its economic progress proceeded unchecked under the beneficent eye of the French imperial administration. But the European population grew very slowly, under the deterrent influence of the system of land tenure. Colonists found their acquisition of property checked by the faulty titles and the refusal of the natives to sell their land, much of which was held by communities. Again, the onerous conditions imposed upon colonists by the state, i.e. a five years' residence requirement for a complete title, retarded immigration.

ALIEN ENEMY PROPERTY CUSTODIAN. See UNITED STATES, History.

ALKALI EARTH METALS. See CHEMISTRY.

ALLEE, WANDER CLYDE (1885-). An American zoologist and teacher, born at Bloomington, Ind., and educated at Earlham College and the University of Chicago. He was assistant professor of zoology at Oklahoma University (1914-15); professor of biology at Lake Forest College (1915-21); assistant professor of zoology at the University of Chicago (1921-23),

and associate professor there. (1923-). He was on the teaching staff of the Marine Biological Laboratory at Woods Hole (1914-21), lecturer in zoology at the University of California (1923) and secretary of the American Society of Zoologists (1918-). He has published numerous papers on animal reactions and on animal ecology, particularly on the ecology of the marine invertebrates of the Woods Hole region.

ALLEGHENY COLLEGE. A coeducational, nonsectarian college at Meadville, Pa., founded in 1815. A new gymnasium and an addition to the women's dormitory were built during the decade 1914-24, and the endowment was increased from \$1,000,000 to \$2,000,000. The student enrollment rose from 405 in 1916 to 540 in the year 1923-24 (102 in the summer of 1923), the faculty membership from 27 to 35, and the number of volumes in the library from 44,000 to 54,500. President, Fred W. Hixson, D.D., LL.D.

ALLEN, BENNET MILLS (1877-). An American zoologist born at Greencastle, Ind., and educated at DePauw University and the University of Chicago. He was instructor, assistant professor and professor in the University of Wisconsin (1903-13); professor of zoology at the University of Kansas (1913-22); and associate professor of biology at the University of California, Southern Branch (1922-). He was vice-president of the American Society of Zoologists (1922). He has published articles on various embryological subjects, the most noteworthy on the relation of the thyroid gland and hypophysis to the metamorphosis of the Amphibia.

ALLEN, CALVIN FRANCIS (1851-). An American engineer, born at Roxbury, Mass. He was graduated at the Massachusetts Institute of Technology in 1872, but after holding various engineering appointments, chiefly in connection with waterworks and railroads, he turned to law, was admitted to the bar, and practiced in both New Mexico and his native State. Returning in 1887 to engineering, he became successively assistant, associate, and then professor of railroad engineering in the Institute of Technology, until 1916, when he was retired. During the War he had charge of important work under the Fuel Administration in Massachusetts. Prof. Allen published *Railroad Curves and Earthworks* (1889), *Tables for Earthwork Computation* (1893), *Field and Office Tables* (1903), and *Business Law for Engineers* (1917).

ALLEN, EDWARD FRANK (1885-). An American editor and author, born in Newark, N. J. Positions which he has held through an active and varied career in journalism included that of reporter in Canandaigua, N. Y., 1904; contributor to the *New York Times* review of books since 1906; managing editor of the *Bohemian Magazine* (1908); publisher of *Book News Service* (1909); editor of *Travel* (1910-14); editor of *Lippincott's Magazine* (1914-15); editor of *McBride's Magazine* (1915-16); editor of *Travel* (1916-); and editor of *The National Marine* (1918-19; 1920-). He is also a contributor to *The Dial*, *Outing*, *Newspaper Feature Service*, *Scribner's*, *The Century*, *Country Life*, etc., and the author of *A Guide to the National Parks of America* (1915) and *Keeping Our Fighters Fit* (1918).

ALLEN, FLORENCE ELLENWOOD (1884-). An American judge, born at Salt Lake City,

Utah, and educated at Salt Lake College, Western Reserve University, the University of Chicago, and New York University. She began her career as assistant to the Berlin correspondent of the *Musical Courier* and was later music editor of the *Cleveland Plain Dealer* and lecturer on music for the New York City Board of Education. She was admitted to the bar and began her law practice at Cleveland, Ohio, in 1914. She became judge of the Court of Common Pleas of Cuyahoga County, Ohio (1921-26), and in 1922 was elected judge of the Supreme Court of Ohio. She was the first woman in America to hold such an office and the first woman in the world to judge first degree murder cases. She is author of *Patris*, a book of poems (Cleveland, 1908).

ALLEN, FREDERICK JAMES (1864-). An American vocational director, born at Limerick, Me., and educated at Dartmouth College and Harvard University. He held teaching positions at Boston University, Simmons College, etc., and subsequently became director of the Young Men's Civic Club of Boston (1904), investigator of occupations for the Vocational Bureau in Boston (1910-17), and director of the Bureau of Vocational Guidance of Harvard University. His works include *Vocations for Boys and Young Men* (1911), *The Law as a Vocation* (1913), *Advertising as a Vocation* (1918), and *A Guide to the Study of Occupations* (1921).

ALLEN, FREDERICK LEWIS (1890-). An American editor born at Boston, and educated at Harvard University. He was assistant in English at Harvard University (1912-14), assistant editor of the *Atlantic Monthly* (1914-16), and managing editor of the *Century Magazine* (1916-17). He was engaged in war publicity work for the Council of National Defense, 1917-19. From 1919 to 1923 he served as secretary to the Corporation of Harvard University. In 1923 he became literary adviser to the publishing house of Harper and Brothers.

ALLEN, FREDERICK MADISON (1879-). An American physician, originator of the Allen fasting treatment for diabetes. He received his education at Stanford University (M.D. 1907). At the Harvard Laboratory of Preventive Medicine and Hygiene he devoted several years (1909-12) to research in the nature of diabetes. Later he was on the staff of the Rockefeller Institute for Medical Research in New York and in 1919 founded the Physiatrie Institute at Morristown, N. J., a clinical and research institution for the study and treatment of diabetes and other nutritional diseases. The results of his early laboratory work were published in 1913 in a large volume, *Studies Concerning Glycosuria and Diabetes*, epochal in our knowledge of these disorders. In 1922 Dr. Allen, who is medical director of the Physiatrie Institute, established the *Journal of Metabolic Research*, of which he is editor-in-chief.

ALLEN, HENRY JUSTIN (1868-). An American governor born in Warren County, Pa., and educated at Baker University and Washburn College, Kan. He began professional life as an editor and subsequently owned several daily newspapers, especially in Kansas. He was in France with the American Red Cross in 1917 and 1918; in the latter year he organized the "home communication service" of the American Red Cross in France. He is best known for his work as governor of Kansas (1919-21), where he took an active interest in industrial problems.

He has contributed to magazines articles on political, industrial, and administrative subjects. He is author of *The Party of the Third Part* and *The Story of the Kansas Industrial Relations Court* (New York, 1921).

ALLEN, HENRY TUREMAN (1859-). An American army officer, born at Sharpsburg, Ky., and graduated from the United States Military Academy in 1882. After an exploration trip into Alaska in 1885, he was instructor in the Academy in 1888-89 and then military attaché in Russia and Germany; afterward he served with the army in Cuba, the Philippines, and Mexico. After organizing a cavalry brigade at Fort Riley, Kan., in 1917, and acting as commander at Camp Travis, Tex., he went abroad as commander of the American Forces in Germany, July 2, 1919. He is the author of *Reconnaissance of Copper, Tanana and Kuyukuk Rivers* (1886); *Military System of Sweden* (1895); *My Rhineland Journal* (1923).

ALLEN, IDA C. B. (1885-). An American dietician, born at Danielson, Conn., and educated at the English High School, Worcester, Mass., Oread Institute of Domestic Science, Worcester, and the Metropolitan Hospital, New York. She is a graduate dietician of the last-named institution. She has been dietician in several hospitals, director of domestic science in the Y. W. C. A., Worcester, Mass., lecturer on dietetics, and author of correspondence school courses. In 1920 she founded Mrs. Allen's School of Good Cookery. She is a contributor to various magazines and was formerly editor of "Three Meals a Day" (*Good Housekeeping Magazine*), "The Housewife's Forum" (*Pictorial Review*), and "Domestic Science" (*Woman's World*). She is author of *The Golden Rule Cook Book* (1916), *Mrs. Allen's Cook Book* (Boston, 1917); *Mrs. Allen's Book of Meat Substitutes*, *Mrs. Allen's Book of Sugar Substitutes*, and *Mrs. Allen's Book of Wheat Substitutes* (1918); *Woman's World Calendar Cook Book* (1922), and *The Bride's Book* (1922).

ALLEN, SIR JAMES (1885-). A New Zealand statesman, born in South Australia and educated at Clifton College and St. John's College, Cambridge, and the Royal School of Mines. He rendered invaluable service to the British government in its problems of an educational, military, and imperial nature. He had an uncommon faculty for solving financial and military questions. During the War he was an unpopular Minister of Defense under the Massey-Ward war coalition, but his unfaltering accuracy and keen judgment subsequently regained public confidence and approval. In 1920 he retired from politics and became the Dominion's High Commissioner in London.

ALLEN, JAMES LANE (1849-). An American author (see VOL. I). He has added to his long list of works *The Last Christmas Tree* (1914), *Sword of Youth* (1915), *The Cathedral Singer* (1918), *Kentucky Warbler* (1918), and *Emblems of Fidelity* (1919).

ALLEN, JOEL ASAPH (1838-1921). An American zoölogist, born at Springfield, Mass., and educated at Wilbraham Academy and Lawrence Scientific School of Harvard University, where he studied under Louis Agassiz, whom he accompanied on his expedition to Brazil. He was in charge of mammals and birds at the Museum of Comparative Zoölogy (1867-85); curator of ornithology and mammalogy at the American Museum of Natural History in New

York City (1885-1919), and curator of mammalogy, that. (1919-21). In 1916 he published an autobiographical and bibliographical paper in which he listed titles of 1433 articles published up to that date. He was editor of *The Auk* (1884-91); *Bulletin of the American Museum of Natural History* (1886-1918); the zoological numbers of the *Memoirs of the Museum*, (1895-1918); *Check List of North American Birds* (1895 and 1910); *Supplement to the Code of Nomenclature and Check List of North American Birds* (1887), and *Code of Nomenclature* (1908).

ALLEN, RILEY HARRIS (1884-). An American editor, born at Colorado City, Tex., and educated at the University of Chicago. He was reporter on the *Honolulu Evening Bulletin* in 1905, but two years later he joined the staff of the *Seattle Post-Intelligencer* (1907-10), subsequently becoming city editor of the *Honolulu Evening Bulletin* (1910-12), and of the *Honolulu Star Bulletin* (1912). In 1918 he went to Siberia with the American Red Cross. In 1920-21 he was engaged in rescuing and repatriating the Russian children exiled in Siberia, and was decorated by the All-Russian Government with the Cross of St. Anne for his services. He has contributed to the *Saturday Evening Post*, *Collier's*, *Munsey's*, etc.

ALLEN, SHERMAN (1875-). An American public official, born at Westford, Vt., and educated in the public schools. He was reporter and city editor of the *Free Press* from 1895 to 1901, and later held many important positions of a political nature, among them that of assistant secretary to President William H. Taft (1910-11), Assistant Secretary of the Treasury (1911-13), and assistant secretary and fiscal agent of the Federal Reserve Board (1914-18). He was treasurer of the War Finance Corporation (1918-19), and in 1919 he identified himself with the National City Bank of New York.

ALLEN, WILLIAM HARVEY (1874-). American social worker and publicist, born at LeRoy, Minn., and educated at the Universities of Leipzig, Berlin, and Pennsylvania. He was a pioneer in the creation of agencies for the scientific study of social and administrative problems and did his most effective work as the head of the New York Bureau of Municipal Research, 1907-14. The idea of the expert in municipal affairs largely owes its inception and extension to his activities, and he himself has played the part of investigator and technical adviser for many local, State, and educational agencies. From 1915 he devoted himself to educational administrative problems; his organization, the Institute for Public Service, served as a clearing house for popular pamphlets and brochures on the subject. In fact he has been a pamphleteer meeting with unusual success in his work, and his catholicity of interests has insured his importance as an unofficial critic of social and governmental machinery. His published works include *Efficient Democracy* (1907), *Cities and Health* (1909), *Woman's Part in Government* (1911), *Modern Philanthropy* (1912), *Self Surveys by Colleges and Universities* and *Self Surveys by Teacher-Training Schools* (1917).

ALLEN TREATMENT FOR DIABETES.
See DIABETES.

ALLENBY, EDMUND HENRY HYNDMAN (1861-). A British field marshal, born in

Felixstowe, England. He was educated at the Royal Military College at Sandhurst and in 1882 entered the Inniskilling Dragoons, with which he served in the Bechuanaland expedition of 1884-85 and in the Zululand operations of 1888; he also served in South Africa, 1890-1902, gaining for his services in that war the rank of brevet colonel, and was made a Companion of the Bath. In 1902 he was given the Fifth Lancers and in 1905 was promoted to command of Fourth Cavalry Brigade. He was advanced to major general in 1909 and a year later became inspector of cavalry. In 1914 he went to France in charge of the cavalry division and a year later was given command of the Fifth Army Corps; shortly afterward, he became chief of the Third Army, participating in the battle of the Somme. The promotion to general was given him in 1917, and he was placed in command of the troops in Egypt and Palestine. The Palestine campaign of 1917 under his direction was brilliantly conducted, culminating in the capture of Jerusalem on Dec. 9, 1917. Later in 1918 he completed his undertaking by occupying Damascus and Beirut, and all Syria passed into the hands of the Allies. For his services in the War he was promoted to the rank of field marshal and made Viscount Allenby of Megiddo and Felixstowe. Since 1919 he has been High Commissioner for Egypt, with headquarters in Cairo. Besides being made a Commander of the Bath (1915), Grand Cross of St. Michael and St. George (1918), and Grand Cross of the Bath (1918), he has received the Distinguished Service Medal of the United States, the Croix de Guerre of both France and Belgium, and many other foreign decorations. For his success in the Palestine campaign the British government made him a grant of £50,000. See *With Allenby in Palestine* by F. S. Brereton (1920) and *Allenby's Final Triumph* by W. T. Maffey (1920). See WAR IN EUROPE, *Turkish Front*.

ALLENSTEIN-MARIENWERDER. Articles 94-98 of the Treaty of Versailles, as a result of the demands of the Poles, provided for the holding of plebiscites in the two regions known as Allenstein and Marienwerder (total area, 15,000 square kilometers). Allenstein, made up of eight East Prussian districts (*Kreise*), seated a population of 556,000, of whom 268,000 were Poles and 288,000 Germans. It is a little-frequented region of forests and marshland, whose leading economic activity is the export of wood. The Poles here had embraced Protestantism in the sixteenth century, and this, as well as their long dependence on their German masters, had estranged them from the great body of Catholic Poles. Marienwerder, consisting of four West Prussian districts, was much more important, although smaller. Its population included 24,000 Poles and 114,000 Germans. Its location on the East bank of the Vistula, and the fact that it was traversed by the Danzig-Mlava railway, the shortest route from Danzig to Warsaw, made its disposition a matter of the first moment to Poland. Inter-Allied commissions took control of both areas until the date fixed for the plebiscites, June 11, 1920, but the presence of troops could not check the frequent disorders, for the most part the work of irregular Polish bands. The votes, as finally taken on July 11, yielded German victories in both areas. In Allenstein 98 per cent of the vote was for Germany, and in Marien-

werder, 92 per cent. The two regions therefore were turned over to Germany. The Treaty of Versailles had assured Poland control of the Vistula, and it was to effect this that the Council of Ambassadors attempted to assign Poland a strip on the Vistula's East bank 50 miles in width and 30 miles long and containing four villages. This raised a storm of protest throughout Prussia, so that reluctance to take a step so clearly unpopular prevented the Council of Ambassadors from delimiting the boundary and ordering the transfer of the territory in question. The matter was still unsettled in 1924.

ALLIANCE FRANÇAISE, FÉDÉRATION DE L'. An association of societies founded for the purpose of encouraging in the United States and Canada the study and cultivation of the language, literature, art and history of France. Established in 1902, it increased its groups from 150 in 1916 to 226 in 1924. It published a Year Book (*Bulletin Officiel*) and a monthly, *L'Echo de la Fédération*, both in French. The Molière centenary was celebrated in 1922 and the Pasteur anniversary in 1923. A Congress of the French Language and Literature was organized in 1922 by the Fédération in Chicago. Every year during the period the Fédération brought one or more eminent men of letters from France as official lecturers to speak before the groups and affiliated societies, and organized lecture tours for other distinguished French travelers.

ALLIED DEBTS. See FINANCE AND BANKING, *Inter-Governmental Debts*.

ALLIN, CEPHAS DANIEL (1875-). A college professor, born at Clinton, Ont., and educated at the Universities of Toronto, Harvard, Berlin, and Oxford. After teaching successively in Leland Stanford Jr. University and in Queen's University (Canada), 1902-07, he entered the University of Minnesota in 1907 as instructor in political science. He became professor of public law in 1917. Besides contributions to scientific journals, he has written *The Early Federation Movement of Australia* (1907), *Annexation, Preferential Trade and Reciprocity* (1911), and *The Tariff Relations of the Australian Colonies* (1917).

ALLINSON, ANNE CROSBY EMERY (MRS. FRANCIS GREENLEAF ALLINSON (1871-). An American writer on the Greek and Latin classics (see VOL. I). She was acting dean of the Women's College at Brown University (1920-21). In her two books, *Greek Lands and Letters*, written with her husband (Boston, 1909), and *Roads from Rome* (New York, 1913), as well as in contributions to magazines, she describes, in an engaging way, her travels in Greece and Italy, recalling the literary and artistic associations of the places she visited and showing the influence of natural environment on literature.

ALLIS, EDWARD PHELPS (1851-). An American manufacturer and zoölogist, born in Milwaukee, Wis. He was educated at Delaware Literary Institute, Antioch College, and Massachusetts Institute of Technology. He founded and maintained for several years the Lake Laboratory at Milwaukee as a private research institution. Here he and his associates worked mainly on the anatomy and embryology of the vertebrate head. His work has been recognized by many of the leading foreign and American societies of which he is a member, and in addi-

tion he has received the Prix Lallemand (Paris), Palmes Académiques (Paris), etc.

ALLISON, DAVID CLARK (1881). An American architect, born in Hookstown, Pa. He took special courses in architecture at the University of Pennsylvania and studied also in Paris. Beginning the practice of his profession in 1906, he moved in 1910 to Los Angeles, forming the firm of Allison and Allison. This firm designed a group of 12 buildings for the University of California and also several high school groups, an open-air Memorial Theatre at Santa Monica, and more than 150 school buildings in California and Arizona. During the War he was divisional representative of the American Red Cross with the American combat division on the British front in France.

ALLOYS. See CHEMISTRY.

ALSACE-LORRAINE. Since 1918, again the French departments of Bas-Rhin, Haut-Rhin, and Moselle. Area, 5605 square miles; population, in 1921, 1,709,749, as compared with 1,874,014 in 1910. According to the 1910 census, 1,634,260 were German-speaking and 204,262, French. The distribution by religions was Catholics, 1,428,343; Protestants, 408,274; Jews, 30,483. The falling off in population was accounted for in part by the loss of 45,000 men in the War and the emigration of from 75,000 to 118,000 German citizens during 1918-21. According to a 1923 estimate, Germans in the three departments numbered 70,434 unnaturalized, and 78,000 naturalized. Other foreign nationals numbered 60,300. The French-speaking population was on the increase through the return of large numbers of former residents. Principal cities with their populations in 1921 were Strassburg, 166,767 (178,891 in 1911); Mulhouse (Mülhausen), 98,393; Metz, 62,311; Sarreguemines, 14,318; Colmar, 42,255; Thionville, 13,410; Guebwiller, 11,520. After 1920, instruction was in French, a certain amount of time, however, being set off for religious instruction in German in certain Alsatian districts. The University of Strassburg was opened in 1919, and in 1921 had 2415 students.

Industry. Agriculture continued to engage the attention of a large proportion of the population. The leading crops were wheat, oats, rye, barley, sugar beets, hops, potatoes. The wine production in 1920 reached 725,000 hectoliters, valued at 124,000,000 francs. The economic importance of the departments to France, however, lay in their mineral wealth. In Alsace were to be found petroleum and great potash fields; in Lorraine, some of the greatest iron deposits in Europe. In fact, from Lorraine, Germany derived 75 per cent (21,000,000 long tons) of all the iron mined in the Empire. In 1921 the output had only reached 7,826,674 metric tons; yet it totaled more than half of the whole French yield. The state of the industry is indicated by the fact that only 8974 workers were employed in 1921 as compared with 17,237 in 1913. Coal, mined largely in that portion of the Saar Basin deposits which extends into Lorraine, yielded 3,795,262 tons in 1913 and 3,621,928 in 1921. In the potash mines of Alsace, whose acquisition made France the greatest producer in the world, 1,039,635 tons were mined in 1920 and 657,087 in 1921, as compared with 355,341 tons in 1913. Oil-fields, lying in the Bas-Rhin (Alsace) were the scene of extensive operations. In 1913, production was placed at 49,584 tons; in 1920, 54,909 tons; in

1921, 55,574 tons. The total for France and the colonies was only 60,000 tons. As a result of these natural resources the Lorraine was the seat of a great iron and steel industry. In 1921, pig iron produced was 1,447,000 tons, as compared with 3,460,000 tons in 1913; steel, in 1921, showed a production of 1,156,129 tons as compared with 22,260,000 tons in 1913. On the other hand, the textile industry was first in importance in Alsace, and by its addition it increased the number of spindles for the whole of France by 23 per cent. The railroad system ranked with the best in France; in 1919 there were 2228 kilometers of line. In 1921, too, there were 131 kilometers of rivers open to navigation and 368 kilometers of canals.

Government. By decree, in 1918, the French Republic took over the administration of the provinces, and a High Commission, accompanied by a military force, was installed at Strassburg. To the High Commissioner were delegated the functions of supervising the activities of the three departments and of recommending appropriate legislation to the French Chambers during the extremely delicate transitional period. During 1919-23, some 400 decrees were prepared to hasten a greater administrative and legislative coördination. The introduction of the French code was to be only gradual. The first step was the installation of the French electoral and fiscal systems on Oct. 17, 1919. For a closer understanding between population and administration, a common regional council was erected with legislative powers concerning budgeting but with only consultative powers in all other matters. The French language was introduced in the schools, though religious instruction in German among Alsations was for the time being maintained. High Commissioners during the period were Georges Maringer (November, 1918, to April, 1919), Alexandre Millerand (to January, 1920), and Gabriel Alapetite (1920-).

History. In accordance with the terms of the Armistice, French troops entered Mülhausen on Nov. 15, 1918, and Strassburg on November 22. On December 5, the Alsace-Lorraine Diet, which had been erected by Germany in 1911 in response to a demand for popular government, converted itself into a national assembly and formally welcomed the return of the French administration. Its president declared: "*Le référendum est fait!*" and four days later the French President replied: "*Le plébiscite est fait!*" The occupation was thus complete, and the answer was given to that branch of Allied opinion, including the Socialists, which sought the holding of a plebiscite in the two provinces in order to invest the restoration with a legal sanction. A year later, in November, 1919, Alsations and Lorrainers, as Frenchmen, took part in the general election to the satisfaction of all the political parties. In the following years, the problems of administration concerned themselves wholly with the readjustments in finance, education, language, etc. It was inevitable, of course, that difficulties should arise. Alsace, in particular, had been essentially a German province, and the transitional period brought with it a derangement of habitual manners and modes of thought. There was grumbling over the substitution of a French bureaucracy for the German, over the tardy settlement of the language and religious questions, over the too zealous application of martial law, and the

inability of the government to convert the German currency into the French with consistency. It was not until June, 1922, that the French government was able to straighten out the financial tangle by providing funds through which the provinces' banks might convert the currency at the authorized rate, viz., 1.25 francs per mark. As for the religious and language questions, a compromise was arranged by which the elementary schools were permitted to maintain their denominational character and continue religious instruction in German, while no attempt was made to sever the connection between Church and State. It was made plain, however, that ultimately Church and State would be separated, as in the rest of France. In general, the French were treating these and all other problems with their characteristic tact, and evidence was not wanting that the process of assimilation was being lightly felt.

ALSTON, ROBERT COTTEN (1873-). An American lawyer, born in Barber County, Ala., and educated at the University of Alabama and the Atlanta Law School (Ga.). He began practicing in Atlanta in 1893 and until 1903 was a member of the firm of Tompkins and Alston. He was later a member of the firm of McDaniel, Alston and Black, and from 1911 to 1921 of the firm of Robert C. and Philip H. Alston. Some of the positions he has held are general counsel of the Southern Express Company, special counsel of the Atlantic Coast Line Railroad, and general attorney of the American Railway Express Company. He was president of the Georgia Bar Association (1913-14) and in 1907 became chancellor of the diocese of the Protestant Episcopal Church of Atlanta.

ALTHOFF, HENRY (1873-). An American Roman Catholic bishop, born in Aviston, Ill., and educated at St. Joseph's College, Teutopolis, Ill., St. Francis Solanus College, Quincy, Ill., and the University of Innsbruck, Austria. He was ordained priest in the Roman Catholic Church at Innsbruck in 1902. After serving as assistant and as pastor in Missouri and in Illinois, he was consecrated bishop at Belleville, Ill., in 1914.

ALTO ADIGE. See TIROL, GERMAN SOUTH.

ALTSCHULER, MODEST (1873-). A Russian orchestral conductor, born at Mogilev, Feb. 15, 1873. From 1886 to 1890 he was a pupil at the Moscow Conservatory, studying cello with Fitzenhagen and composition with Arensky, Safonov and Taneiev. After touring Russia with his own trio he came to New York, where in 1903 he organized the Russian Symphony Orchestra for the purpose of introducing the works of the then little known Russian composers. Among those whom he first introduced to American audiences were Rachmaninov, Ippolitov-Ivanov, Skriabin, Liadov, Vassilenko, Spendiarov, and Konius. Players who made their American debut under his baton include Elman, Lhevinne, Rachmaninov, and Margaret Volavv. On Mar. 20, 1915, he gave the first complete performance anywhere of Skriabin's *Prométhée*, which requires the use of a specially constructed color-keyboard. From the very beginning Altschuler's concerts met with success. In 1920 the orchestra was disbanded, after accomplishing the object for which it was founded.

ALTSCHULER AWARD. See LABOR ARBITRATION.

ALUMINA CEMENT. See CEMENT.

ALUMINIUM, OR ALUMINUM. The world's output of aluminium in 1913 amounted to 78,093 metric tons; it reached a maximum of 200,328 metric tons in 1918. The United States generally produces from 35 per cent to 50 per cent of the world's output; at the same time it imports a certain amount, and in 1922 it reached a record total for metal, crude scrap and alloy, of 43,065,039 pounds. The world's production, which in 1921 had fallen to 76,494 tons, was estimated at 117,130 metric tons in 1922. The United States in 1922 produced 52,000 tons, against 28,750 in 1921. The value of new aluminium produced in the United States during 1923 was estimated by the United States Geological Survey at \$28,305,000, more than double the value produced in 1922 at domestic plants. Domestic aluminium was quoted at \$.22 to \$.23 during January, 1923, but by the end of April the price had reached \$.27 per pound for a 99 per cent grade; it remained practically stationary at this point throughout the year. The 98 per cent grade was quoted \$.01 lower, and foreign aluminium was somewhat less expensive.

The expansion in the consumption of aluminium between 1914 and 1924 was largely due to the increase in the construction of automobiles. It was estimated that 25 per cent of the domestic aluminium produced in the United States was consumed by makers of automobiles, who used 72,700,000 pounds of the metal in 1922. In fact the consumption of aluminium followed quite closely the status of the automobile industry and the number of cars produced, as it was being employed more and more, not only in sheets for bodies and in small castings, but also in aluminium alloys for engine parts.

Duralumin connecting rods were employed in several motor car engines, while duralumin rims for motor car wheels also had been developed. Duralumin was the most important of the aluminium alloys which had been developed, and it also found application in airships and airplanes. It was an alloy of aluminium with copper, manganese, and magnesium, having a maximum specific gravity of 2.75 and a tensile strength of 55,000 pounds per square inch. This alloy proved very useful in Europe and was employed in the United States for the airship *Shenandoah* and other aircraft. Several plants were developed for the production of this metal, and by 1924 an important industry in the manufacture of duralumin shapes and forgings had been developed. See **MOTOR VEHICLES**.

Other uses of aluminium, in addition to household ware and various sorts of containers, were in bronze powder and in solid rubber tires for motor cars. There was also an increased use of aluminium foil for wrapping food and confectionery products. In steel metallurgy it was employed for oxidizing and for thermite purposes and for alloys. In 1923 there were important developments of silicon-aluminium alloys. Formerly silicon had been believed to be very harmful in the metal, and in all steps in mining the ore and in making aluminium, precautions were taken to remove silica, but it seemed from later research that bauxite of lower grade than had been considered usable could be employed in making the metal. The imports and exports for the years 1922 and 1923, given in the accompanying tables, indicated that the producers of aluminium in the United States were well able not only to take care of the domestic

demand but to supply a considerable amount to the rest of the world.

IMPORTS OF ALUMINIUM INTO THE UNITED STATES IN 1922 AND 1923

Class	Quantity (pounds)	
	1922	1923
Metal, crude and alloy	39,951,690	43,065,039
Manufactures of plates, sheets and bars	Not given	1,288,651
Hollow ware	Not given	648,933

EXPORTS OF ALUMINIUM FROM THE UNITED STATES IN 1922 AND 1923

Class	Quantity (pounds)	
	1922	1923
Ingot, scrap, and alloys	1,538,079	1,169,753
Plates, sheets, bars, strips and rods	2,808,941	4,369,918
Tubes, moldings, castings, and other shapes	353,847	442,370
Table, kitchen, and hospital utensils	1,255,743	1,175,659
Other manufactures	2,935,359	3,820,406

ALUMINIUM SALTS. See **CHEMISTRY** and **BAUXITE**.

ALVEAR, MARCELO T. DE (1868-). A president of the Argentine Republic, born at Buenos Aires, educated at the University of Buenos Aires, and elected to the National Congress in 1912. In 1916 he was appointed minister of Argentina to Paris, and in 1922 he was elected to the presidency. He was a member of the Radical party. His efforts while in Paris to foster good feeling between France and Argentina were greatly appreciated in both countries.

ALVORD, CLARENCE WALWORTH (1868-). American scholar and educator (see **VOL. I**). Since 1914 Professor Alvord has been one of the most prominent American historical scholars. He served as editor of the important *Illinois Centennial History* and the *Mississippi Valley Historical Review*. The latter under his management rapidly assumed a commanding place in American scholarship. His work, *The Mississippi Valley in British Politics* (1917), which received the Loubat Prize, was an excellent example of good technical research aided by the exercise of a real imaginative understanding and the power to envisage the whole field under treatment as a unit. It was another example of the gratifying work being done in the history of American sectionalism. Professor Alvord published *The Illinois Country* in 1919. In 1920 he took the chair of history at the University of Minnesota.

ALVORD, JOHN WATSON (1861-). An American engineer, born at Newton Centre, Mass., and educated at the Harvard University Preparatory School and at J. W. Hunt's Normal School, Wash. In his extensive career he has undertaken innumerable important engineering enterprises, the majority of them in the Middle West. He was associated with the Chicago Water Works (1880-84), Chicago Exposition (1890-93), Illinois and Michigan Canal (1897-1901), United States Steel Corporation, Gary, Ind. (1907), Illinois State Board of Natural Resources and Conservation (1918), etc. In 1918 he was appointed director of the American Society of Civil Engineers. He has contributed to periodicals articles on engineering, sewage disposal, and water works, to which he gave particular study. He is the author of *Relief and Floods* (1918).

ALWOOD, OLIN GOOD (1870-). An

American bishop, born at Delta, Ohio, and educated at Hartsville College, Ind. He was ordained in the ministry of the Church of the United Brethren in Christ (old constitution) in 1892. He held various pastorates in Michigan and Ohio (1892-1903), was presiding elder (1903-05), and became bishop in charge of the North District in 1905. He became editor of *The Christian Conservator* in 1921.

AMADE, ALBERT GERARD D' (1856-). A French general, born at Toulouse, and educated at La Flèche. He entered the army in 1876, and served as military attaché in China, with the British forces during the South African war, in London, and in 1907 as commander of the expeditionary force in Morocco. In the War he was in charge of the Army of the Alps till Italy came out on the side of the Allies; he was then given other commands at Lille and Douai. In 1915 he led the French forces at the Dardanelles. In May of that year he was recalled to France and sent on a military mission to Russia. He was inspector general at Lyons in 1916 and commandant of Rennes in 1917. See **WAR IN EUROPE, Western Front**.

AMATOL. See **EXPLOSIVES**.

AMBASSADORS, COUNCIL OF. See **PEACE CONFERENCE AND TREATIES**.

AMBLER, CHARLES HENRY (1876-). American college professor and historical student. He was born at New Mattamoros, Ohio, and studied at West Virginia and Wisconsin Universities. In 1908 he became professor of history at Randolph-Macon College, from which he went to the University of West Virginia in 1917. He has edited many valuable historical collections and has written monographs for the journals of learned societies. While Professor Ambler's work has been concerned primarily with problems in Virginian local history, he has succeeded in carrying over into his researches an understanding of the great importance which sectionalism played in the development of America; in this regard he is an important exponent of the school headed by Frederick J. Turner. His most important work is *Sectionalism in Virginia from 1777 to 1861* (1910). Other writings include *Thomas Ritchie, A Study in Virginia Politics* (1918) and *Life and Diary of John Floyd* (1918).

AMBROSE, PAUL (1868-). An American organist and composer, born at Hamilton, Ont., and educated in the public schools and at Hamilton Collegiate Institute. He studied piano with his father, a composer, and other teachers. He was organist in various New York churches from 1886-1917; in 1917 he became organist and choirmaster of the First Presbyterian Church of Trenton, N. J. He was professor of music in the New Jersey State schools, 1903-17, and was formerly engaged as soloist and accompanist. He is the composer of many sacred and secular songs, vocal duets, instrumental works, etc. He has held the vice-presidency of the Synthetic Guild of New York City and was president of the New Jersey section of the National Association of Organists, 1913-15.

AMBROSETTI, JUAN BAUTISTA (1865-1918). An Argentinian anthropologist. He was born in Gualeguay and educated at Buenos Aires. He was an early student and collector of archeological specimens and at the age of 21 was made director of the Zoological Museum

of Parana. Among his publications are *Algunos Vasos Ceremoniales de la Region Colchaqui* (1902); *Antigüedad del Nuevo Mondo* (1903); *Los Grandes Hachas Ceremoniales de Patagonia* (1903), and *Apuntes sobre la Arqueología de la Puna de Atacama* (1904). His latest work, a contribution to the Pan-American Congress (1915-16), was *Los Vasos del Pekara de Tilcara*.

AMERICAN ASSOCIATIONS AND SOCIETIES. For organizations whose official titles begin with the word American, see under important descriptive word of the title, thus: **American Bar Association.** See **BAR ASSOCIATION, AMERICAN**; **American Legion.** See **LEGION, AMERICAN**; **American Library Association.** See **LIBRARY ASSOCIATION, AMERICAN**.

AMERICAN COUNCIL ON EDUCATION. See **EDUCATION IN THE UNITED STATES**.

AMERICAN EXPEDITIONARY FORCE. See **WAR IN EUROPE, Western Front**.

AMERICAN FARM BUREAU FEDERATION. See **AGRICULTURE**.

AMERICAN INDIANS. See **ETHNOGRAPHY**.

AMERICAN LAW INSTITUTE. See **LAW, PROGRESS OF THE**.

AMERICAN MUSEUM OF NATURAL HISTORY. See **EXPLORATION**.

AMERY, LEOPOLD C. M. STENNETT (1873-). A British politician (see **VOL. I**). During the War he served with the British army in France and later in Saloniki. He was reelected to Parliament in 1918. He was assistant secretary of the War Cabinet (1917); member of the staff of the War Council, Versailles, and of the staff of Secretary of State for War (1917-18); and Parliamentary Under-Secretary for the Colonies (1919-21).

AMES, JOSEPH SWEETMAN (1864-). An American physicist and writer (see **VOL. I**). In 1917 he was a member of the National Advisory Committee for Aeronautics, and later became chairman of the foreign service committee of the National Research Council which visited France and England for the purpose of investigating the organization and development of scientific activities in connection with warfare.

AMES, OAKES (1874-). An American botanist, born at East Eaton, Mass., and educated at Harvard University. Beginning as an assistant in botany and assistant director of the Botanical Gardens at Harvard in 1899, he became assistant professor of economic botany in 1915 and was director of the Botanical Gardens, 1910-22. He has been recognized as an authority on orchids, concerning which he has written a great deal. He has contributed to botanical periodicals and is the author of *Orchidaceae* (1905-08) and *Notes on Philippine Orchids* (Boston, 1920).

AMHERST COLLEGE. A nonsectarian institution for men at Amherst, Mass., founded in 1821. The enrollment increased from 416 in 1914 to 561 in 1923, the faculty from 43 to 51 members, and the library from 107,800 to 130,000 volumes. The productive funds were increased from \$2,776,000 to \$6,500,000, and the income from \$224,800 to \$534,000. The George Daniel Olds professorship in economics was established in 1914; Edward C. Converse gave \$250,000 for a new library building for a memorial to his brother, James B. Converse; and Mrs. Rufus Pratt Lincoln endowed a professor-

ship in science in memory of her son, Rufus Tyler Lincoln, in 1916. The Amherst Memorial Fellowships were established in 1919 and the John Woodruff Simpson Fellowships and Lectureships in 1922. Important additions were made to the biological and geological collections. During three years beginning with 1920, experiments were made in conducting classes for workers in Holyoke and Springfield. The Amherst plan for alumni reading and study was initiated in 1922. The college celebrated its hundredth anniversary at commencement time, June, 1921. The alumni subscribed a centennial gift fund of \$3,000,000 for the college during the centennial year, and a series of publications, to be known as the Amherst Books, was started. Alexander Meiklejohn, Ph.D., LL.D., president, resigned in June, 1923, to take effect June, 1924, and was on leave of absence, 1923-24. President-elect and acting president for the year 1923-24, George Daniel Olds, LL.D.

AMIDON, SAMUEL BARKER (1863-). An American lawyer and banker, born at Perry, Ohio, and educated at the Geneva (Ohio) Normal School, Oberlin College and Hiram College. He began practicing in 1886, belonging successively to the firms of Amidon and Conly, and Amidon, Buckland, Hart and Porter. President or director of numerous banks and business concerns, he was also a member of the Democratic State Committee of Kansas from 1902 to 1904 and was appointed to the Democratic National Committee in 1917. He became vice-chairman of the latter in 1919, as well as assistant to the Attorney-General of the United States in the prosecution of the I. W. W. cases in Kansas.

AMMONIA. See CHEMISTRY; CHEMISTRY, ORGANIC; COKE; EXPLOSIVES.

AMMONS, ELIAS MILTON (1860-). A governor of Colorado (1913-15). He was born in Macon County, N. C., and educated at the East Denver High School. He worked at various odd jobs during his boyhood and later joined the staff of the *Denver Times*. Subsequently he went into ranching and in 1890 entered politics as clerk of the District Court of Douglas County, Colo. After holding several political offices, he was elected governor of Colorado in 1913. He did much for the advancement of agriculture and agricultural education in that State.

AMMUNITION. See ORDNANCE; ARTILLERY; SMALL ARMS.

AMUNDSEN, ROALD (1872-). A Norwegian explorer (see VOL. I). In 1918 he started in the *Maud* from Norway to begin his drift across the Arctic Ocean. By July, 1920, he had completed the northeast passage and had landed at Nome, Alaska. Subsequently the trip by boat was abandoned and in June, a flight to the North Pole was arranged; but this also ended in failure. See POLAR RESEARCH.

ANÆMIA. Between 1914 and 1924 progress in the relief of incurable primary anæmias by surgical intervention, especially by the removal of the spleen, was considerably practised. Hundreds of such operations were performed. The removal of the organ is not followed by injurious after-effects, and the operation is not especially hazardous. Usually there is reason to suspect that the anæmia is due to some disease of the spleen, but in these pernicious

forms of primary anæmia the cause is often quite obscure; the spleen is then removed as a last resort. Another surgical resource now much used in these cases is repeated transfusion of blood and the two may be combined. There is even a third surgical possibility, the removal of any focus of suppuration present in the body of one of these patients, as infected teeth or tonsils; for it may be that from some such apparently insignificant lesion the morbid blood state has taken its origin, at least in part. Only a few years ago the prophecy that pernicious anæmia would come under the head of a surgical disease would have sounded highly fanciful. It is too much to claim that a disease hitherto regarded as incurable can be radically cured by surgical means, when we are still ignorant of its exact causation, but many patients have shown improvement and have obtained a new lease of life from such treatment. Only time can decide the question of its value finally.

ANATOLIA. See TURKEY.

ANATOMY. See ZOÖLOGY.

ANCIENT MAN. See ANTHROPOLOGY.

ANDAMANESE. See ETHNOGRAPHY.

ANDERSEN, HENDRIK CHRISTIAN (1872-). An American sculptor, born in Bergen, Norway. He studied art and architecture in Boston, Paris, Naples, and Rome. Andersen has also distinguished himself as the author of *The Creation of a World Centre of Communication*, which contains a detailed plan for the founding of a monumental city devoted to human progress; a second volume enumerates the legalizing and the economic advantages of a world centre. He devoted nine years to this work and succeeded in enlisting the interest of the rulers of leading European countries and the United States in his project, but just about this time the War broke out. He was also founder of the World Conscience Society. His leading works in sculpture include "The Fountain of Life," "The Fountain of Immortality," "Jacob Wrestling with the Angel," "Study of an Athlete," and busts, medallions, and portraits of Pope Benedictus XV.

ANDERSON, ALBERT BARNES (1857-). An American judge, born near Zionsville, Ind., and educated at Wabash College. He was admitted to the bar in 1881. In 1902 he was appointed United States district judge of the District of Indiana. He presided at the trial of the so-called dynamite conspiracy case at Indianapolis in 1912. In 1919 he had charge of the case against the United Mine Workers of America. Basing his decision on the Lever Act, he issued an injunction against the miners' officials, demanding that the strike order be rescinded. The legality of this injunction was questioned, but the miners' officials gave in.

ANDERSON, CARLOTTA ADELE (MRS. J. SCOTT ANDERSON) (1876-). An American educator, specially interested in the Montessori method and in the instruction of the deaf and dumb. She was born in New York City, and studied at various colleges and universities, among them the Wright Humason School for oral teaching of the deaf, and Teachers College, Columbia University. She studied the Montessori method in Rome. Herself a teacher of the deaf for some years, she was from 1901 to 1916 the owner of oral schools for the deaf and of teacher-training schools in New York and Pennsylvania. For many years, too, she interested

herself in introducing the Montessori method in the public schools. She was in charge of training teachers of the deaf at the New Jersey State Normal School at Trenton (1918-21). She was United States delegate to the third International Congress on Home Education at Brussels in 1910 and was general secretary of the fourth International Congress.

ANDERSON, CHANDLER PARSONS (1866-). An American lawyer, born at Lakeville, Conn., and educated at Yale University and the Harvard Law School. He was admitted to the bar in 1891 and soon attained prominence in the field of international law. In 1896-97 he was secretary for the United States and Great Britain of the Bering Sea Claims Commission, and in the following year secretary for the United States of the Joint High Commission with Great Britain for the settlement of Canadian questions. He was counsel in various boundary disputes, notably those of Alaska (1903), Passamaquoddy Bay (1909), Costa Rica and Panama (1913-14), Guatemala and Honduras (1918), and Nicaragua and Honduras (1920). From 1905 to 1909 he was special counsel for the Department of State under Secretary Root, and the following year under Secretary Knox, in the negotiation of treaties with Great Britain concerning British North America. He has also been United States agent in the North Atlantic Coast fisheries arbitration at The Hague in 1910, counselor to the Department of State (1910-13), United States arbitrator in the British-American pecuniary claims arbitration (1913), legal adviser for the American embassies and legations in Europe on questions of American interests growing out of the War, and for the Department of State (1914-15), counsel on international questions for the United States War Industries Board (1917-18), counsel for the International Committee of the Red Cross Societies in France (1919), United States arbitrator in the American-Norwegian Shipping Claims Arbitration (1921), and United States legal expert for the Washington Conference (1921-22).

ANDERSON, DICE ROBINS (1880-). An American college president, born at Charlottesville, Va., and educated at Randolph-Macon College and the University of Chicago. After teaching in various colleges and academies, he was president of Willie Halsell College, Vinita, Okla. (1906-7). He was instructor in history in the University of Chicago (1908-9), professor of history and political science (1909-19), and professor of economics and political science and director of the School of Business Administration (1919) in Richmond College, Va. In 1920 he became president of Randolph-Macon Woman's College. He is author of *William Branch Giles, a Study in the Politics of Virginia and the Nation, 1790-1815* (1914), and is editor of the *Richmond College Historical Papers* (1915, 1916, 1917).

ANDERSON, EDWIN HATFIELD (1861-). An American librarian (see Vol. I). As director of the New York Public Library, Mr. Anderson has pressed forward the perfection of organization and administrative methods which has been all the more essential because of the unprecedented increase in the use of the different departments and the limited accommodations of the Library. He was president of the New York Library Association in 1914.

ANDERSON, HENRY WATKINS (1870-). An American lawyer, born in Dinwiddie County, Va., and educated at Washington and Lee University. He began the practice of law in Richmond, Va., in 1898, and three years later became a member of the firm of Mumford, Hunton, Williams and Anderson. He has been president of the Richmond-Washington Highway Corporation, vice-president and general counsel of the Atlantic Life Insurance Company. In 1912 he was the reorganizer of the International and Great Northern Railroad Company of Texas, and its general counsel from 1912 to 1914. In 1921 he was appointed trustee by the United States government for the Armour and Swift interests in the Stockyards. During the War he engaged in Red Cross work in the Balkans and received decorations from many foreign governments.

ANDERSON, ISABEL (MRS. LARZ ANDERSON) (1876-). An American author, wife of the sometime Minister to Belgium and Ambassador to Japan. She was born in Boston, Mass., and educated in private schools. She is author of stories for children and reminiscences of travel and diplomatic and social life, written in a lively and entertaining manner. Her works include *Captain Ginger's Fairy* (Boston, 1910), *Captain Ginger's Playmates* (Boston and Philadelphia, 1911; translated into French and German, 1911), *Every Boy and Other Children's Plays* (New York, 1914), *The Spell of Japan* (Boston, 1914), *The Spell of Belgium* (Boston, 1915), *Presidents and Pies* (Boston, 1920), *Topsy Turvy and the Gold Star* (Boston, 1920), *Polly the Pagan* (Boston, 1922). She has also contributed to periodicals. During the War she served on several relief committees and in French and Belgian front line hospitals. She has been decorated by the Japanese, Belgian, French, and American governments.

ANDERSON, JOHN FISHER (1873-). An American physician born at Fredericksburg, Va. (see Vol. I). Since Jan. 1, 1918, Dr. Anderson has been director of the research and biological laboratories of E. R. Squibb and Sons, New Brunswick, N. J. He was co-editor of the United States *Dispensatory*, 20th ed. (1918), and was professor of hygiene at Rutgers College.

ANDERSON, KARL (1874-). An American painter and illustrator, brother of Sherwood Anderson, the novelist. He was born at Oxford, Ohio, and educated at the Art Institute of Chicago and in Paris. He began his career as an illustrator and writer but turned to painting and soon achieved distinction for the beauty of his colors and the imaginative quality of his pictures, which were exhibited in galleries both in Europe and America and won numerous prizes. Among his best known works are "The Idlers" (Art Institute of Chicago), "Sisters" (City Museum, St. Louis), "Apple Gatherers" (Cleveland Museum), and "The Hairloom" (Pennsylvania Academy, Philadelphia).

ANDERSON, PAUL LEWIS (1880-). An American expert in pictorial photography, born at Trenton, N. J. He studied electrical engineering at Lehigh University and from 1901 to 1907 held engineering positions in various electrical companies. He founded the Struss-Anderson Laboratories for the manufacture of kalogen, a photographic developer which he

originated. His photographs have been exhibited abroad and in this country. He is the author of some excellent textbooks in photography, *Pictorial Landscape Photography* (1914), *Pictorial Photography, Its Principles and Practice* (1917), and *The Fine Art of Photography* (1919).

ANDERSON, PIERCE (1870-). An American architect, born in Oswego, N. Y. He graduated from Harvard in 1892 and took post-graduate courses at Johns Hopkins and Paris. He was with D. H. Burnham and Company and their successors from 1900 to 1917, and from the latter year he was a member of the firm of Graham, Anderson, Probst, and White. In 1912 he was appointed to membership in the Federal Commission of Fine Arts. He was chairman of the Central Department of the Military Training Camps Association.

ANDERSON, SHERWOOD (1875-). A prominent American author. He was born in Camden, Ohio, and was educated in the public schools. He then engaged in both business and newspaper work. From 1916 to 1923 he published four novels, three collections of stories, and a volume of poems. His writings were hailed as being among the most significant works of the new American novelists, and with the publication of *Winesburg, Ohio* (1919), he was immediately accorded popular recognition. This collection of portraits and short narratives, concerned with the characters of a typical Mid West town, is a book of the highest order. The plain American figures in it are handled with tenderness; a loving sympathy is displayed for their real spiritual lives, although they happen to be cramped and twisted underneath the drab exterior of commonplace persons and existences. Mr. Anderson's thesis is not leveled at the village, for his works are neither provincial nor regional, as it is against the whole character of the contemporary life with its bustle, its garishness, and its want of satisfying aspiration. His *Triumph of the Egg* (1921), also a volume of short stories, catches up the theme and manner of the earlier work, only with a more perceptible incisiveness of diction and a more rounded narrative art. These two books are, artistically, the best of Mr. Anderson's work.

In his novels, his vague, mystical, still adolescent reveries and his romantic wonder are given too free a play, with the result that scenes and characters very often overstep the probable. *Windy McPherson's Son* (1916), *Marching Men* (1917), and *Poor White* (1920), all display the same preoccupations; they are concerned with rather inarticulate, restless young men who rebel against the confinement of their native villages and plunge into the life of the larger cities, only in the end to be thwarted in their quest for real happiness. Mr. Anderson fumbles a little too much with theme and character. There is also a good deal of tactless though never really objectionable writing. In *Many Marriages* (1923), Mr. Anderson's faults and virtues stand out conspicuously. The story is loosely constructed and highly improbable in incident; its mystical symbols very often cloud rather than clarify its issues; and yet it is a work that touches depths rarely plumbed before. It proves Mr. Anderson a great artist although his art is still imperfectly formed. His other works include *Mid-American Chants* (1918), a volume

of poems, and *Horses and Men* (1923), a collection of stories.

ANDERSON, WILLIAM FRANKLIN (1860-). A Methodist Episcopal bishop, born at Morgantown, W. Va., and educated at West Virginia University, Ohio Wesleyan University, Drew Theological Seminary, and New York University. He was ordained in the Methodist ministry in 1887. After holding several pastorates and offices on the Board of Education of the Methodist Episcopal Church, he was elected bishop in 1908. In 1914-18 he traveled widely as official supervisor of Methodist missions in Europe and Africa. During the War he served on the Committee of Emergency and Reconstruction of the Methodist Episcopal Church in Europe and in the Army Y. M. C. A. He was delegate of the Methodist Episcopal Church to the English and Irish Wesleyan Conferences in 1918 and 1919 respectively and fraternal delegate from the Federal Council of Churches of Christ in America to the Assemblée Générale du Protestantisme Français in Lyons, France. In 1922 he was decorated by the French government. He is author of *The Compulsion of Love* (1904) and *The Challenge of To-day* (1915).

ANDERSON, WILLIAM HAMILTON (1874-). An American temperance worker, born at Carlinville, Ill., and educated at Blackburn College, Carlinville, and the University of Michigan. After teaching school and practicing law, he became attorney of the Anti-Saloon League of Illinois in 1900 and was State superintendent of the Illinois League, 1900-06. This determined the trend of his whole subsequent life. Beginning in Illinois, he later held positions in the Anti-Saloon Leagues of New York and Maryland and in 1914 was elected general superintendent of the Anti-Saloon League of New York; at the same time he held various offices on the Board of Temperance of the Methodist Episcopal Church, in the Anti-Saloon League of America, and in the World League Against Alcoholism. Besides articles contributed to various periodicals, he is the author of *The Church in Action against the Saloon* (Westerville, Ohio, 1906; revised edition, 1910) and *The "Yonkers Plan" for Prohibition Enforcement* (Westerville, 1921).

ANDLER, CHARLES (1866-). A French professor. After his graduation from the Sorbonne he devoted himself to German philosophy and literature. At the outbreak of the War he had gathered around him in the University of Paris quite a group of young *Germanistes français*, whose object it was to bring about an intellectual *rapprochement* between France and Germany. He had a six-volume critical biography of Nietzsche in press, but the War put off its publication until 1919. The first four volumes, *Les Précurseurs de Nietzsche, La Jeunesse de Nietzsche, Nietzsche et le Pessimisme Esthétique, and Nietzsche et le Transformisme Intellectuel*, have now been published, and the two final volumes, *La Maturité de Nietzsche and La Dernière Philosophie de Nietzsche: le Renouveau de Toutes les Valeurs*, were in preparation in 1924. They portray the German philosopher as an opponent of modern Prussianism and essentially a French genius nourished by the work of the French psychological moralists like Montaigne, Pascal, La Rochefoucauld, and Stendhal. During the war Professor Andler published four volumes on the

rise and menace of the Pan-Germanist movement. He also wrote a volume on *La Philosophie de la Nature dans Kant* and a history of contemporary socialism in Germany.

ANDORRA. A semi-independent republic in the Eastern Pyrenees between the French department of Ariège and Catalonia in Spain. Its total area is 191 square miles; its population at the latest count available in 1924, 5231, scattered among 30 villages, the largest of which is the capital, Andorra la Vella. It is ruled jointly by the Bishop of Urgel and the French Republic, which maintains a permanent delegate in the country. Both authorities receive a biennial due from the native government. The excellent pasture land of the valley in which the republic is located furnishes the livelihood of its inhabitants. Coarse cloth is made from the wool of the flocks, some of which is exported. Grains are imported from France. The projected trans-Pyrenean railway was to pass within a few miles of the frontier and thus facilitate communications with the outside world. In 1924 communications were maintained by means of wagon-road with both Spain and France. Catalan is spoken by the natives, who embrace Catholicism. French and Spanish currency are both in use, though the French exert a predominant influence.

ANDRASSY, JULIUS (1860-). A Hungarian statesman (see VOL. I). In 1915 he urged the making of peace and an extension of the franchise in Hungary. As Foreign Minister, in 1918, he declared the alliance with Germany dissolved and tried to conclude a separate peace. He retired from office in the same year, but was returned in 1920 to the National Assembly as non-partisan delegate. He subsequently became leader of the Christian National party. His later works include, in Hungarian and German, *Wer Hat den Krieg Verbrochen? Interessensolidarität des Deutschlands und Ungarums*, and *Diplomatik und Weltkrieg*.

ANDRÉEV, LEONID NIKOLAEVITCH (1871-1919). A Russian writer and novelist (see VOL. I). The last years of Andréev's life formed a tragedy whose bitter pathos he alone could have expressed adequately. Idealist and rebel, he lived to see the Russian Revolution, the long-predicted cataclysm to which so many hopes had been pinned, but he saw it evolve in a direction contrary to his aspirations. Unlike his friend and fellow reformer, Maxim Gorki, who accepted the Bolshevik revolution as a fact and devoted his energies to saving its intellectual heritage from the old régime from destruction, Andréev could not make peace with the new order. He retired to a villa in Finland and addressed manifestoes to the world at large against the excesses of the Bolsheviks. Ironically enough, these writings were used as grist in the interventionist propaganda of the reactionary counter-revolutionists, whom Andréev hated as bitterly as he did the Bolsheviks. His death, on Sept. 12, 1919, was largely the result of his mental anguish over the Russian débâcle; for his social sympathies were as serious as only a Russian idealist's and mystic's could be. Aside from his political writings, Andréev published little after 1914. A play, *The Horrors of Belgium*, was written at the beginning of the War to celebrate the heroism of the Belgians against the invaders.

It was produced in the United States, and so were the earlier plays, *The Life of Man* (1917), *The Rape of the Sabine Women* (1922), *He Who Gets Slapped* (1922) and *Anathema* (1923).

ANDRESS, JAMES MACE (1881-). An American psychologist and author of works on physical education, born at Chesaning, Mich., and educated at the Michigan State Normal College, the University of Chicago, Harvard University, and Clark University. He was instructor in history and education at Manchester College (Ind.), 1906-07, and head of the department of psychology and school hygiene at the State Normal School, Worcester, Mass., 1908-15, and became head of the department of psychology and child study, Boston Normal School in 1915. He was special lecturer on the history of education and on health education in various institutions, and in 1920 he was special agent of the bureau of education and taught at Chautauqua Institution, N. Y. He is author of *Johann Gottfried Herder as an Educator* (1916); *Teaching Hygiene in the Grades* (1918); *Health Education in Rural Schools* (1919); *Rosy Cheeks and Strong Heart*, in collaboration with Annie Turner Andress (1920) and *Suggestions for a Programme of Health Teaching in the Elementary Schools*, with M. C. Bragg (1921).

ANDREW, A(BRAM) PIATT, JR. (1873-). An American economist and public official (see VOL. I). During the War he served first with the French and later with the American forces (1914-1919) and organized and directed American Field Service with the French army. He subsequently received the Croix de Guerre and the D. S. M. (1919) and became Chevalier de la Légion d'Honneur (1917).

ANDREWS, ARTHUR IRVING (1878-). An American college professor born in Providence, R. I., and educated at Brown University, the University of Wisconsin, and Harvard University. He was professor of history and public law at Tufts College (1912-20) and professor of diplomacy at Charles University, Prague (1921). He has contributed to the *American Journal of International Law*, *Historical Outlook*, *Science Review*, etc.

ANDREWS, AVERY DE LANO (1864-). American lawyer, capitalist, and soldier, born in Massena, N. Y. A graduate of the United States Military Academy in 1886. He received his law education at George Washington University and the New York Law School and was admitted to the New York Bar in 1891. He soon attained prominence as a corporation lawyer, and played an important part in the activities of large corporate industries. He was an officer or director of the General Asphalt Company, the Uintah Railway Company, the Mexican Eagle Petroleum Company, and several banks. He was a staff officer in the Spanish-American War and saw service in France (November, 1917-May, 1919), as a staff member attached to General Headquarters. In 1918 he was made a brigadier-general. The United States, France, Belgium, and Italy decorated him. He was police commissioner of New York City, 1895-98.

ANDREWS, CHARLES MCLEAN (1863-). An American historian and college professor (see VOL. I). Professor Andrews continued his work in the interpretation of colonial institutions; his *Boston Merchants and the Nonimportation Movement* (1917), *Fathers of New*

England (1919), and *Colonial Folkways* (1919) were of particular importance. The last-named, written for the *Chronicles of America* series, is a kindly and understanding study and constitutes a real contribution to American belles lettres. In 1921 he edited with his wife *The Journal of a Lady of Quality* and in 1923 published *British Colonial Policy and the American Revolution*.

ANDREWS, CHARLTON (1878-). American author and teacher, born at Connerville, Ind., and educated at De Pauw University and Harvard. Formerly he did newspaper work and taught and lectured in English at various schools. He was on the editorial staff of the *New York Tribune* (1914). He has contributed to many magazines and is the author of *The Drama To-day* (Philadelphia and London, 1903), *The Technique of Play Writing* (1915), and several plays.

ANDREWS, FANNIE FEEN (PHILLIPS) (?-). An American lecturer, social worker, and writer, born at Margaretville, N. S., and educated at the Salem (Mass.) Normal School, Radcliffe College, and Harvard Summer School. She is known as a lecturer on education in Europe and America, as secretary and organizer of the American School Citizenship League, and as a member of the advisory council of the Institute of International Education and the International Peace Bureau (Berne, Switzerland), etc. She was delegate to the International Conference on Education in 1914 and represented the United States Bureau of Education at Paris during the Peace Conference. Her works include *The United States and the World* (1918), *The World Family* (1918), *The War—What Should Be Said about it in the Schools?* (Boston, 1914), *Central Organization for a Durable Peace* (Boston, 1916), *Freedom of the Seas* (The Hague, 1917), and *A Course in Foreign Relations*, prepared for the Army Education Commission (Paris, 1919).

ANDREWS, FRANK (1872-). An American statistician, born at New Albany, Ind. He graduated from Johns Hopkins University in 1893 and took post-graduate courses in economics in that university. Until 1900 he was a teacher in the public schools of Maryland and Pennsylvania and in 1902-3 was employed in the United States Navy Department. From 1903 to 1914 he was assistant at the Bureau of Statistics for the United States Department of Agriculture, and from 1914, chief of the Division of Crop Records of this Bureau. He was a member of several economic societies and the author of bulletins on the marketing of crops, statistics of sugar, etc. In 1914 he became a member of the United States Crop Reporting Board.

ANDREWS, IRENE OSGOOD (MRS. JOHN B. ANDREWS) (1879-). An American writer on problems of women in industry. She was born at Big Rapids, Mich., and educated at the School of Philanthropy in New York and the University of Wisconsin. She began her career as agent for the Associated Charities at Minneapolis, Minn., and in 1906 was appointed special agent for relief work in the American Red Cross in San Francisco, and factory inspector in Wisconsin. She was head resident of the Northwestern University Settlement, Chicago, in 1907. She became assistant secretary of the American Association for Labor Legislation in 1908 and a member of the Y. W.

C. A. National Industrial Commission to Europe (1918). She is author of *Minimum Wage Legislation, Working Women in Tanneries, Irregular Employment and the Living Wage for Women, The Economic Effects of the War upon Women and Children in Great Britain* (Oxford, 1918, 1921; reprinted by the Carnegie Endowment for International Peace, Washington, D. C.), and of contributions to the *Legislative Review*.

ANDREWS, JOHN BEETRAM (1880-). An American economist, born at South Wayne, Wis. He was educated at the University of Wisconsin and Dartmouth College. After teaching economics at both of these institutions, he founded in 1911 the *American Labor Legislation Review* with the purpose of recording advances in social reform. During the 10 years 1914-24, he served on various committees and organizations devoted to labor and industrial problems. In 1921 he was called by President Harding to serve on the Unemployment Conference. He was a member of the secretariat to the League of Nations' first official International Labor Conference in Washington. With Prof. John R. Commons he was the author of *Principles of Labor Legislation* (1916) and *History of Labor in the United States* (1918). He was also associate editor of *Documentary History of American Industrial Society* in 1910 and has written some United States government reports on occupational diseases.

ANDREWS, ROY CHAPMAN (1884-). An American naturalist and author, associate curator of mammals of the Eastern Hemisphere at the American Museum of Natural History, New York. He was born at Beloit, Wis., and educated at Beloit College and Columbia University. In 1908 he traveled and made explorations in Alaska and was special naturalist with the U. S. S. *Albatross* in an expedition to Borneo and Celebes (1909-10). He explored Northern Korea, 1911-12, joined the Borden Alaska Expedition in 1913, and was leader of the three Asiatic expeditions of the American Museum of Natural History, first to Thibet, Southwest China, and Borneo (1916-17); then to northern China and outer Mongolia (1919), and finally to Central Asia (1921-26?). In 1918 he was in the intelligence service in China. He is author of *Whale Hunting with Gun and Camera* (Chicago, 1916); *Camps and Trails in China*, with Mrs. Yvette Borup Andrews (Chicago, 1918); *Across Mongolian Plains* (Chicago, 1921), and the American Museum of Natural History publications, *The California Gray Whale*, with Hermann von W. Schulte (1914) and *The Sei Whale* (1916).

ANET, CLAUDE (1866-). The pseudonym of Jean Schopf, a French novelist and essayist. His novel *Quand la Terre Trembla* (1921) is a good naturalistic reproduction of the people's emotions during the War. His other works include *Les Roses d'Ispahan* (1907); *La Révolution Russe* (1917); *Les 144 Quatrains d'Omar Khayyam* (1914); *Ariane, Jeune Fille Russe* (1920); *Petite Ville* (1921), and *L'Amour en Russie* (1922).

ANGELL, JAMES ROWLAND (1869-). An American psychologist and educator (see VOL. I). He was the Sorbonne exchange lecturer for 1915. On America's entry into the War he became a member of the Psychology

Committee of the National Research Council and was assigned by the adjutant-general's office to the work of classification of personnel in the army. He was chairman of the National Research Council (1919-1920) and president of the Carnegie Corporation (1920). In 1921 he was chosen president of Yale University. He published in 1918 *An Introduction to Psychology*.

ANGELL, NORMAN. See LOVE, RALPH N. ANGELL.

ANGINA PECTORIS. Not a little has been learned of this condition in the years 1914-24. It is not infrequently a consequence of remote syphilis and of imperfect treatment of the latter in its early stages. While it bears all the earmarks of a degenerative and destructive affection it has been found amenable, even when well advanced, to the operation of division of the sympathetic nerve, and apparent cures of desperate cases by Jonnesco and other surgeons are on record.

ANGLICAN CHURCH. See ENGLAND, CHURCH OF.

ANGLIN, MARGARET (1878-). An American actress born in Ottawa (see VOL. I). She took leading rôles in *The Trial of Joan of Arc* (1921), *Electra* and *Medea* (New York, 1918). It was in the Athenian tragedies particularly that she excelled. Both critics and audiences received her Shakespearean productions in 1914 with warm approbation. Miss Anglin has been described as having the courage of the grand style, although her most distinctive gift is for high comedy, as in *Lady Windermere's Fan*.

ANGLO-JAPANESE ALLIANCE. On Jan. 30, 1902, England and Japan concluded an alliance whereby the two Powers, "actuated solely by a desire to maintain the status quo and general peace in the extreme East," recognized the independence and territorial integrity of China and Korea and bound themselves to come to the assistance of each other in case more than one power joined in hostilities against either one. On Aug. 12, 1905, the treaty was renewed in a revised form, inasmuch as it provided that war with one power was to be sufficient cause for common action. It was to run for five years and thereafter until one year after either contracting power should have denounced it. Moreover, while the phrase of maintaining general peace was retained, nothing further was said about the maintenance of the status quo. The changes in the Far East, particularly the annexation of Korea by Japan, brought again a renewal and revision of the treaty in 1911. While the objects of the new pact were essentially the same as those of the treaty of 1905, an additional article was adopted which read, "Should either of the high contracting parties conclude a treaty of general arbitration with a third power, it is agreed that nothing in this agreement shall impose on such contracting party an obligation to go to war with the power with whom such an arbitration treaty is in force." This was inserted to exclude the United States from the list of powers with whom Great Britain might find herself at war as a result of the treaty.

The Anglo-Japanese Alliance had originally been formed against Russia, and it had been a factor in bringing about the Russo-Japanese War and Russia's defeat. After 1907, when an

understanding had been reached by Great Britain and Japan on one side and Russia on the other, Germany became the potential enemy, and a direct result of these developments was the withdrawal of the British squadron from the Far Eastern Waters to the North Sea. When the War broke out, Japan declared war on Germany "in accordance with the terms of the Anglo-Japanese Alliance." The ultimatum which Japan delivered to Germany on Aug. 9, 1914, contained, however, only terms which would have been equivalent to a surrender of German territory and rights in the Far East. This fact leaves open the question whether Japan would have declared war in case Germany had accepted the terms, or whether Japan was not, after all, more interested in eliminating a rival than in fulfilling the terms of the Alliance and protecting British possessions in Asia, notably India. While outwardly fulfilling her treaty obligations arising out of the Alliance, Japan in reality used the Alliance as a screen behind which she furthered her own aims in the Far East. The preoccupation of the Allies gave her a free hand. Occasional representations and protests from the Allies were of no avail. Primarily as a result of the Anglo-Japanese Alliance, the conclusion of the War found Japan, with the connivance of Great Britain, in a powerful position, from which she receded only after the Peace Conference.

In 1914 Great Britain and the United States signed the Peace Commission Treaty, which, strictly speaking, was not an arbitration treaty. Nevertheless, Sir Edward Grey, the English Foreign Secretary, notified the Japanese government that the British government would regard the treaty as a "general arbitration treaty" within the meaning of the exemption clause of the Alliance. The fact that this notification was kept secret until 1921 served to strengthen the impression that the Alliance would operate against any power whatsoever, and thus worked materially to the benefit of Japan. After Japan had eliminated in succession, by means of the Anglo-Japanese Alliance, Russia and Germany as competing powers in the Far East, the most serious obstacle to Japanese power in the eastern Pacific was the growing ascendancy of the United States. Aside from the question of Japanese immigration in western Pacific territories, which was in itself serious enough, Japanese and American interests came more and more into conflict in the Far East. For example, the United States stood for the "Open Door" in China, while Japan was the strongest protagonist of the policy of zones of interest in that country. It had been made clear to Japan that the Anglo-Japanese Alliance would not operate in case of a clash between Japan and the United States. Hence there appeared in Japan signs of coldness toward a continuation of the treaty with England. It was no mere coincidence that in 1916, simultaneously with vigorous demands in the Japanese press for abrogation of the Alliance, the Japanese government concluded a secret treaty with Russia for cooperation in the Far East, which would have superseded the pact with England had not the Russian Revolution occurred. (See JAPAN AND SIBERIA AND THE FAR EASTERN REPUBLIC.) Japan, thrown back on the Anglo-Japanese Alliance for the time being, concluded thereupon in 1917 the Lansing-Ishii Agreement, whereby she obtained

liberty of action in China, at least for the duration of the War. See JAPAN.

The period following on the Peace Conference witnessed further accord between Great Britain and the United States, and the two Powers began more and more to coöperate in all the main issues of world affairs. At the same time the points of conflict between Japan and the United States grew sharper. Japan was compelled under pressure from the Powers to forego a large part of her position on the Far Eastern mainland and, *nolens volens*, had to accept the Open Door policy in China. It became evident, moreover, that no full accord or alliance between Great Britain and the United States was possible while the Anglo-Japanese Alliance was in existence. As a matter of fact the Alliance had outlived its usefulness, since Japan would not be able to count on British assistance against her only possible rival. Hence demands were made in the press of both countries for the discontinuation of the treaty. When, therefore, after the lapse of the 10-year term the renewal of the Alliance came up for consideration in July, 1920, it was decided in accordance with the clause contained in the text of the 1911 treaty to let the Alliance run for another year. Meanwhile Great Britain desired to consult the Dominions, whose attitude toward Japan was akin to that of the United States. At the same time Great Britain and Japan discovered that the text of the 1911 treaty was "inconsistent" with the Covenant of the League of Nations and in a note apprised the League of this fact, promising that on the renewal of the treaty this inconsistency would be remedied. When after the lapse of the year no agreement had been reached as to a proper basis for renewal, the treaty was declared by mutual agreement in July, 1921, to remain in force for three months, and the League was informed that this automatic extension conflicted in no way with the note to the League of the preceding year. At the end of the stipulated three months the Washington Conference (q.v.) convened (November, 1921) and there treaties and agreements were concluded in consequence of which the Anglo-Japanese Alliance became completely obsolete. The Alliance was allowed to lapse in consequence of the Four Power Treaty. The Lansing-Ishii Agreement was superseded by the Nine Power Treaty of the Open Door in China. What actually took place was that Great Britain and the United States reached a complete accord as to the chief issues in the Pacific and that Japan, under pressure from the two English-speaking powers, had to make concessions and forego her liberty of action in the Far East. The British change of front from the Anglo-Japanese Alliance to coöperation with the United States had become a fact. In consequence of these events and of the American immigration legislation in 1924, Japan subsequently pursued a policy which indicated a desire to reach an agreement with Soviet Russia on Far Eastern questions, similar to that concluded with Imperial Russia in 1916.

ANGOLA, or PORTUGUESE WEST AFRICA. A Portuguese colony situated on the West coast of Africa, bounded on the North and East by the Belgian Congo, and on the South and East by Rhodesia and the Union of South Africa. It presents a coast-line of 1000 miles to the Atlantic and has an estimated area of 484,800 square miles. In 1914 the population was

placed at 2,124,361, which was considered too low. Later estimates gave Angola 4,119,000 souls, of whom all but some 30,000 whites, mostly Portuguese, were natives of Bantu-Negro stock. Loanda, the capital, situated on the coast, has an estimated population of 18,000. Other important towns are Cabinda, Ambriz, Novo Ridondo, Benguela, Mossamades, and Port Alexander. The chief products continued to be coffee, rubber, wax, sugar, vegetable-oils, coconuts, ivory, oxen, fish, and whale oil. The rubber industry steadily declined, with the result that the government applied itself to the encouragement of cotton and sugar-cane culture. The colony contained considerable quantities of copper, iron, petroleum, salt, and some gold, none of which was worked extensively. The trade, largely with Portugal and carried in Portuguese bottoms, consisted of imported textiles and exported rubber, coffee, dried fish, and whale oil. In 1921 these totaled 39,995,382 escudos for imports and 23,597,548 escudos for exports, both exclusive of the Congo. Communications were of course still in a primitive state. There were 818 miles of railway, 375 miles of which were purchased by the Portuguese government in 1918. The completion of the railroad out of Benguela, designed to tap the British copper region of Katanga, Belgian Congo, was under way in 1921. The removal of Germany from Africa as a result of the War left British influence dominant. Rivalry between British and German interests had been keen for the gaining of economic concessions and the Germans had been particularly active in southern Angola. German agents recruited native workers for transportation to the Otavi copper mines in German territory and thus gained the enmity of the Portuguese. During the War, border conflicts took place between German and Portuguese forces.

ANGORA GOVERNMENT. See TURKEY.

ANIMAL PSYCHOLOGY. In 1914 animal psychology was just emerging from the anecdotal stage and was fighting for the right to be regarded as a legitimate branch of experimental psychology. This right 10 years later had been achieved through the perfection of objective methods of control. Indeed, the technique of animal psychology, necessitating the study of external behavior without regard to states of consciousness, had a powerful repercussion on psychology proper (see BEHAVIORISM). Unfortunately, the development of an experimental technique did not bring the students of animal psychology much nearer the synthetic viewpoints for which they had all hoped. Many problems were attacked but few comprehensive theories discovered. The greatest amount of experimenting was done on habit formation, with white rats learning to pick their way in a maze. The topics treated included learning ability, distribution of effort, retention of motor habits, and transfer of training. While many hypotheses of learning ability were suggested, none stood the test of criticism. When the assumption of a conscious directive force was abandoned, the pleasure-pain explanation was attempted. But this was seen to prove nothing except that animals prefer pleasure to pain, when they have a choice between the two. As for the more complex sentiments, the experimental technique generally proved insufficient (*Psychological Bulletin*, 1921, vol. 15, p. 573). The theory of the con-

ditioned reflex formulated by the Russians. Bechterev and Pavlov, has not received any new developments. That certain reflexes, such as the salivating reflex in the case of dogs, can be made to function by conditions habitually associated with the adequate stimulus, was definitely established. But the theory cannot be used greatly to anticipate experience, although it does explain it after the fact.

Two other fruitful subjects of research were the study of tropisms and instincts among the lowest animals and the higher mental processes among animals most closely resembling man. The first seems by its nature to favor a mechanistic explanation and the second a conscious explanation. Jacques Loeb, in his two works, *The Organism*, considered as a whole from the physico-chemical standpoint, and *Tropisms*, forced movements and animal conduct, attempted to extend the physico-chemical explanation to the entire animal kingdom, man included. However, experiments with the lowly amœba revealed an unexpected degree of complexity even in the movements of unicellular animals. Kepner and Edwards (*Journal of Experimental Zoology*, 1917, vol. xxiv, p. 381) find that the *Amœba pelomyxa* has two types of feeding reactions, one to nonmoving objects which have no possibility of escape, the other to objects in motion, which may escape. Schaeffer (*Journal of Animal Behavior*, 1917, vol. vii, p. 220) points out that the ordinary amœba can choose between digestible and nondigestible particles. He regards the movement of the particle as the most important condition of the feeding reaction. Glass particles are eaten if they are in motion but not otherwise. Numerous experiments with light waves led to no important conclusion as to the behavior of the lower animals, inasmuch as the light stimulus produces immediate reactions from the higher animals and from man. The mental life of primates was investigated by Robert M. Yerkes (*Behavior Monographs*, No. 12) and by Wolfgang Koehler (*Psychologische Forschung*, 1922, vol. i, p. 2). The latter developed an interesting support to the *Gestalt* theory of perception (see PERCEPTION) by showing that chimpanzees and apes react to the form of the stimulus rather than to any specific element of it. Henning (*Zeitschrift für Biologie*, 1919, vol. lxx, p. 1) has found that untrained dogs gave no reaction to odors without biological significance but could be trained to respond to any type of odor detectable by man. See INSTINCT.

Bibliography. Most of the discussion of animal psychology is scattered through the psychological and biological periodicals. Washburn's *The Animal Mind* continued as the standard textbook on the subject. For a popular exposition of animal psychology, consult the first section of McDougall's *Outline of Psychology*.

ANISFELD, BORIS ISRAELEVICH (1870-). A Russian painter and scenic decorator. He was born at Bielitz, Bessarabia, and received his chief artistic training in five years at the Odessa Art School. At the Academy of Petrograd he was allowed to develop independently. A series of South Russian landscapes brought his first artistic triumph at Petrograd and Paris in 1906. The same season saw his first scenic production, the "Marriage of Zobeide," which in its daring color schemes and original conception was epoch-making in Rus-

sian scenic art. It attracted the attention of Diaghilev, who employed him on the Russian ballet. (See PAINTING, section *Russia*.) Among other scenic triumphs were "Boris Godounov" (1908), "Ivan the Terrible" (1909), "Sadko" (1911), "Islamey," "The Preludes," "Egyptian Nights," and "La Reine Fiammette" (New York, 1918). This scenic work gave his easel and other paintings an increasingly imaginative character. The chief influence was undoubtedly Oriental art, and he is primarily a colorist, but he subordinates color and all else to constructive synthesis. Among his best known canvases are "Clouds on the Black Sea," "Alder Grove—Iver," and "Gray Day on the Neva"—landscapes; a series of still lifes; "The Blue Statue," "The Exodus," "Garden of Eden," "The Golden God," "Garden of the Hesperides," "Buddha and the Pomegranates." His portraits include several of himself, the singer Chaliapine and L. M. Wourgaft. He is represented in all important Russian museums and in Brooklyn and Buffalo. In 1917 he escaped through Siberia to the United States, where he held exhibitions in 1917 and 1924, and became an important factor in stage decoration.

ANNAM. See FRENCH INDO-CHINA.

ANNAPOLIS. See UNITED STATES NAVAL ACADEMY.

ANN ARBOR MUSIC FESTIVAL. See MUSIC, *Festivals*.

ANNUNZIO, GABRIELE D' (1864-). An Italian novelist and poet (see VOL. I). When the War broke out in 1914 he was in France, but he sent many messages to the Italian people urging them to join on the side of the Allies. He returned to Italy in 1915, and although 55 years of age he volunteered for active service. He took part in many torpedo and submarine raids, and later joined the flying force, and in August, 1918, flew over Vienna, but dropped pamphlets instead of bullets on the unfortified city. He was promoted to the rank of lieutenant-colonel. After the Armistice, his bitter denunciation of President Wilson and the Allied Powers was effective in straining relations between Italy and the American President, already upset by the dispute over Fiume. When D'Annunzio led an expedition into that city, many of his most ardent admirers fell away from him, but a large body of important Italian opinion supported him in his rôle of "Commandant" of Fiume, and many of the army and navy officers served loyally under him. For 15 months he reigned in Fiume, and refused to submit to the Italian government in enforcing the provisions of the Rapallo treaty. He was overcome by the government and obliged to leave Fiume in January, 1921. He settled at Gardone on the lake of Garda. Among his later writings are *Le Chèvrefeuille* (1914); *Per la più Grande Italia* (1915); *La Leda senza Cigno* (1916); *La Befsa di Buccari* (1918); *La Rincossa* (1918), and *Notturmo* (1918).

ANSELL, SAMUEL TILDEN (1875-). An American lawyer, born at Coinjock, N. C., and educated at the United States Military Academy and the University of North Carolina. Beginning with the commission of second lieutenant in the infantry in 1899, he became major judge advocate in 1913, and brigadier general in 1917. He served with the civil government as prosecuting attorney in the Philippines (1909-11). By special assignment of the War Department, he was attorney before the Federal

courts of the United States for Porto Rico and the Philippines and acting judge advocate general of the United States of America (1917-18); for this work he was awarded the D. S. M. He inaugurated the movement which resulted in the reformation of the army court martial system. In 1919 he resigned from the army to practice law.

ANSPACHER, LOUIS KAUFMAN (1878-). An American dramatist and lecturer, born at Cincinnati, Ohio, and educated at the College of the City of New York and Columbia University. He was secular lecturer at Temple Emanuel, New York (1902-5), and became a member of the lecture staff of the League for Political Education of New York (1906), and of the Brooklyn Institute of Arts and Sciences (1908). Subsequently he was lecturer for the University Extension Centre, New York, and a member of the staff of the Civic Forum Lecture Bureau at its formation. He is the author of several successful plays which include *Tristan and Isolde* (New York, 1904), *Embarrassment of Riches* (New York, 1910), *Anne and the Archduke John* (1907), *The Woman of Impulse* (New York, 1909), *The Glass House* (1912), *The Washerwoman Duchess* (1913), *Our Children* (New York, 1915), *The Unchastened Woman* (New York, 1915), *That Day* (Los Angeles, 1917), *Madame Cécile* (1918), *The Rape of Belgium*, with Max Marcin (1918), *Daddalums* (London, 1920), *The Dancer*, in collaboration (New York, 1919), *All the King's Horses* (1920), and *The New House* (1921).

ANTARCTIC REGIONS. See **POLAR RESEARCH.**

ANTHONY, ALFRED WILLIAMS (1860-). A leading American theologian, born in Providence, R. I., and educated at Brown University, the Cobb Divinity School, and the University of Berlin. He was ordained in the Free Baptist Ministry in 1885 and appointed pastor in Bangor, Me. (1885-8), professor of New Testament exegesis at the Cobb Divinity School (1890-1908), and professor of Christian literature and ethics at Bates College (1908-11). Since 1911 he has devoted himself chiefly to executive work in Baptist church affairs. Among his recent works are *The Conscience and Concessions* (1918) and *The Church in the Community* (1919).

ANTHONY, KATHERINE (SUSAN) (1877-). An American writer on feminism, born at Roseville, Ark., and educated at Peabody College for Teachers, Nashville, Tenn., the Universities of Heidelberg and Freiburg, Germany, and the University of Chicago. She was instructor in Wellesley College (1907-8) and did research work in economics for the Russell Sage Foundation, New York (1909-13). She is author of *Mothers Who Must Earn* (1914); *Feminism in Germany and Scandinavia* (1915); *Labor Laws of New York* (1917); and *Margaret Fuller—a Psychological Biography* (1920). She was author of the essay on "The Family" in *Civilization in the United States—an Inquiry by Thirty Americans* (1921) and editor of *The Endowment of Motherhood* (New York, 1920).

ANTHRACITE. See **COAL.**

ANTHRAX. This communicable disease, in the form known as malignant pustule or malignant carbuncle, came much before the public because of its transmission through infected horsehair shaving brushes. Ordinarily it is an

occupational disease which occurs in workers in rawhide, wool, horsehair, bristles, etc. During the past few years numerous cases have occurred especially in Pennsylvania, both in horsehair workers and tanners on the one hand and among the general public on the other, as a result of infection from the use of horsehair shaving brushes. As a consequence of these infections the Health Department of that State issued a ruling that all horsehair should be subjected to dry heat for 24 hours at 200°F., or for 2 hours to steam at 15 pounds pressure, and finally to continual boiling in water for 3 hours. The public has been repeatedly warned by health authorities against the use of cheap shaving brushes, but this warning is insufficient for the protection of the community; and in New York State a law was passed which became effective on Jan. 1, 1922, prohibiting the manufacture, sale and offering for sale of shaving brushes made of horsehair. The general decline in the use of the shaving brush in recent years must be set down as due in part to this possibility of contamination. In the larger exposed industries, as tanneries, the men are notably indifferent toward self-protection, and only a small proportion are directly exposed to contagion. Statistics have shown that about 10 per cent of those exposed will contract the disease, with a mortality of about 20 per cent. In the past 12 years 119 workers in the Pennsylvania tanneries have been infected.

ANTHROPOLOGY. The decade 1914-24 witnessed a series of important discoveries in biological anthropology bearing on human evolution and new interpretations of older finds. Among these Boule's *Les Hommes Fossiles* (1921) is a work of outstanding merit, while the English-speaking public found convenient summaries in A. L. Kroeber's *Anthropology* (1923), G. Elliot Smith's pamphlet on *Primitive Man* (1916), and H. F. Osborn's *Men of the Old Stone Age* (1914). It was generally admitted, largely as a result of A. Hrdlicka's critical inquiries, that the New World must be excluded as a possible centre of origin of the family Hominidæ, and that southern Asia was the most likely place. Nevertheless, the Asiatic expedition organized by R. Andrews, with W. Granger serving as palæontologist, concentrated its attention on a region considerably to the north, in Mongolia, while the possibility of a European origin was suggested to Dr. Hrdlicka by his inspection of the Piltdown remains. At all events by far the fullest information came from Europe, where the Neanderthal type (*Homo neanderthalensis*) has been definitely established as a distinct species of man, very much lower morphologically than the Australian or Tasmanian.

This conclusion is based on a succession of finds which definitely rule out the older hypothesis of pathological deformation. The type is associated with the cultural subdivision of the Palæolithic known as Mousterian. Toward the end of 1921 a startling discovery was made in Broken Hill, Rhodesia, where for the first time human remains of archaic type were unearthed from African soil. Palæontologically, the associated fauna does not indicate great antiquity, but the skull itself has a tremendous development of brow-ridges suggestive of the Neanderthals. No complete description was available up to 1924, and some features, such as the close approximation to erect posture inferred

from the position of the *foramen magnum*, indicated important deviations from that species. (See G. G. MacCurdy, in *American Anthropologist*, 1922, p. 97 et seq.) On the other hand, fragments of two jaws found near Weimar in 1914 and since described in H. Virchow's *Die Menschlichen Skeletreste . . . von Ehringsdorf bei Weimar* are accepted as Neanderthaloid.

Respecting the much lower form represented by the Heidelberg jaw, found in 1907, there was no dissension. It was recognized as belonging to a member of the human family but of a species distinct from both recent and Neanderthal man. Some inclined to the view that it belongs to a separate genus, *Palaeoanthropus*. On the other hand, there is considerable dispute as to the interpretation of the Piltown remains unearthed in 1912. The reconstructions of the cranium made by different investigators varied appreciably, and non-British students were strongly inclined to consider the jaw as that of a chimpanzee and unconnected with the skull. G. Elliot Smith, however, maintained that it is impossible to maintain this opinion when it is tested by examination of the actual remains instead of mere casts, because the mandible and its teeth are indisputably human. Since the same holds for the skull in far greater measure, the brain falling within the range of living races and displaying a marked overgrowth of what corresponds in position to the speech centres, Smith sees here a corroboration of his favorite theory that the brain led the way in human evolution. *Pithecanthropus erectus*, the ape-man of Trinil, Java, had not, up to the middle of 1924, received monographic treatment at the hands of its discoverer, Dr. E. Dubois. It is recognized as the lowest member known to date of the family Hominidæ. In 1923 Dr. Hrdlicka had access to the actual specimens and was reported to have evolved a new interpretation of the find.

The origin of the races now in existence was still enveloped in doubt, though the Cro-Magnon man of the Upper Palæolithic—tall, narrow-skulled, and broad-faced—was usually conceived as Caucasian and indeed was believed by some to survive in different parts of Europe, for example in Scotland. A female skeleton and that of a youth found in Grimaldi and roughly contemporaneous with the Cro-Magnon remains were sometimes conceived as Negroid, but the determination was not universally recognized, while evidence of a prehistoric Mongolian race seems to be lacking. On the other hand, a fossilized Australian skull, found in Talgai, Queensland, and supposed to be of considerable antiquity, was regarded by G. Elliot Smith and S. A. Smith as ancestral to the present aborigines. The only distinctive feature was the great size of the palate and teeth, especially the canines. As to the cause of racial differentiation, two suggestive hypotheses found some following. In his presidential address on *The Differentiation of Mankind into Racial Types*, A. Keith (British Association for the Advancement of Science, 1920) explains the evolution as the result of differences in the ductless glands. On the other hand, Eugen Fischer in the *Eduard Hahn Festschrift* and elsewhere propounds the view that man is a domesticated animal and hence naturally has developed variations on a considerable scale in the same directions as such species as horses, dogs, cattle. As a matter of fact, the very traits distinctive

of breeds of cattle, dogs, etc.—type of skull, hairiness, hair texture, size—are the criteria employed by anthropologists in their classifications.

A conservative statement on classifications, with brief summaries of older schemes, will be found in Kroeber's *Anthropology*. G. Elliot Smith, e.g. in *Primitive Man*, injects a genetic point of view into the problem. Appraising the Australian as the lowest type extant, he regards him as something of a survival of the primeval *Homo sapiens*; he is supposed to have become localized in India, leaving the pre-Dravidians there when he migrated to his historic home. The Negroids became segregated at a later period, and still later four stocks with less pigmentation evolved, the Mongolian, Alpine-Armenoid, Mediterranean, and Nordic. The Polynesians are interpreted as a Mediterranean and Armenoid mixture, which even affected the essentially Mongolian population of aboriginal America. The last of these propositions—the partly Polynesian affiliation of the Americans—is likewise championed by Von Luschan and R. B. Dixon. The latter, in his book on *The Racial History of Man*, advances, however, a far more radical position. Taking three cranial features, the cephalic index, height index, and nasal index, he bases a system of races on them alone, to the exclusion of such hitherto universally accepted features as pigmentation and hair texture. As a result he discovers proto-Negroid, as well as Mediterranean, Alpine, and Caspian, i.e. Nordic, strains in the American Indian population and arrives at equally startling conclusions for races of other regions. So far these have been met with reserve or skepticism by most writers. Certainly Boas's observations on the mutability of the cephalic index in successive generations of southern and eastern European immigrants into America and those on the change of the Russian index in the direction of dolichocephaly as a result of the famines (Alexis Ivanovsky, *American Journal of Physical Anthropology*, 1923, pp. 231-353) hardly tally with the assumption that this index expresses a profound biological verity. On the other hand, the attempt made by Dixon to consider the combination of traits in individual subjects, e.g. to regard the association of dolichocephaly, leptorhiny, and hypsicephaly, as distinctive of a separate strain in a population, rather than to define the whole group on the basis of statistical averages, is in accord with a widespread tendency among recent investigators. Thus, V. Lebzelter (*Mitteilungen der Anthropologischen Gesellschaft in Wien*, 1923, pp. 1-48) splits up his Serbian subjects into a Dinaric group with tall stature, dark hair, and broad heads; another strain with short stature, dark hair and broad heads; and so forth.

The War, which in some respects blighted scientific work, including that in anthropology, nevertheless stimulated research along anthropometric lines. Investigations were made on prisoners of war. Thus, F. G. Parsons in his *Anthropological Observations in German Prisoners of War* tested and confirmed the fundamental differences between northern and southern Germans. Highly suggestive are the conclusions of J. Czekanowski (*Bulletin et Mémoire de la Société d'Anthropologie*, 1920, pp. 48-69), who denied that the time-worn classification of European races into Nordic, Alpine, and Medi-

terranean is at all applicable to Eastern Europe. Thus, he finds at least four additional stocks in Poland alone, of which a short, mesocephalic group is said to represent the oldest element, while a tall, blond, drachycephalic type and an obsolescent short, fair and dolichocephalic variety are equally noteworthy. These observations have been partly paralleled in Russia.

A model study of a particular people, made from a morphological and genetic point of view, is furnished by F. Sarasin's *Anthropologie der Neu-Caledonier und Loyalty Insulaner* (1920). These aborigines are shown to have affiliations with the Australians and Tasmanians. The technique of anthropology found detailed treatment in Rudolf Martin's monumental *Lehrbuch der Anthropologie* (1914), of which a second edition was in process of preparation in 1924. Besides this classic there are several lesser treatises, such as Fabio Frassetto's *Lezioni di Antropologia* and A. Hrdlicka's *Anthropometry and Physical Anthropology*. Apart from descriptive anthropometry, various biological questions engaged attention as to their bearing on man. Much of the avowedly eugenicist literature that flooded the market may be unqualifiedly stigmatized as unscientific trash, but the relevant data as seen by a eugenicist were set forth in a spirit of exemplary caution in S. J. Holmes's *The Trend of the Race* (1921). Closely correlated with these problems is that of Mendelism and of heredity generally. By far the most thorough inquiry into miscegenation was Fischer's investigation of Dutch-Hottentot breeds (1913), which seemed to prove Mendelian inheritance for some features. At all events, certain traits such as tallness appeared dominant, and the mutually independent transmission of distinct traits was demonstrated by the coexistence of spiral hair with blondness in breed children. In northernmost Norway, where Lapps and Scandinavians have intermarried, H. Bryn (*Troms Fylkes Antropologi*, 1922) likewise finds evidence for Mendelism, but it must be admitted that exact proof for the typical ratios has not yet been furnished for the human species. This point is made in F. Boas's *Report on an Anthropometric Investigation of the Population of the United States* (*Journal of the American Statistical Association*, 1922), where the basic interrelations of environment and heredity are discussed. A large number of important articles on biological anthropology appeared in the *American Journal of Physical Anthropology*, founded and edited by Dr. A. Hrdlicka.

A whole series of semipopular treatises became available for the layman's orientation. The account in A. L. Kroeber's *Anthropology* (1923) may be recommended for its conciseness and the infusion of a sense for culture-history as a whole, frequently lacking in more detailed discussions. A clarification of the highly misleading connotation of the term Neolithic is among the merits of this exposition. Since the grinding of stone did not begin in Europe until a relatively late stage of this period a new definition in terms of the first appearance of the bow, pottery, and the dog is imperative. In this view Kroeber more or less coincided with G. Elliot Smith, who, however, not only divided off the Neolithic along similar lines but also regarded as more fundamental the division of the Upper from the Lower Paleolithic (*Primi-*

tive Man, 1916). M. C. Burkitt's *Prehistory* and R. H. S. Macalister's *Text-book of European Archaeology* are storehouses of fact. The former emphasized prehistoric art. H. F. Osborn's *Men of the Old Stone Age* and Sollas's *Ancient Hunters* are also convenient summaries. For the Neolithic, J. M. Tyler's *The New Stone Age in Northern Europe* is an accessible guide. A great deal of valuable research in France and Spain has been done or stimulated by Abbé H. Breuil, whose reports appear from year to year in the issues of *L'Anthropologie*.

Outside of Europe relatively little work of fundamental value for the early history of mankind was done, though in America much was accomplished with important bearings on later epochs tying up with historic populations. Siberian data were well summarized in Gero von Merhart's essay in the *American Anthropologist* (1923, pp. 21-55), which described the Yenisei finds as corresponding to the European Upper Paleolithic; the Solutrean technique is absent, but Aurignacian types are paralleled, nor are Magdalenian features wanting. Sensational conceptions of extra-European Paleoliths were developed by J. Bayer (*Mannus*, vol. xi-xii, pp. 215-223), who synchronized them with the proto-Neolithic of Europe. This he coupled with a rejection of the traditional glacial chronology by combining the Riss and Würm periods into one, with the Lower Paleolithic at its commencement and the proto-Neolithic at its close. See ETHNOGRAPHY; ETHNOLOGY; EUGENICS; MAN, PREHISTORIC RACES OF; RACE PROBLEMS IN THE UNITED STATES.

ANTHROPOMETRY. See ANTHROPOLOGY.
ANTI-AIRCRAFT GUNS. See SMALL ARMS.

ANTI-AIRCRAFT ARTILLERY. See ARTILLERY.

ANTIBODIES. See HEREDITY.

ANTIN, MARY (1881-). An American writer on the immigrant. She was born at Polotzk, Russia, came to America in 1894, and was educated in the public schools, the Girls' Latin School (Boston), Teachers College (Columbia University), and Barnard College. Her books, especially *The Promised Land* (Boston, 1912) and *They Who Knock at Our Gates* (Boston, 1914), made an instant and deep impression by their sincerity, their idealism, and the vividness with which she shows, from her own experience, what America means to the immigrant. Her other works are *From Polotzk to Boston* (Boston, 1899); *At School in the Promised Land* (selections from *The Promised Land*, Boston, 1916), and *The Lie* (Boston, 1919).

ANTIOCH COLLEGE. A nonsectarian, co-educational institution at Yellow Springs, Ohio, founded by Horace Mann in 1853. The student enrollment increased from 230 in 1913 to 500 in 1923-24, the faculty from 20 to 48 members, and the library from 12,000 to 16,000 volumes. In the fall of 1921, the college was completely reorganized. The Antioch plan undertook to determine what were the controlling demands and opportunities of modern life and to furnish in a single orderly programme those elements of discipline and training which would best prepare students for all the relationships of life, personal, social, and vocational. In pursuance of this plan, the college united, in a single co-ordinated course of six years, a liberal college education, guidance in the choice of a profession or other calling and training for it, and a

practical apprenticeship to life through part-time, practical work. Students were not accepted who desired to confine themselves solely to technical training. The purpose of the part-time, practical work was primarily to develop self-reliance and responsibility and to give the student first-hand acquaintance with practical life and his own powers. The part-time work also helped the student to discover and prepare for his calling and more than cut in two the cost of a college education. Half the students studied while the other half worked, in alternate periods of five weeks. More than a hundred firms coöperated with the college in this programme. The enrollment was limited, and very close relations were maintained between students and faculty. The professional and other vocational courses prepared for engineering, business administration, education, journalism, and institutional management. Emphasis was placed on administrative and managerial training rather than on specialized technique. Arthur E. Morgan succeeded A. D. Fess, LL.D., as president in 1921.

ANTI-SALOON LEAGUE OF AMERICA. See PROHIBITION.

ANZACS. See WAR IN EUROPE, *Turkish Front.*

AOSTA, EMANUELE FILIBERTO, DUKE OF (1869-). An Italian general, son of Prince Amadeo of Savoy. He commanded the 1st Division at Turin and the 10th Army Corps at Naples. When the War began he was on the reserve list but was appointed to succeed General Zuccari in command of the 3rd Army and remained in that position till the end of the War. He made a most successful record. See WAR IN EUROPE, *Italian Front.*

APES, FOSSIL. See MAN, PREHISTORIC RACES OF.

APICULTURE. See ENTOMOLOGY, ECONOMIC.

APOLLINAIRE, GUILLAUME (1880-1918). A French poet and novelist. He distinctly represented the extreme modernist tendencies of *les jeunes*. He did not live to see the crystallization of the Dadaist movement, but the inspiration for its new formula of aesthetics, with its suggestion of a juggler doing tricks before spectators, came largely from his writing. As editor of *Le Festin d'Esopo* (1903-04) and *Les Soirées de Paris* (1913-18), he influenced both the younger school of French poetry and cubist painting. He hoped to develop an aesthetics which would unite poetry and painting into a single art. His works include *L'Enchanteur Pourissant* (1903) and *Hérisarque et Compagnie* (1912), his prose masterpiece, *Alcoola* (1913) is a collection of his more finished poems. *Le Poète Assassiné* (1918) is a lyric autobiography relating his impressions of the War. *Calligrammes* (1918) contains verses composed at the front. *La Femme Assise*, published posthumously in 1921, is a novel in the new manner.

APPLETON, WILLIAM ARCHIBALD (1859-). A British Trade Union leader, born at Nottingham, England. He was a lace-maker in Nottingham until 1896, when he became secretary of the Lace-Makers' Trade Union. In 1907 he was elected secretary of the General Federation of Trade Unions of Great Britain, an organization to provide strike benefits for members of unions affiliating with the General Federation. He was accepted as

spokesman for British labor by the British government during the War, although it was maintained that his organization was usurping the powers of the British Trade Union Congress and the Labor party.

APPONYI, ALBERT, COUNT (1846-). Hungarian statesman (see VOL. I). He served in the Hungarian Chamber of Deputies during the War but retired in 1918 as a result of the October revolution. In the next year he sat in the National Assembly and also represented his country at the Peace Conference. Later he took his place in the Lower House of the newly constituted Hungarian Parliament, and as a tribute to his avowed nonpartisanship, though his sympathies were with the exiled royal family, he was chosen speaker. His influence on Hungarian policy was great, and he was recognized abroad as one of Hungary's authentic spokesmen. In 1923 he visited the United States at the invitation of the Institute of International Education and was cordially received.

AQUEDUCTS. With the notable growth of cities and town development generally in the United States the extension and increase of existing water supplies, and the provision of new sources of water supply became an important consideration. Not only was there a large and sudden gain in population in many American cities, but at the same time improved standards of living and in some instances industrial needs rendered necessary more abundant water supplies. In some cases, such as New York and Los Angeles, California, provision already had been made and the increased facilities were availed of with the ever-growing demands. In certain of the cities on the Great Lakes it was found necessary to increase the tunnels by which the supply was received, and also the purification plants, while in other cities, such as San Francisco, notable projects were designed to take care of future needs.

In Europe also the needs of an increased water supply were appreciated in many districts. The conditions following the War were hardly such as to make important developments possible. In Italy a comprehensive scheme in Apulia was brought to a successful completion in 1923, and other work was under way.

Aside from the size and length of the more important projects there was but little novelty in their construction. In many cases they involved rock tunneling, sometimes on an unprecedented scale, as in the case of the Shandaken Tunnel of the Schoharie development of the Catskill Aqueduct, while elsewhere long pipe lines of steel covered with concrete or other types of construction were involved.

Shandaken Tunnel. The Schoharie development, referred to above, involved the construction of an 18-mile tunnel in rock to connect a reservoir formed by the construction of the Gilboa Dam (for description and plate see DAMS) across the Schoharie Creek, with Esopus Creek, whence the water would flow along the original stream bed into the Ashokan Reservoir and augment the available supply for the City of New York by some 500,000,000 gallons daily. The Shandaken tunnel, which was opened early in 1924, was designed for a maximum capacity of 600,000,000 gallons per day to be operated intermittently and at varying rates depending upon the conditions of the stream flow and storage requirements.

The tunnel had a horseshoe cross-section with

a maximum internal height of 11 feet, 6 inches, and an internal breadth of 10 feet, 3 inches. It was driven from each portal and by sinking six intermediate shafts, concrete lined, 14 feet in diameter, and driving headings from them in both directions. The total length was 95,740 feet, or 18.1 miles, and the tunnel was lined throughout with concrete. It was the longest continuous tunnel in the world, being 1787 feet longer than the New York City aqueduct tunnel for the delivery of Catskill water within the city limits.

Greater New York Aqueducts. Notwithstanding the large capacity of the Catskill water supply system as planned it became evident in 1922 and 1923 that additional conduits must be provided to afford an adequate supply to the boroughs of Brooklyn, Queens and Richmond, where there had been a phenomenal growth in the residential districts. Portions of the boroughs of Brooklyn and Queens had drawn their supply from Kings, Queens and Nassau counties, while Richmond (Staten Island) had been supplied not only from local sources but from the main Catskill Aqueduct by a 36-inch cast-iron siphon under the Narrows. The new construction involved a cast-iron 42-inch pipe line across the Narrows from Brooklyn to Staten Island, and a series of steel pipe conduits, most of which were 72 inches in diameter, taking the water from the main city tunnels in Brooklyn. Thus one of the lines extended from Shaft 23 at Flatbush and Third Avenues, Brooklyn, to Silver Lake Reservoir in Richmond, and comprised the Park Slope and Fort Hamilton conduits in Brooklyn, 41,430 feet in length; the new Narrows Siphon No. 2, already mentioned, 9400 feet long, across the Narrows, and the Clove conduit, 16,600 feet long, in Richmond Borough.

These conduits which vary from 72 inches in diameter for the Park Slope and Fort Hamilton conduits to 66 inches in diameter for the Clove conduit on Staten Island, were designed primarily to supply Richmond Borough, but also afford direct connection with the mains of the Brooklyn high pressure service and with the intermediate and low service in South Brooklyn and Bay Ridge. Another conduit was an independent line in Brooklyn, 16,800 feet in length, known as the Mt. Prospect conduit, extending from Shaft 24 of the city tunnel in Fort Greene Park to the Flatbush district, in order to relieve the draft on the shaft from which the supply previously was drawn. It was proposed also to construct a line from Shaft 24 to Long Island City.

These various pipe lines were noteworthy in that steel pipe was used in place of cast iron as it was considered more economical and more reliable in conduits of large size. These pipes are made up in sections not less than 30 feet in length, fabricated in taper courses $7\frac{1}{2}$ feet long with double-riveted lap joints for the longitudinal seams and single-riveted lap joints for the transverse seams.

Hetch Hetchy Aqueduct. After many years of discussion and plans the city of San Francisco started a much-needed water supply development in 1919 by awarding the contract for the Hetch Hetchy dam situated on the Tuolumne River about 150 miles east of the city. From the reservoir thus formed water was to be carried to San Francisco and the metropolitan district by means of a system of aqueducts

with an ultimate capacity of 400,000,000 gallons a day. At the same time due to the height of the reservoirs in the mountains there could be developed 200,000 hydro-electric horse power. The aqueduct was being constructed in sections as needed, the first or Mountain section beginning at Early Intake and extending after a short open canal in a tunnel through the mountains 18.3 miles to Moccasin Creek, where a power plant was located. The Foothill division has about 17 miles of aqueduct from Moccasin Creek to Oakdale Portal and then there are 45 miles of steel pipe across the San Joaquin Valley to Tesla Portal. The Coast Range tunnel would extend 31 miles to the east side of San Francisco Bay at Irvington Gate House where the line would divide in three, the main portion extending westerly under the bay through a pipe line of 200,000,000 gallons capacity to the San Francisco peninsula, another section going to the east bay cities, and the third southwest to San José. The new aqueduct by means of a connection of 23 miles between the Alameda Creek and the Crystal Springs reservoir of the Spring Valley Water Company was to be connected with that system. The Hetch Hetchy supply thus could be made available through the Spring Valley system as required so that the distribution facilities could be used so long as they are adequate.

Hetch Hetchy Dam. The total estimated cost of the entire Hetch Hetchy project from the mountain reservoir to Crystal Springs Reservoir, San Francisco, in 1924 was placed at \$78,000,000, and of this amount some \$45,000,000 had been spent up to Jan. 1, 1925. This sum covered the 18-mile tunnel, the dams and other work in the mountain district, most of the work on Moccasin Creek hydro-electric plant and the 60-inch pipe line from the Crystal Springs reservoir to Irvington. It was estimated that the section of the aqueduct not put under construction by 1924, from Moccasin Creek to Irvington, would cost \$33,000,000, this portion, it would be noted, including 17 miles of tunnels on the eastern side of the San Joaquin tunnel to 30 miles of tunnels to the west of that valley. This part of the project was to be known as the San Joaquin Valley Division.

Winnipeg Aqueduct. A different type of aqueduct was this important water supply system put under construction in 1913 and completed so that in 1919 the first water could be passed through. The country traversed is generally flat and the aqueduct is 80 miles in length from the intake at the lake reservoir to within 17 miles of Winnipeg. It is built of concrete pipe and arch sections and has a nominal capacity of 85,000,000 gallons a day, though this is exceeded.

Apulian Aqueduct. One of the longest aqueducts in the world, including some 152 miles of main trunk and 841 miles of main and subsidiary branches or a total length of supply conduits of 993 miles, was put into service in 1924 in southern Italy. This project, which as regards total length could be compared with the Coolgardie pipe line in Australia, is 350 miles long and may be compared with the Los Angeles aqueduct, the longest in America, about 240 miles in length. It was constructed to supply some 266 communities with a population of about 300,000 people, scattered over some 8100 square miles, and included in the ancient

Apulia on the eastern or Adriatic slope of the Apennine Peninsula.

This work had been under construction since about 1907, and involved a main trunk conduit beginning at the Caposele Springs at the head of the Sele River on the western slope of the Apennines, and extending in an easterly direction piercing the Apennine Mountains by means of a series of 38 grade tunnels, aggregating almost 50 miles in length. At a point 15 miles away from the Adriatic Coast, the main aqueduct turns southeast and runs practically parallel with the coast for about 90 miles until it reaches Villa Castelli in the province of Lecce. For this portion of the aqueduct the construction was largely a cut-and-covered conduit. The total length of the main trunk aqueduct is 244 kilometers (152 miles), and in this are included 99 tunnels of about 67 miles total length, about 76 miles of cut-and-covered conduit, 93 aqueduct approaches, having a total of 4.25 miles in length, and six siphons having a total length of 4.6 miles. From the main trunk branches were built to such towns and districts as Foggia, Bari, Brindisi, Toranto, etc.

Tulsa, Oklahoma, Aqueduct. In 1924 one of the longest reinforced concrete pipe lines that had been attempted was constructed to bring mountain water from Spavinaw Creek 55 miles distant from the city. Here there was a reservoir formed by a gravity concrete dam of 55 feet maximum height. From this reservoir a pipe line made of 54- to 60-inch reinforced concrete formed a conduit to carry the water to a pumping station at the end of the pipe line. In connection with this conduit, the pipes for which were made in the field, there was also constructed the Tiawah Tunnel, a 7000-foot solid rock tunnel of horseshoe section 84 inches in diameter which was lined with concrete. This tunnel was constructed from four headings—one at each end and two from the intermediate shaft. See DAMS; TUNNELS; WATER SUPPLY.

ARABIA. A peninsula of southwestern Asia. The area is estimated at 1,000,000 square miles, the population from 4,000,000 to 5,000,000. Because of the nomadic habits of the Bedouin tribes inhabiting the peninsula accurate population figures are impossible. The settled communities are to be found in the oases of Central Arabia and in the fertile districts along the coasts. The boundaries of the various principalities are ill-defined and the loyalties of the various tribesmen are equally tenuous. The political divisions in existence in 1924 were:

(1) *The Kingdom of the Hedjaz*, which has an estimated area of 170,000 square miles and an estimated population of 900,000. It is the chief principality of Arabia because of its possession of the holy cities of Mecca (population 80,000) and Medina (population 10,000). The capital is Mecca and the chief port Jidda (population 20,000). The gathering of dates forms the leading activity of the natives; the more important imports are foodstuffs and building materials. Through the heart of the kingdom runs the Hedjaz railway with its terminus at Medina (815 miles), and it was the possession of this route which rendered Turkish power supreme in Western Arabia. On June 6, 1916, the Sherif Hussein threw off the suzerainty of the Turkish Sultan and assumed the title of King of the Hedjaz. (2) *The Emirate of Nejd and Husa*, in Central Arabia, which has an estimated population of 400,000. Its capital is

Rujadh (population 20,000). Other towns are Boreida (15,000) and Anciza (10,000). Hides, butter, dates, textiles, and live stock were produced and exported to some extent. In 1914 the Emir Ibn Saud expelled the Turks from Hosa and pushed his dominions to the borders of the Persian Gulf. (3) *The Emirate of Jebel Shammar* in Central Arabia north of Nejd. The estimated population is placed at 250,000. The capital is Hail. The ruler in 1924 was Abdullah Ibn Mitab, who ascended the throne on the assassination of his cousin Ibn Rashid (1920). During the period 1914-24, the principality fell, to some extent, under the power of Nejd. (4) *Asir*, a small area on the Red Sea coast, South of the Hedjaz, with an estimated population of 1,000,000. The ruler was Mohammed Ibn Ali-el-Idrisi, but Highland Asir was controlled by the Aidh family. (5) *The Imamate of Yemen*, at the southwestern extremity of the peninsula. Its estimated area is 75,000 square miles; estimated population, 1,000,000. The capital, Sanaa, had 25,000 inhabitants; the chief port, Hodeida on the Red Sea, 40,000. Mocha was another port. The leading economic resource was coffee, which was exported through Aden. On the East the leading principalities were virtually British protectorates, for Great Britain supported the reigning houses and controlled their external policies. These principalities were: (6) *The Sultanate of Oman*, in southeastern Arabia, with a coast line of 1000 miles on the Oman and Persian Gulfs. Its area is 82,000 square miles; population, 500,000. The largest cities are Muscat and Matrah, which together have 20,000 inhabitants. Dates are produced, and exported, while the imports include rice, cotton goods and coffee. All these enterprises are controlled by British Indians, and it is with India that intercourse is mainly carried on. The Sultan's independence was guaranteed by Great Britain and France, a step made necessary by the turbulence of the interior tribes which recognized the sovereignty of the local Ibadhi imamate rather than that of the sultanate. (7) *Trucial Oman*, on the eastern coast, made up of five sheikdoms. (8) *El Qatar*, a sheikdom on the peninsula of that name, from which the Turks were driven out in 1913 by the Emir of Nejd. (9) *Bahrein*, made up of a group of islands of which Bahrein Island is the chief. The ruling sheik was maintained by a British subsidy. (10) *The Sultanate of Koweit*, in the southeast on the Persian Gulf. It has an estimated population of 50,000. The town of Koweit is of considerable importance and most of its trade is carried on with India. In 1914 the sultan renounced the sovereignty of Turkey and threw in his lot with the Allies. The present ruler is subsidized by the British government. The remaining political divisions are: (11) *The Protectorate of Aden* (see ADEN); (12) *The Kingdom of Transjordan* (see TRANSJORDANIA), Irak (q.v.), Syria (q.v.), and Palestine (q.v.) are also Arab lands, though situated north of the Arabian peninsula.

Explorations. The War greatly retarded the exploration and subsequent mapping of the country, so that it is doubtful whether much more was known of this land in 1924 than in 1914. While some new knowledge was acquired of the topography and social and economic life of Asir and Yemen, the only real advances were made in Central Arabia and in the

Hedjaz Kingdom. The outstanding achievement was the work of H. St. J. B. Philby, who, in 1917, on his way to the court of the powerful Emir of Nejd, penetrated into the heart of Central Arabia and thus was the first European in 100 years to cross from sea to sea. His journey lay from Ojair on the Persian Gulf to Jidda on the Red Sea, by way of Hofub, Riyadh, and Taif. In the following year he journeyed into the southern provinces of Nejd, laying his course from Riyadh to Dam, the capital of the little known Wadi Dawasir. As a result of these activities cartographers were able to settle more accurately the locations of such places as Riyadh, Hair, Sulaiyil, and Dam. His discoveries of a large lake near Laila and of several reservoirs were of particular importance. Two other travelers achieved notable success. In 1914 Miss G. L. Bell and Capt. W. H. I. Shakespear each added 1500 miles of survey by their observations. The latter, in a three and one-half months' journey just before the outbreak of the War, crossed Arabia by a northern route, traversing 1200 of the total 1810 miles, through country hitherto unknown to Europeans. His line lay from Koweit, on the Persian Gulf, to Kuntilla, the first Egyptian outpost in Sinai. Shakespear was killed in January, 1915, in a clash between forces of Ibn Saud and Ibn Rashid. During war operations, British military and naval officers carried on extensive researches in the Hedjaz.

Communications and Trade. The only railway in Arabia was still the Hedjaz line, though the construction of two branch lines was considered during the period 1914-24. The first was to run from Medina to Mecca (280 miles) and the second from Maan to Akaba on the Red Sea. Internal communications continued to be carried on by means of the native caravan routes, the most important of which was the transpeninsular track from Zobeir to Jidda by way of Boreida and Mecca (913 miles). Economically the activities of the Arabs were devoted largely to the satisfaction of their local needs. Cereals were cultivated, and camel, horse and ass rearing was carried on to some extent. Articles of export included dates, hides, coffee, pearls, and the native butter; imports were made up of cotton goods and foodstuffs. On the western coast the important ports of call were Aden, Hodeida, Jidda, Mocha, and Jeizan; on the eastern coast, Muscat, Manama, and Koweit. The only ports carrying on a considerable commerce with Europe and the East were Aden and Manama, which were becoming the entrepôts for Arabia. For Aden, for example, imports totaled £4,377,000 in 1913-14, and £6,000,000 in 1921-22; exports for the two years, £4,149,000 and £5,000,000.

History. The story of Arabia, over the period 1914-24, may be divided into two phases, the first that of the ascendancy of the British in Arabian affairs, exerted largely through the control of the King of the Hedjaz; the second that of the passing of this influence with the growing suspicion of British purposes and the increasing importance of the native Wahabi movement, led by the Emir Ibn Saud. Arabs had looked coolly on the Pan-Turanian movement before the War; what nativist sentiment there was was largely centred in the idea of an Arab empire free from Turkish control. At one pole was thus the ambition of the Ottoman Sultan to absorb Arabia completely; at the

other stood the aspirations of the various local leaders to head a nationalistic movement. It was the ability on the part of the British to capitalize this discontent that saved Arabia from a holy war and freed British possessions in Arabia and East Africa, as well as India, from the threat of serious Ottoman attack. In Hussein, the Sherif of Mecca, the British found the key to the situation, for in 1915 they succeeded in making a treaty with him which guaranteed the establishment of an independent Arab state under the Sherifian family for the support of the war against the Turks. Thus buttressed by British arms, Hussein, who up to 1913 had fought in the Turkish cause, threw off his allegiance to the Sultan and in June, 1916, declared his independence. In December he assumed the title of King of the Hedjaz; in the next year he was recognized by the Allies. The Anglo-French declaration of Nov. 8, 1918, renewed the promise of Arab independence; the Hedjaz was represented at the Peace Conference by Hussein's ambitious son, the Emir Faisal; and in 1920 the country gained admittance into the League of Nations. But after 1920 it was perceptible that neither was Hussein a dominating power in the Arab world nor was it at all likely that Hedjaz would ever grow to be a united Arab kingdom. In the first place Pan-Arab ideals envisaged the incorporation of the Sudan, Syria, Palestine, and Mesopotamia with Arabia, an amalgamation which Great Britain and France were prepared actively to oppose. By the Sykes-Picot agreement of 1916 and the Balfour Declaration of November, 1917, the French and British had indicated their interest in Mesopotamia, Syria, and Palestine, which they took as mandates when the War was over, regardless of Pan-Arab protests. To some extent, however, the British government was willing to utilize Hussein's aspirations; indeed on June 14, 1921, the British Colonial Secretary announced that Great Britain would thenceforth pursue the policy of Sherifianism; that is, of placing members of Hussein's Sherifian dynasty on the thrones of other Arab kingdoms. Accordingly two of Hussein's sons were given thrones. Emir Faisal was established in Irak (see MESOPOTAMIA) and Emir Abdullah in Korak or Transjordan (q.v.). The British administration in India vehemently opposed any further extension of the Sherifian power; in fact the Indian government had proposed to create an Arab state based on Bagdad and ruled by Ibn Saud of Nejd, Hussein's rival. The reason for this attitude was that in view of the Moslem desire to have the Holy Places controlled by an independent Moslem power, the maintenance of an admittedly British-controlled kingdom of Hedjaz seemed an act of folly. The abandonment, however, of the Ottoman caliphate (q.v.) by the Turkish nationalists in 1924 played into the hands of the advocates of Sherifianism, and King Hussein in that year not only revived his political ambitions but also indicated his aspirations to the caliphate. On the other hand the Arabs of Central Arabia looked askance at a dynasty so obviously used as a pawn by British imperialism; increasingly they pinned their hopes on Nejd as the nucleus of Arab nationalism. This attitude was strengthened when King Hussein, during the course of treaty negotiations with Great Britain in 1923-4, indicated his intention to recognize the British interest

at least in Mesopotamia and Transjordan, as well.

During the period 1914-24, Ibn Saud, Emir of Nejd and spiritual leader of the Wahabi or Akhwan movement, steadily extended the outposts of his domain, so that 1924 saw him the most influential individual in Arab affairs. In 1914 he wisely allied himself with Great Britain and thus was able to wage war without hindrance against his neighbor to the North, Ibn Rashid, Emir of Jebel Shammar, who had espoused the cause of the Turks. His campaigns were generally successful, with the result that in 1918 Ibn Saud controlled Central Arabia. It was plain that Ibn Saud had ambitions to the West; his relations with Hussein, never heretofore cordial, became strained in 1919-23, and here and there fighting took place over boundary questions; but the presence of Great Britain served as a check. Meanwhile Ibn Saud continued to consolidate his position and advance his power to the East. Koweit was his immediate objective. The Akhwan movement showed no signs of abating, and Hussein's pretensions to the caliphate were regarded with indifference in 1924. But Hussein's political manoeuvres were the cause for a deeper concern. In 1924 he showed a renewed energy in the furtherance of his own fortunes. A trip was made to Amman, the capital of his son Abdullah, Emir of Transjordan, where conversations were carried on with the British and French High Commissioners; there was much talk on the part of Arabs in the Hedjaz, Transjordan, Palestine, and Mesopotamia, of an Arab confederation; Hussein began to style himself King of Arabia. To all this, Ibn Saud's reply was bluntly that Hussein was not acceptable as leader to Central Arabia. On this discordant note the events of the summer of 1924 closed.

ARBITRATION, IN INDUSTRIAL DISPUTES. See LABOR ARBITRATION.

ARCHÆOLOGY. A considerable portion of the period 1914-24 was occupied by the War, during which archæological investigation was curtailed. Yet enough was done to throw new light on old problems and following the close of the War a considerable intensification of archæological exploration was observable. Egypt perhaps less than any other country felt the impact of the War, so that here there was a more consistent development of work than elsewhere. At Abydos in 1914, behind the West wall of Seti's temple was found what is probably the mystic tomb of Osiris. This is an underground structure, thirty feet below the level of the temple. It may be described as a rectangular hall about 60 x 100 feet with walls 20 feet thick. There are three aisles separated by huge monolith piers 8 and a half feet square and 15 feet in height, 5 on each side of the central aisle. These piers support an enormous architrave, 6 feet in height, which in turn carries a ceiling of granite blocks 6 feet in thickness. In 1917 the expedition sent out by the University of Pennsylvania investigated at Gizeh the ancient necropolis near the pyramid of Cheops. It was found that the tombs belonged to princes and lesser officials. The burials took the form of shaft graves. From one tomb was recovered an inscription containing the cartouches of Cheops, Chephren, and Dedefra, which established the fact that these kings followed each other in the order given.

The most consistent work, at least in continuity of exploration, was that of the Metropolitan Museum of Art, which from 1910 investigated its chosen site at Thebes. In 1918 it carried to completion the excavation of the palace city of Amenhotep III. On this site in 1922 was discovered one of the most important demotic papyri yet found. It throws light on the history of Egypt during the period 309-246 B.C. During his work at Illahun in 1920, in which he cleared the 12th dynasty pyramid and its surroundings, Petrie came most unexpectedly on a small undisturbed prehistoric cemetery which contained about one hundred burials. Practically every stage was represented from the open grave to the shaft tomb. In all, 30 different types were counted. One of the most interesting finds of the year 1920 was the discovery of the 11th dynasty tomb of Mehenkewtre. It lay to the South of Deir el-Bahari. In the monument was a small chamber which contained a complete set of funerary models of gardens with pools, fruit trees, covered walks, slaughter houses, carpenter shops, breweries, bakeries; in fact the complete equipment of a princely house.

In 1921 the Egypt Exploration Fund resumed its work at Tel el-Amarna. This had been interrupted by the War. Had the town no other claim to distinction than its association with the name of Akhenaten it would still be interesting. But excavations showed that it presents a beautiful illustration of organized town-planning. One of the most interesting discoveries was that in some instances the streets reached a width of 180 feet. The digging afforded much information as to the character of the private houses of the Egyptians. Of course in this case the houses were for the use of workmen, and, doubtless for economy, they were arranged according to one plan; yet it may be assumed from that very fact that the plan was usual. It showed in the centre of the house a square living room with its clerestory. In this room was a large clay brazier for heating and an ablution slab for the ceremonial washing of hands and feet. The work of the succeeding year, 1922, was concentrated on the workmen's village, the main city, the river temple and the precinct of the South pool. From this campaign was derived an excellent idea of a princely villa. About the time of this discovery, Petrie was doing interesting work a mile or so distant from the Royal Tombs at Abydos. Here it was found that each king had laid out a great square of graves about 240x400 feet. In this area were discovered some 500 graves in which was evidence of the practice of human sacrifice. Apparently at the death of a potentate court officials were buried alive with their master. One might imagine that such a custom must have had a depressing effect on the desire to hold office. The dates of the interments are from the third to the fifth dynasty, that is to say, 5437-5303 B.C. Among the objects found was an ivory comb of King Zet. Many bone arrow heads and neatly trimmed flints were recovered.

The most spectacular discovery since Theodore N. Davis's finding of the tomb of Youa and Touya was the opening of the rockcut tomb of Tutankhamen (q.v.) by Lord Carnarvon and Howard Carter in the Valley of the Tombs of the Kings at Luxor in 1922. Here below the tomb of Rameses VI was uncovered the opening

ARCHAEOLOGY



BY COURTESY OF MR. HOWARD CARTER

THE ROYAL CEMETERY IN THE VALLEY OF THE TOMBS OF THE KINGS AT LUXOR

Showing the Tomb of Tut-Ankh-Amen below that of Rameses VI.

ARCHAEOLOGY



BY COURTESY OF MR. HOWARD CARTER

THE TOMB OF TUT-ANKH-AMEN

1. Interior of the Antechamber of the Tomb of Tut-Ankh-Amen.
2. The Antechamber as seen from the Passage through the Steel Grille installed for protection.

of the tomb of this king. A flight of stairs led down to two rock-hewn chambers which were literally crammed with golden treasure. The intrinsic value of the find, estimated at \$40,000,000, is astounding enough in itself. The tomb was a revelation of the luxurious life of an Egyptian king in the second millennium B.C. (c. 1350). Owing to differences between the Egyptian government and Mr. Carter, who carried on the work after the sudden death of Lord Carnarvon, the exploration of the tomb is incomplete. Just at the moment when the British archaeologist was about to open the sarcophagus of the king work was suspended. Especial interest attaches to the find historically, because this prince was the son-in-law of the famous heretic king, Akhenaten.

Perhaps the most important result of the 10 years' work was the gradual collection of data on the early history of predynastic Egypt. As far back as 1911 the Archaeological Survey of Nubia showed a certain correlation of the culture of this land with that of early Egypt. So far as can be made out, the indigenous population of the Nile Valley was closely related to this Nubian stock. In the course of time this primitive civilization was overrun by the invasion of a race which seems to have come in from Asia and to have begun this dynastic history of Egypt. As if in retribution, this Nubian stock appears to have returned, at a much later date, to its ancient dominion of the Nile valley. This is borne out by the results of the expedition sent to Nubia in 1921 by Harvard University and the Boston Museum of Fine Arts. At Napata the explorers examined royal cemeteries and at Nuri a group of pyramids belonging to kings and queens who lived in the years 660-250 B.C. Not the least interesting event was the uncovering of the burial chamber of Tihaqa, who is mentioned in Isaiah. From the data collected by the expedition it is fairly well established that this Ethiopian people, of Libyan origin, entered the land about 900 B.C. and eventually became the conquerors of Egypt.

Asia Minor, because of the operations of the War, was a less profitable archaeological field than Egypt. The Mesopotamian valley became a seat of war, and the great excavations inaugurated by the Germans at Babylon in the last years of the nineteenth century by Koldewey came to a close with the opening of hostilities. The resumption of archaeological work throughout this territory was tardy. In a measure the delay was occasioned by the manifest hostility of the Turks toward western people. In 1920 the British Museum resumed its work at Carchemish, which had been interrupted in 1914. The efforts of the excavators were concentrated upon the site of the double ring of the city walls. On the land side all the gates, the fortifications of the acropolis, and the great river wall were cleared out. On this site of Carchemish were discovered a number of Hittite tombs and certain other archaeological material belonging to this race. All evidence illuminating this mysterious people is welcome, but in spite of attempts to show an Indo-European source for the race, results at the end of this period had not been conclusive. One particular bit of evidence for the story of prehistoric Greece at least is the discovery of an inscription which records a treaty between a certain Hittite king and Atreus of Mycenæ. Not only is this document important for establishing

contact between the Greek mainland and the coast of Asia Minor, but it also strengthens the value of Homer as an historical document. Work at Nippur produced new tablets narrating the stories of the creation and the deluge. Moving westward into Palestine, the diggings of the English at Bethshehem threw some light on the origin of the Philistines, who appear to have been a people penetrating from the Mediterranean area. The establishment of the American School at Jerusalem was expected to produce results which would help to clear up the early history of this part of Palestine.

Greece was the scene of renewed archaeological activity at the close of the War, as well as the islands of the Ægean, and the eastern shores of the Mediterranean. In 1922 the American School of Classical Studies, in association with the Fogg Art Museum of Harvard University, began explorations at Rhodes. At Colophon the French had been engaged in excavating. At the latter place evidences of geometric culture, probably of the sixth century, were discovered, and at one place a Mycenaean beehive-tomb was found, which shows that about 1000 B.C. the culture of Ionia was about the same as that of the Ægean and the Greek mainland. As in Egypt, considerable of the archaeological work in Greece was connected with the problem of the prehistory of the country. For a long time it had been the concern of scholars to discover the source from which came the pre-Mycenaean stock. As early as 1912 Wace and Thompson worked in Thessaly and were able to establish that at least in that part of Greece the inhabitants had penetrated into the peninsula from the North. In this early period, contact with the southern, Mycenaean culture of the Mediterranean was not established until well on toward the close of the Bronze Age. This pre-Mycenaean civilization was latterly given the somewhat vague name of Helladic. That the people represented by this culture penetrated gradually southward until they overran Greece is proved by Blegen's discoveries at Korakou, not far from Corinth. From the evidence already accumulated it would appear that this Helladic culture represented what might be called the original civilization of the Greek mainland and that its creators continued in control of the country until, fairly early in the second millenium before our era, the race represented so well in the remains in Crete and later at Tiryns and Mycenæ invaded from the Mediterranean, and conquering the native stock, made themselves overlords and gave us what we call Mycenaean culture. The use of the term Helladic indicates an effort to discover a name which will describe more accurately than Mycenaean or Minoan that culture which in the days of the florescence of Mycenæ, to use the words of one of its inventors, Dr. Blegen, extended "from Thessaly to Southern Laconia and from Thoricos to Pylos." The name, as can be seen, is intended more closely to fit the breadth of culture which obtained in early Greece than any local or dynastic name could. This culture, or rather the period covered by this name, follows upon the Neolithic Age in Greece. It is synonymous with the Age of Bronze. Its dates are about 2500 B.C. to 1200 B.C. Since it is a period in which dates are all too vague, it has been found convenient to divide it, as in Crete, into three divisions, known respectively as Early

Helladic (2500-2000), Middle Helladic (2000-1600), and Late Helladic (1600-1150?). Late Helladic is meant to be synonymous with Mycenaean. This was the time when the power of Minoan Crete had extended northward and overcome the indigenous culture which, developing on the mainland, had stemmed from the north before the coming of the Aegean folk.

Wace, who had already worked in Thessaly, showed by work at Mycenae that this place was already inhabited at the close of the Neolithic Age and became a flourishing city about 2000-1500 B.C. He discovered that the famous circle of graves within the Lion Gate belonged to this time. His examination of the palace made it clear that the structure was much more elaborate than had previously been believed. It appeared that, after Cnossus fell, the city was fortified by a wall which was also carried around the famous circle of graves. At that time the ground was leveled, the circle of slabs erected and new gravestones put in place to mark the site of the original burials. These tombs belong to an earlier dynasty than that represented by the beehive tombs. To return to the palace, Wace found that the structure, which dates 1400-1100 B.C., is of the megaron type. Under it were traces of first or second Late Helladic culture (1600-1400). To this latter time belong the circle of graves which continued in use until 1400 B.C. Under the present palace remains were remains of an earlier palace dating about 2200-1800 B.C. This structure, older than the palace at Tiryns, was later replaced by one belonging to the first Late Helladic period, and that in turn by one much larger. This one recalls the building at Cnossus and helps to show the relationship of this culture with that of Crete. The accumulated evidence makes it clear that the earliest settlement on the site goes back to the beginnings of the Bronze Age. The place became important in the period reaching from 1800 to 1600 B.C. By the year 1300 Mycenae had become the chief city of that part of Greece and so continued until the coming of the Dorians.

At Carthage notable work was done by the French, who excavated two Punic temples and a Punic acropolis dating about 700 B.C. Near the Punic parts of the city was discovered the temple of Tanit in the midst of a field which was practically covered with votive inscriptions set up in her honor and to Baal Ammon. Under these inscriptions was uncovered a bed of urns containing the bones of birds and sheep as well as those of a few children. In the deepest stratum, third from the top, many jars were found containing the bones of children whose ages ranged from four months to twelve years, grim evidence of the human sacrifice practiced in the name of the goddess Tanit. The date of these remains is about 800 B.C. So far as can be made out, Carthage was a flourishing Egyptian colony at the time Dido was supposed to be building it. Egypt had established a settlement there some 500 years before the coming of the Phœnicians.

In Italy little that is remarkable occurred. War gripped the country too hard. One notable discovery was made in 1921, when an important hypogeum was located outside Porto Maggiore. The building dates from the end of the second or early in the third century of the Christian era. In the upper part is a sepulchral chamber down to which leads a

staircase that ends on a landing just outside the room. The main chamber is 15x17 feet and has a vaulted roof with an opening for light in the middle. Besides the two main rooms there are several galleries. After the close of the War excavations were pushed at Ostia and Pompeii. In addition to this many smaller, unimportant places had been more or less spasmodically dug. Possibly the most interesting work was in connection with the excavations at Pompeii where not only much interesting material was actually recovered but much that would otherwise have been lost was saved by the skillful use of plaster poured into the natural molds made by the volcanic deposit on the various objects covered by it. In this way it was possible to restore the appearance of such things as house doors, even to the bronze hinges, the nails, and the very grain of the wood. The same care was displayed in the reconstruction of houses, with the result that in several places it was possible to reconstruct the overhanging balconies and the window frames of the fronts of houses in such a way that much of the original appearance of the street was obtained. At Syracuse excavations were conducted on the site of the temple of Athene. Under the foundations of the building the Italians discovered traces of pre-Hellenic settlement. These remains were succeeded by early colonial Greek remains. In Spain, France, England, and Germany discoveries of minor importance were made from time to time, usually unpremeditatedly.

ARCHER, GLEASON LEONARD (1880-). An American lawyer and educator, born at Great Pond, Me., and educated at Boston University. He was admitted to the Massachusetts bar in 1906; in the same year he founded the Suffolk Law School, and became dean and treasurer. He was appointed chief arbitrator by the State of Massachusetts in the Springfield Street Railway dispute of 1914. He is author of *Law Office and Court Procedure* (1910), *Law of Contracts* (1911), *Law of Agency* (1915), *Law of Torts* (1916), *Equity and Trusts* (1918), *Law of Evidence* (1919), *Introduction to the Study of Law* (1919), and *Building a School* (1919).

ARCHER, WILLIAM (1856-). An English dramatic critic (see VOL. II). Within recent years Mr. Archer has ventured into play writing. *War is War* appeared in 1919 and *The Green Goddess* in 1921; the latter was produced by Winthrop Ames at the Booth Theatre in New York. It was a melodrama, and a popular success, although relatively of much less importance to the art of the drama than his critical work.

ARCHIBALD, RAYMOND CLARE (1875-). An American professor of mathematics and author, born in Colchester County, N. S., and educated at the University of Mt. Allison College, N. B.; Harvard University, the University of Berlin, the University of Strassburg, the Sorbonne, and the University of Rome. He began his career in Canada as professor of mathematics and in 1908 was called to Brown University. He was promoted to the rank of assistant professor of mathematics in 1911, and associate professor in 1917. In 1912 he was a delegate to the Congress of Universities of the British Empire in London. He was elected member of the Council of the American Mathematical Society in 1918, and librarian in 1921. In the latter year he became president of the Mathe-

mathematical Association of America. Besides contributing extensively to mathematical journals and reviews in Europe and America, he is author of *The Cardioid and Some of Its Related Curves* (1900), *A Bibliography of the Life and Works of Simon Newcomb* (1905), *Carlyle's First Love: Margaret Gordon, Lady Bannerman* (New York, 1910), *Mathematical Instruction in France* (1911), *Mathematical Instruction and the Professors of Mathematics in the French Lycées for Boys* (1912), *Euclid's Book on Divisions of Figures with a Restoration* (1916), *The Training of Teachers of Mathematics for the Secondary Schools of the Countries Represented in the International Commission on the Teaching of Mathematics* (1918). He was editor of the *Bulletin of the American Mathematical Society*, 1914-20, and of the *American Mathematical Monthly*, 1917-18, and became editor-in-chief of the latter in 1919.

ARCHIPENKO, ALEKSANDR PORFIRIEVICH (1887-). A Russian sculptor, esteemed the foremost of radical modernists. He was born at Kiev, studied two years at the Moscow Art School, and went to Paris at 20. But he was more influenced by the Byzantine art of his native land, the monumental sculpture of Egypt, archaic Greece and the Gothic, which he studied in the Louvre, and by Central American carvings. Rejecting Cubism, he aimed to achieve pure, abstract sculpture independent of natural form. His figures are slender and rhythmic, the heads unfinished and very small. His art is the embodiment of plastic absolutism. One of his innovations is to hollow out the parts of the figure he wishes to emphasize, which the imagination of the spectator is expected to fill; another is "sculpto-paintings" in which wood, metals and papiermache are combined in decorative panels. His school at Paris was dispersed by the War during which he worked at Nice. In 1921 he removed to Berlin, where he established an important school, and in 1924 to the United States. He is represented in 28 continental museums, including Berlin, Vienna, Frankfurt and Rotterdam, and Nisaka in Japan, and the Société Anonyme in New York. Compare his biography by Hans Hildebrandt (Berlin, 1923).

ARCHITECTURE. It was inevitable that the economic and emotional chaos that accompanied and followed the War should profoundly affect the architecture of all nations. There were neither materials nor men available for general building; and except in a few absolutely indispensable lines, building, and therefore architecture, the art of building, languished. Nor did architecture recover after the close of the War in 1918. Indeed, the confusion of economic policies that resulted all but killed the last dying embers, and forced deflation proved temporarily more disastrous to building than wartime stringency. This was true in both victor countries and defeated; the discussions between Germany and France with regard to the possibility of German labor and German materials being used directly for the rebuilding of the devastated areas in France, as part of the reparations payments, is but one of many indications of the direct result of post-war conditions on building and architecture. Little by little, however, adjustments have been made, and in one country after another the amount of building has increased until the United States, at least, has had a building boom which has gone far

to compensate for the necessary stagnation of wartime and post-war years. The economic results of the War have not stopped with the mere reduction of the amount of building. They include vast changes in the types of building produced and in the design of those types. It is this particular class of war results, which have led to the most striking movement in architecture during the past decade, a movement entirely international, as true of Germany as of England, France, and the United States. That is the immense impetus given to the so-called industrial housing question, in all its broadest implications of city planning and a deep study of its economic and sociological effects. See CITY PLANNING and HOUSING.

But the results of the War were not only economic; they affected the entire emotional life of the people as well, and that, in turn, affected all art. The idea of force cannot be paramount without entailing in art either on the one hand a sharp brutalism, or on the other, by compensation, a wishy-washy sentimentalism. Architecture was no exception, and where the sobering demands of a stark economy did not enter, as they so deeply do into housing, the results were either the extravagances of the secessionist movement—with its demand, heard often from critics who should have realized the temporary character of this unrepressed emotionalism, that art must be utterly personal, unaffected by tradition—or the equally sterile protest of those who blindly followed the past in the vain pursuit of a golden age. The end of the War, with its cumulative and almost universal disappointment of popular hopes, and its absolute demonstration of the futility of a national philosophy based on force, wrought a great change, reflected architecturally with surprising directness in the gradual modification of style ideas all over the world. The worst extremes of secessionism have been everywhere discredited. Even in Germany, where the doctrine of *Machtpolitik* had produced its most terrifically brutal expressions, design since the War, although free and untrammelled, is also, for the most part, quiet, restrained, and the best of it remarkably consistent with the general traditional forms of the country. This is typical of style development throughout the western world. There was a corresponding development in so-called conservative design. All over the world the strict classicism or strict Gothic of the "revival" spirit was finally killed by the War. Its artistic futility was too evident. Instead, there was developed a new realization of the fluid character of style; precedent was not neglected or tradition flouted, but neither were they worshipped. Classic or Gothic forms came to be accepted merely as a convenient vocabulary, to be modified, combined, and used or not as the designer's temperament or the demands of the problem required. It has come at last to be almost universally realized that in design it is not style that should control, but rather planning, mass-composition, and structural system.

United States. This style development can be seen at work with particular clarity in this country, because the amount of building has been so great. Between the creative Gothic of the Intercession Chapel or St. Thomas's in New York (both by Bertram Goodhue) or even the more conservative design for the nave of the New York Cathedral of St. John the Divine, by

Ralph Adams Cram, and the strictly archaeological Gothic of much earlier church work, there is a great gulf. The architecture of the Panama-Pacific International Exposition at San Francisco in 1915 was prophetic of what was to come. In style throughout, whether in the conservative Court of the Universe, by McKim, Mead and White, or the radical Court of Abundance, by Louis C. Mullgardt, it shows how style itself is subordinated to the demands of pure design. It was the least archaeological and at the same time the most colorful and imaginative of all American expositions. Style in America has had during the past decade several characteristic developments. Most notable among these has been the growing popularity of free versions of the Georgian or Colonial style for houses, schools, and smaller public buildings, such as town halls or libraries. Many houses of John Russell Pope, of H. T. Lindeberg, of Charles A. Platt, of Dwight James Baum, of Murphy and Dana, show this trend. The popularity of this style—a popularity founded on its fitness to the American climate and the American landscape as well as its traditional character—extended to larger buildings as well; the group of Johns Hopkins University, for instance, by Parker, Thomas and Rice, or the Waterbury Municipal Building, by Cass Gilbert.

Another interesting development is the growth of various local styles based on local climate, local materials, or special local traditions. The stonework of the neighborhood of Philadelphia is an example of a local style dependent on material; a very freely adapted Spanish Renaissance in California is a local style dependent on climate, and the forms of Indian Pueblo origin occasionally used in the Southwest is a local style dependent on local tradition. This is an important development, because it goes far to compensate for the deadening and unifying effect of the centralized manufacture of building materials by large industrial corporations whose market is nation-wide. There are other trends of almost universal scope in recent American design which deserve mention. The first is the increasing love for effects of dramatic climax produced by sharp contrasts of restrained surfaces with a few accents of richness. This is evidenced not only in all the best California houses of Spanish style (the Dater house, by Bertram Goodhue, and much work of Myron Hunt and William Templeton Johnson) but also in the Georgian work of the East (as, for example, the smaller houses of Dwight James Baum or the houses at Pelham Bay Gardens by Electus Litchfield). Another of these trends is the growing delight American architects take in the frank expression of materials. A higher standard of craftsmanship allows greater freedom in design. This development is specially marked in the use of rough or unusual textures in stucco walls, stonework and brick, and in iron and bronze work, such as doors, grilles, and bank screens. The work of Samuel Yellin, of Philadelphia, in wrought iron is particularly noteworthy; and the results he has achieved have done much to raise the standard of architectural design in metal.

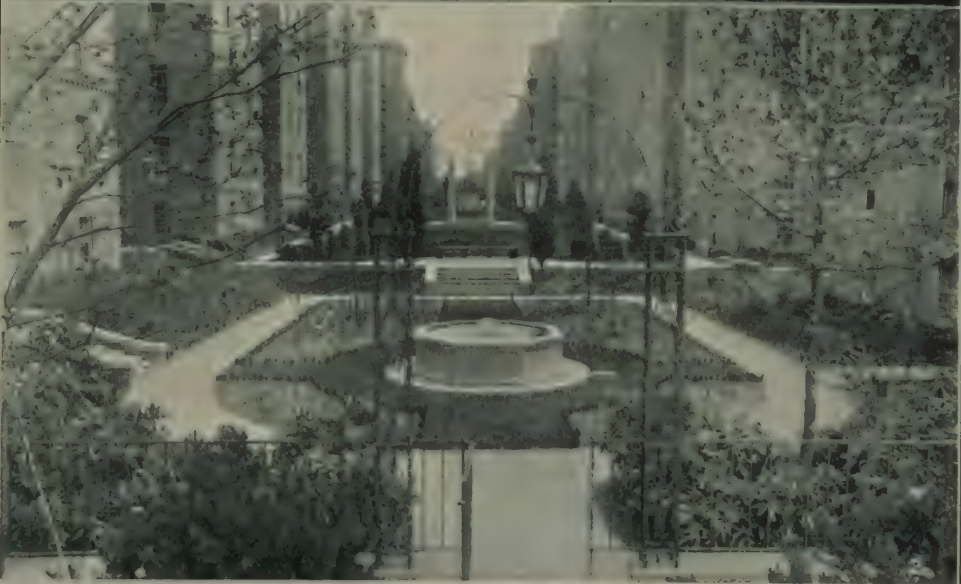
The two greatest and most marked achievements of American architecture during the decade were matters of larger implication. These were the development of a truer emotionalism and romance in design of all kinds and a new

grasp of the importance of a sense of form and mass. They are inextricably bound together, and both, strange as it may seem, owe not a little to the purely practical necessity of building in accordance with the new zoning laws which regulate building heights. New York's adoption of this type of building regulation served not only to improve the architectural standards of high building design by forcing a study of the interplay of big masses but has also been an example followed by an ever increasing number of American cities. The result has been the reëntry of shadow into architecture; mere decorated facades could no longer be depended on; detail became at once less important, and the piling of mass on mass, the governing composition, was seen as the important matter. True romance was the inevitable result. One of the finest examples of the effects produced by height regulation is the Shelton Hotel for men in New York City by Arthur Loomis Harmon (see ARCHITECTURE in the 1923 *New International Year Book*). The dominance of mass composition is also easily visible in all the best designs submitted in the Chicago *Tribune's* competition, particularly in the designs placed first and second, that of John M. Howells and Raymond Hood, and that of Eliel Saarinen, and in the honorable-mention design of the late Bertram Goodhue.

The great Lincoln Memorial in Washington, by the late Henry Bacon, illustrates the restrained emotionalism of modern American architecture. Built in a severe Greek style, it is nevertheless without coldness or academic monotony; instead its simplicity, its directness, its perfection of proportion, express perfectly the deep and quiet reverence in which the name of Lincoln is held. The same qualities of emotion characterized the winning design of H. Van Buren Magonigle in the competition for the Kansas City War Memorial, and to an even greater extent the piled mass of Bertram Goodhue's design for the same competition. A similar romantic yet unsentimental emotionalism is the most outstanding quality of Mr. Goodhue's design for the Nebraska State Capitol, now under construction. This is an epoch-marking building in American architecture, because of its perfect style freedom without a hint of eccentricity or sensationalism.

In new expressions for structural systems, advance has been less encouraging. The problem of the treatment of a steel frame so that the structure will be frankly expressed in the necessary fireproof covering is still unsolved, and it is perhaps unsolvable in the strict manner demanded by some logicians. Concrete remains a material of purely practical use; its treatment is still often a mere matter of engineering, and its architectural opportunities remain largely unknown. Exception must be made of a few serious attempts to find a true architectural expression for concrete; among these the Army Supply Base in Brooklyn, by Cass Gilbert, is preëminent. There are evidences, however, of a changing attitude toward architectural engineering. Many architects are growing disgusted with the method in vogue, by which the structural framework is hidden by an interior cage of wire lath and plaster that forms vaults and beams and entablatures having little or nothing to do with the actual construction. The attempt is growing to lay out structural members with a carefully planned

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1. "The Towers" Apartment House, Jackson Heights, New York. Andrew J. Thomas, Architect
2. Interior Court of "The Towers"
3. Grammar School No. 2, Glendora, California. Allison & Allison, Architects

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EUROPEAN ARCHITECTURE

1. Ross Way and Estate Office, Well Hall Estate

2. Sandby Green of Well Hall Estate

3. City Hall, Stockholm. Ragnar Oestberg, Architect

and definitely articulated relation to the desired interior effect, so that the structural form shall count, and to confine enrichment to surface decoration. But this movement is still in its infancy.

In the science of planning, the greatest advance has been made in the domain of popular housing. The acute housing crisis during the War forced the development, under the auspices of the Shipping Board and the Department of Labor, of many important housing developments, in which economy of space and materials was a governing factor. Minimum standards were set, and many excellent types of plan were evolved, in which waste space was absolutely eliminated. The combinations of standard plans and details in such a way as to give the maximum of livable variety was achieved in some of the developments to a remarkable degree. The most outstanding examples are York-ship Village, N. J., by Electus Litchfield, and several developments in and around Bridgeport, Conn., by Clipston Sturgis. It is an interesting fact that the direct result of the Bridgeport developments was the forming of the Bridgeport Housing Company, which is still building and selling low- and medium-priced houses whose architectural quality is exceptionally high. Yet the underlying economic questions are still unsettled. (See HOUSING.) In this connection, mention must also be made of the Architects' Small House Service Bureau, a corporation developed under the auspices of the American Institute of Architects, whose purpose is the development of small house designs that shall combine economy with durable construction and high architectural quality. Its work so far has been principally in the West, but new divisions are being formed continuously, and the importance of the work it is doing, not only by the example of houses actually built, but also by the careful use of well planned publicity, cannot be overestimated.

In urban housing, similar advances in planning have been made. Economy has worked continuously to produce large-scale groupings, in which court spaces are concentrated to give additional light and air and in which corridors and halls are as far as possible eliminated. Andrew J. Thomas of New York has been a pioneer in this development and has produced some remarkable results, such as (with D. Everett Waid) the great group of cheap apartments for the Equitable Life Insurance Company and apartments of a more expensive type in Jackson Heights, N. Y. The work he has done here and elsewhere is certain to be the foundation on which later apartment house designers will build. In factory architecture, the United States has lagged. Comparatively few factories show any architectural study whatsoever, and in many which are "architectural," the design consists merely of an "architectural" dressing of the stark forms with detail, often of modernized Gothic type. Certain of the smaller plants and power houses have beauty of a sort due to the frank treatment of large windows, but of the true architectural mass composition of an entire factory group there has been surprisingly little. Development in the design of theatres, and particularly of moving picture theatres, has been marked. Not only has there come a mastery of the practical points involved, and the consequent development of a new type of theatre for moving pictures, but also there

has been a great liberation of decorative imagination. The best interiors are dramatic, gay, lavish, and well composed. In California, numerous interesting style experiments have been made. Particularly noticeable are Grauman's Hollywood Theatre, in Hollywood, by Meyer and Holler, done in a clever Egyptian style, and Grauman's enormous Metropolitan Theatre, in Los Angeles, by William Lee Wollett, which has a strange and imaginative interior in which classic eclecticism, modernism, the decorative treatment of concrete, and a queer symbolism all play their parts. It is a little incoherent but typically American and extremely effective.

England. The greatest English architectural achievements of the decade have been in the design of rural or suburban housing, in which English craftsmanship and traditional English cottage forms have the fullest scope. The number of examples of this type of work which possess a charm and vitality unknown in America is enormous, particularly when one considers the conditions under which they were erected. Developments in various suburbs by the London County Council, the City of Birmingham, and the City of Bristol are noteworthy; the London houses particularly are grouped into masses of delightful color, texture, and composition. Despite much criticism in England both of design and construction, English war and post-war housing seems to an American remarkable alike for economy and for beauty. The Well-Hall development, near Greenwich, is particularly lovely; despite the fact that it was built in the midst of the War, it has a variety, a truth to its tradition and environment, a livable quality, an unostentatious charm that make a total effect of real beauty. In public and commercial buildings, English architects seem to keep close to that habit of overornamented and restless classic fixed so deeply before the War. The London County Council Hall, by Ralph Knott, with W. E. Riley as consulting architect, is typical; it has a great colonnaded hemicycle, high roofs, many chimneys, heavy rustication, end-motives of huge arches filled with modernistic sculpture, that altogether produce an effect of unstudied chaos. Even the beautiful colonnade of the new wing of the British Museum by J. J. Burnet, completed in 1914, where an obvious attempt was made to follow the severe classic of the older Greek portion, has its effectiveness lessened by end motives insufficiently classic and monumental. Victory House, in London, by Trehearne and Norman; the Midland Adelphi Hotel, in Liverpool, by R. A. Atkinson, and the Regent Palace Hotel, in London, by Tanner, Wills, and Ansell, are all typical of this modern overlaid English classic.

Since the War there has been a development toward greater simplicity. The influence of modern American classic design is widespread. Moorgate Hall, London, by Richardson and Gill, is a typical example of this trend to simplicity; the building for Heal and Son, London, by Smith and Brewer, shows the same restraint despite its "new art" guise, and the lovely new buildings for University College in London, by F. M. Simpson, reveal this tendency toward a more restrained simplicity. In public buildings, the Cardiff Technical Schools, Cardiff, part of an ambitious civic centre layout, by Jones and Thomas; Australia House, London, by A. M. Mackenzie and A. G. R. Mackenzie, particularly in its lavish interiors; and the

building for the Metropolitan Water Board, by H. Austin Hall, all show an attempt to break away from the fashion of overdecorated richness. The Port of London Authority Building by T. Edwin Cooper is another outstanding attempt at monumental and restrained classic design. In the design of houses, English architects continued their successful free adaptations of the tradition that has made so many English houses models for reproduction elsewhere. Despite occasional eccentricities, English houses built since 1914 are of a high quality and remarkably in tune with their landscape; the work of Ernest Newton, Stanley Hamp, Ernest Willmot, T. Lawrence Dale, Robert Atkinson, and Guy Dawber has all the charm of homelikeness, picturesqueness, a careful use of materials, and especially a harmony with environment and tradition, which have long characterized the best English domestic work. English churches are remarkable chiefly for their use of brick. Less and less purely Gothic work is produced, despite the very beautiful modern Gothic of the recent work in Liverpool Cathedral by G. Gilbert Scott; and more and more English architects are working out fresh forms based on the frank use of brick for both exterior and interior, with either stucco vaults or open timber ceilings. St. Cuthbert's Church, Copnor, Portsmouth, by F. Stanley Hall, is an example.

Modern English architecture in India deserves a brief notice. A serious attempt has been made to produce forms in harmony with the double tradition of British imperialism and of native Indian Mogul architecture. To blend these is exceptionally difficult. In the New High Courts at Allahabad, by Frank Leshman, the result has been a strange mixture of Indian and classic forms, not without impressiveness though not wholly convincing; but in the buildings for New Delhi, and particularly in the Secretariat, by Herbert Baker, greater simplicity has led to greater power and a new and dramatic beauty.

England has the honor of having the most impressive war memorial that the great War has yet produced. Its greatness is all the more remarkable because in size it is small, and in decoration restrained. And yet the Cenotaph in Whitehall, London, by Sir Edwin Lutyens, has, in the perfection of its simple form, an impressiveness, a dignity, and an emotional power that are marks of great architecture, and of great architecture alone.

France. French architecture during and since the War was going through a period of transition. The old quiet traditional classic that made Paris the most harmonious city in the world was passing, and there was as yet uncertainty as to what would take its place. Examples of it were still built, such as the building for the Messageries Maritimes, Paris, by St. Maurice, and the beautiful new work in the Hôtel du Louvre, by Vaudroyer. Yet the old mastery is often gone. The French architect seems striving after something new and fresh. French War memorial schemes, without one exception, are characterized by this striving for originality, and sometimes the striving is forced and the results strained. The Verdun monument, on the other hand, attains tremendous and sombre grandeur in its use of "secessionist" forms. The same striving for originality is to be seen in the somewhat incoherent

Palais de la Mutualité in Paris by Bélesta, which, however, contains a meeting room of the most delicate beauty, decorated by Hannotin. The École Nationale des Arts et Métiers of Paris, by G. Roussi, achieves repose and originality by the use of a fresh style whose roots in *néo-grec* can be easily seen, and the Musée de Paléontologie Humaine at Menton by Pontremoli, also has freshness, simplicity, and beauty, with an added interest given by a unique sculptured frieze.

Despite the uncertainty of French style developments to-day, French planning retains its old brilliance. This is particularly noticeable in the results of various town-planning competitions that have been held since the War. Particularly noteworthy is the great competition of the City of Paris for its enlargement and the design for the treatment of lands adjacent to the fortifications by Hébrard, Trévelas, and Dumail; and the plans for the City of Lille, by Gréber and Cordonnier. The most noteworthy monument of the housing agitation in France was the great competition of 1918 for house types to be used in the reconstruction of the devastated areas. Hundreds of designs were submitted, and in all the best traditionalism, the spirit of the particular locality, was allowed, rightly, to dominate. The result was that that tight, new-looking squareness which characterizes so much of the modern rural work in France was happily absent. Of actual constructed work, the Cité Jardins de Draveil, by Jean Walter, and the town of Le Trait, with its factories, docks, and workmen's houses, are especially noteworthy. The latter especially is an interesting attempt to compose, not a pure garden city, but a modern industrial city that shall nevertheless have its gardens and open spaces, and the great docks dominate the whole in a bold and picturesque fashion.

Germany. The two most outstanding facts in German architecture during the decade were the unexpectedly large amount of notable work produced under the most adverse and trying conditions, and the vitality, originality, and high quality of design. It is as if modern architecture in Germany had during the War grown out of the eccentricities of adolescence into a maturity that preserves originality but realizes the value of restraint. Almost all the old brutality is gone; the ostentatiously aggressive loudness and blatancy of the early twentieth century is dead. Instead, an innate traditionalism has again asserted itself, working in and through the new forms in most interesting ways. The Berlin Naval Offices, for instance, by Reinhardt and Süssenguth, is charmingly restrained, and its delicate shadows and curved roof lines are delightfully consistent with much late eighteenth century work. Yet there is no archaeology in the design; it is as free and original as it is delicate and restrained. The great Town Hall of Hanover shows the same influences. This characteristic combination of underlying traditionalism, and individual freedom and originality, governs most of the houses and housing of this period, as well as much school work. It is, however, in industrial and commercial buildings that German originality has found its most congenial field. Even before the War there had been built shops that had all the originality but none of the brutality of the current German official building, and since then development has been startling. The Waren-

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- City Hall, Stockholm. Ragnar Östberg, Architect

haus Wertheim, by Eugen Schmol, in Berlin, is typical; its bold yet quiet vertical lines and its lovely and intricate detail have just the right note of elegance. The great building of the "Nordstern" Insurance Company, Berlin, by Paul Mebes, has a truly Roman dignity, a grand monotony like that of the Colosseum that leads not to fatigue but to impressive beauty. The Automobilausstellungshalle, by Hans Richter, is simple, clear, expressive; and the railroad station at Oldenburg, by Mettegang, in dignity, beauty of proportion and detail, and expressiveness, is the equal of any station of its size anywhere.

It is in frankly industrial work that the Germans are preëminent. German architects are the only architects in the world who have realized to the full the possibilities of factory design as a whole. They have seen the problem not as a matter of a designed head-building with hidden ugly shops behind, but as a great opportunity for concerted mass-composition of the entire plant. Simplicity, direct expression, imagination, these serve to give often to modern German factories a new and thrilling beauty, closely allied to the new beauty of the best modern American building under the zoning laws. The Deutsches Bücherei at Leipzig is typical; the Kraftwerk Prinzengruben at Kottowitz, by Alfred Malpricht, is a remarkable piece of straightforward brick design, in which simple forms and towering chimneys give an effect truly romantic. The work of one man in this field is particularly remarkable—Hermann Muthesius, who seems to have a genius for being direct without ugliness, and original without eccentricity. The silk mills of Michels and Company at Nowawes show his imaginative and masterly handling of industrial forms,—but perhaps it is the great wireless station at Nauener in which his genius has achieved the simplest and most impressive results. In modern Germany alone has factory architecture received the attention it deserves or attained to any true and organized beauty.

Other Countries. Scandinavian work is characterized by the same combination of traditionalism and independence that dominates German architecture. In general, tradition is stronger in the Scandinavian countries; many delightful houses have resulted. The Gothenburg Exposition, by Bjerke, on the other hand, revealed individualism run riot. The Exposition buildings were interesting attempts to build counter to the prevailing tradition of overrich and overmonumental exposition building. They were frankly temporary; although they had an appealing simplicity, much of the detail seemed attenuated, effeminate, and unconvincing. In monumental work, the great Stockholm Town Hall by Ragnar Östberg shows Swedish architecture at its best; the mosaicked Golden Hall in it is a unique and beautiful piece of modern interior design.

Holland produced some amazingly original designs; but although they possess verve and a certain picturesqueness, they seem often forced and outlandish, like some of the German work before the War. The Marine Hotel, in Amsterdam, by Von der May, and the Amsterdam Housing, by Klerk, are especially notable examples. The latter is a particularly interesting example of modern work in the variety it attains in one city block.

Much interesting modern work has been done

in Finland, so that Helsingfors to-day is one of the most interesting cities in Europe as an exhibition of frankly "modernist" architecture. The Railroad Station, by Eliel Saarinen, who was placed second in the Chicago *Tribune* competition, is particularly noteworthy.

Beyond spasmodic housing, Italy produced but little during the ten years. Austrian work is characterized by much of the same spirit as that of Germany, but classicism plays a more important rôle in Vienna than in Berlin. The Konzerthaus and Akademie für Musik is a typical piece of modern Austrian classic, and the Österreichische-Ungarische Bank by Leopold Bauer shows the typical Viennese classic of a freer and more original type. Since the end of the War there has been little building in Austria.

In the Orient, the struggle of East and West goes on, with disastrous architectural effects. The great port cities are rapidly assuming the air of an awkward European city, and all sorts of caricatures of western styles are produced by native architects. In China, to be sure, a certain vitality in native work is in evidence, connected with the Buddhist revival; but it is almost entirely confined to the rebuilding of temples destroyed during the Tai-Ping rebellion. The cultural chaos of the modern Orient has produced architectural conflict, and the future is uncertain.

ARCTIC REGION. See POLAR RESEARCH.

ARGENTINA. A South American republic lying on the eastern coast of the southern part of the continent, consisting of 14 provinces, 10 territories, and one federal district. Its area is 1,153,119 square miles, and its population (Jan. 1, 1921), 8,698,516. This represented a gain of 1,526,606 or 21.3 per cent over the official estimate of Jan. 1, 1911. The populations of the larger cities were estimated thus in June, 1922: Buenos Aires, 1,720,000; Rosario, 265,000; Córdoba, 156,000; La Plata, 151,000; Tucumán, 100,000. Because of the annual return of Spanish and Italian laborers to their homes after the harvests, immigration and emigration almost balanced, the numbers in 1917 being 51,665 immigrants to 83,999 emigrants; in 1919, 69,879 immigrants to 67,710 emigrants, and in 1920, 188,688 immigrants to 148,907 emigrants. The males still continued in excess of the females, the totals in 1918 being 4,440,367 males to 3,838,792 females. Immigration from Germany, Belgium, and the Slavic countries began to increase.

Agriculture. In 1920, out of a total area of 250,000,000 acres available for farming, 62,500,000 acres were being tilled. This was a gain of 12,170,000 acres, or 24 per cent, over the season of 1910. The following were the acreage, yield in metric tons, and quantity exported, of the leading crops for 1922-23:

	Acreage	Metric Tons	Tons exported
Wheat	15,939,494	5,145,031	3,964,641
Oats	2,617,854	797,967	283,205
Maize	7,850,750	3,890,000	2,771,325
Flax	4,111,793	1,124,769	925,958
Linseed			

Because of the virgin fertility of the soil, the food crop harvests were bountiful with the result that Argentina in late years led the world in the exportation of maize, as well as linseed, and stood next to the United States and Canada

in the exportation of wheat. The danger of sapping the soil was always real, and the government wisely applied itself to teaching the advantages of a more varied husbandry and intensive cultivation. This fact, together with the higher prices during the War, resulted in an increasing application to cotton, tobacco, and sugar cane culture.

The grazing industries of course stand next to agriculture in prominence. In 1920 there were 27,392,126 cattle (29,116,625 in 1908); 9,366,455 horses (7,531,376 in 1908); 825,226 asses and mules (750,125 in 1908); 45,303,419 sheep (67,211,754 in 1908); 4,670,130 goats (3,945,086 in 1908); 3,227,346 pigs (1,403,591 in 1908).

Industry. By the industrial census of 1920, 48,779 factories, employing 410,201 persons, with a capital of 1,787,662,000 pesos, were enumerated. The value of manufactured products was 1,861,789,710 pesos (\$782,000,000). The most important single industry was that of food production; 19,000 establishments were engaged in it. Packing plants, flour mills, creameries, and wool-washing plants were at the head.

Mining. This industry reached no great importance. Control of the mines was vested in the state and national governments, and concessions were strictly regulated. Petroleum was the most important of the products mined, the output of the Comodoro Rivadavia wells in 1921 being 1,730,500 barrels. During the War, wolfram and mica were in considerable demand.

Commerce. The total foreign trade of Argentina in recent years is shown below. The figures given represent the real rather than the nominal value adopted for tariff purposes and are stated in gold pesos with a par value in United States money of 96.5 cents per peso. In 1919, the average exchange value of the gold peso was \$.99; in 1920, \$.907; in 1921, \$.731, and in 1922, \$.818.

Year	Imports	Exports
1913	496,280,000	519,160,000
1919	655,772,000	1,030,965,000
1920	934,968,000	1,044,085,000
1921	749,534,000	671,129,000
1922	686,000,000	672,600,000

The chief articles imported were textiles, iron and steel, glassware and crockery, foodstuffs, oils, chemicals, timber and wood, and coal. The exports were chiefly foodstuffs, including wheat, corn, frozen beef and mutton, linseed, hides and skins, wool and quebracho. The United States advanced to a commanding position in Argentina's import trade, while the United Kingdom remained the best customer for Argentine exports. The trade with the more important countries for 1913 and 1920, the latest year for which details were available, are given in thousands of gold pesos.

Country	1913		1920	
	Imports	Exports	Imports	Exports
United States	73 013	22,895	310,395	154,136
United Kingdom ..	154 055	120,378	218,605	279,677
France	44,815	87,719	55,943	70,822
Italy	40,947	20,039	41,337	84,272
Brazil	10 898	24,809	50,435	22,407
Spain	14,582	4,818	49,068	14,630
Germany	83 934	57,915	44,620	23,756

For the 12 months ending June 30, 1923, the

United States exported goods to Argentina valued at \$109,384,460 as compared with \$80,495,064 for the same period of 1921-22. Imports from Argentina to the United States for the fiscal year 1922-23 totaled \$131,591,656 compared with \$60,767,964 in the preceding year. By July, 1923, it was evident that Argentina had emerged from the commercial depression that had started with 1921 and was rapidly on the way to a renewed economic activity.

Communications. After 1912, railroad building was retarded, only 1521 miles having been added by 1922. Work was under way on the Argentine section of the Trans-Andean railway designed to connect the Argentine state railway system from Salta, Argentina, with the port of Antofagasta, Chile, on the Pacific. On Jan. 1, 1923, of the total mileage, 3947 miles were state-owned, and 18,400 miles privately owned. In 1921, there were 52,470 miles of telegraph lines; 3619 post offices; and 12 stations for wireless telegraphy. Aerial communications were established between Buenos Aires and Salta, Catamarca, Posadas, and other cities, as well as with Montevideo, Uruguay.

Finance. The budget charges, in paper pesos, for 1912 and 1922, were as follows, one paper peso equaling 44 centavos gold money:

Year	Revenue	Expenditure
1912	128,751,718	248,764,942
1922	551,931,685	599,956,504

In 1922, the external debt was 561,537,364 paper pesos (\$239,000,000 at par), and the internal debt, 698,235,344 paper pesos (\$297,000,000). The floating debt was 628,836,663 paper pesos (\$267,000,000). An idea of the expansion of Argentina's activities may be gained from comparing the last charge with the 1911 figure of 34,064,123 paper pesos (\$14,477,000). The 1922 budget carried 128,736,485 paper pesos for interest and amortization of the debt; in 1911 the same item was about 70,000,000 paper pesos.

Education. In 1920, 1,121,311 pupils attended 9009 primary schools; 11,022 pupils were attending 38 secondary schools supported by the national government; 14,202 pupils were attending normal schools. The following new universities were organized after 1910: National University of the Litoral in Rosario (1920) and the provincial universities at Tucumán (1912) and Cuyo (1921). In 1920 the federal expenditure for education was 71,885,335 paper pesos, as compared with the 1911 figure of 19,200,000.

Defense. In 1910, two dreadnaughts were laid down in American yards. These, finished in 1917, were the *Moreno* and *Rivadavia*, both of 27,940 tons displacement and capable of 22.5 knots per hour. For 1922, the military budget was 48,812,937 paper pesos, and the naval budget 41,940,200 paper pesos.

History. The period of the War saw Argentina confronted by local problems in many ways analogous to those of the United States. The conflicting sympathies of the foreign-born population, many of whom returned to their native lands to fight in the armies; the active Allied and German propaganda; the rising cost of living; and the increasingly articulate character of labor, which expressed itself in strikes and disturbances; all added to the vexations of the government and distracted attention from mat-

ters which had hitherto been Argentina's main concern; i.e. its economic expansion and development. In 1917 a general railway strike temporarily paralyzed business, and sporadic strikes continued throughout 1918 and 1919.

Argentina's rôle as a neutral was made difficult in 1917 by the intensification of the German submarine campaign and the subsequent arrogance displayed by the German Foreign Office. The famous *spurlös versenkt* despatch of the German Ambassador, which the papers published on Sept. 8, 1917 ("I advise that they [Argentina's ships] be sunk without trace"), brought matters to a head, and after serious anti-German disturbances in Buenos Aires, the Argentine Congress voted for the severance of diplomatic relations. The President thereupon refused to intervene, and in spite of the entry of the United States into the War, Argentina remained aloof from the struggle.

In 1910 Roque Sáenz Peña was elected President, and on his death in 1914, the Vice-President, de la Plaza, continued the term. In 1916 a split in the governing party caused the election of Hipólito Irigoyen, the Radical candidate, and Argentina viewed an administration of hitherto unknown men. Leaders in the new party included Honorio Pueyrredon, Diego Luis Molinari, Elpidio González, and Alfredo Demarechi. Business men and technicians were appointed to important offices, and civilians held the war and navy portfolios. In the Congressional elections of 1919 both houses remained Radical. The President's known sympathies for labor threw him into many difficulties, notably with the foreign-owned public service corporations. His able administration and his success in maintaining Argentina's neutrality won universal recognition for his talents. In 1922 Marcelo T. de Alvear, likewise of the radical party, was elected President.

The growing amity between Argentina and the United States was displayed by the number of loans placed with American bankers in spite of the competition of English capitalists, who, up to the War, had played the most important part in Argentina's industrial affairs. During 1922 and 1923 loans for \$27,000,000, \$50,000,000, and \$13,000,000 were floated. These borrowings reflected the most important problem before the Alvear administration; i.e. the unsatisfactory fiscal situation. One of the most pressing needs was the funding of the large deficits which were annually accumulating; in 1922 alone the deficit was 90,000,000 paper pesos. Another was the necessity for consolidating the floating loan. The solutions proposed by the government were radical: an income tax law, an upward revision of the tariff, double taxation for absentee landlords, higher land valuations, and a tax on bank deposits. In spite of its straitened finances, the government was moving toward an ambitious defense and public works policy, the budget for 1923 calling for 30,000,000 pesos for modernizing the navy and renewing army equipment, 300,000,000 pesos for railroad extensions, and 20,000,000 pesos for oil refineries.

Though Argentina was the first state to ratify the Covenant of the League of Nations, July 7, 1919, she withdrew from active participation in League affairs the following year, when the first League Assembly refused to take favorable action on the amendments to the Covenant proposed by the Argentine delegation, viz., admis-

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sion of enemy states; admission, without vote, of very small quasi-sovereign states; compulsory jurisdiction for the Court; and systematic rotation of the members of the Assembly in the elective seats on the Council. Thenceforth the Argentine Republic refused to send delegates to Geneva and to pay its dues. In 1923 it was announced that Argentina meant to pay up arrears and assume an active rôle. See also NAVIES OF THE WORLD, and PAN-AMERICAN CONFERENCES.

ARGENTINE ANT. See ENTOMOLOGY, ECONOMIC.

ARIZONA. The fifth of the United States in size (113,956 square miles), and the forty-fifth in population; capital, Phoenix. During the decade 1910-20, the population of the State increased from 204,354 to 334,162, a gain of 63.5 per cent. The white population increased from 171,468 to 291,449, while the Negro population increased from 2009 to 8005, and the Indian population from 29,201 to 32,989. The Chinese in the State in 1920 numbered 1137, against 1305 in 1910; the Japanese, 515, against 301. The native white population increased from 124,644 to 213,350, while the foreign-born whites increased from 46,824 to 78,099. The urban population rose from 63,260 to 117,527, while the rural population increased from 141,094 to 216,635. The largest cities in the State are Phoenix and Tucson. The population of the former increasing from 11,134 to 29,053, while the population of the latter grew from 13,193 to 20,292.

Agriculture. Agriculture is not the leading industry in Arizona, nor did the agricultural development of this State keep pace with the growth of its population. This will be noted from the fact that while the increase in population in the decade 1910-20 was 63.5 per cent, the number of farms in the State increased only 8.1 per cent, from 9227 to 9975. It should be noted that in 1910 individual schedules were secured for farms on Indian reservations, whereas in 1920, in a number of cases where the farming operations of a reservation were returned on a single schedule, the reservation was recorded as one farm, a difference of at least 2000 farms being thus accounted for. The land in farms increased from 1,246,613 acres in 1910, to 5,802,126 acres in 1920, or 365.4 per cent. The improved land in farms also showed a considerable increase, from 350,173 acres to 712,803, or 103.6 per cent. The total value of farm property made an apparent increase of 210.9 per cent, from \$75,123,970 to \$233,592,989; the average value per farm, from \$8142 to \$23,418. In interpreting these values, and indeed all comparative values in the decade 1914-24, the inflation of the currency in the latter part of the period is to be taken into account. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The proportion of land used for agricultural purposes in 1910 was 1.7 per cent, and in 1920, 8 per cent. The percentage of farm land improved decreased from 28.1 to 12.3. Of the total of 9975 farms in 1920, 7869 were operated by owners, 1801 by tenants, and 305 by managers, a decrease in the decade of about 400 farmers, and an increase of about 1000 tenants. The great proportion of farmers in Arizona are natives. In 1920 there were 8262 native white farmers and 1067 foreign-born. Indian farms

in 1910 numbered 3159; in 1920, 537 (but see above). The farms free from mortgage numbered 3708 in 1920, and 7038 in 1910; those under mortgage numbered 3380 and 1043. Arizona is one of the most important States in live stock production. Cattle in 1920 numbered 821,918, compared with 767,042 in 1910; but sheep decreased from 916,600 to 881,914. It is also one of the most arid States, and its possibilities for agriculture are controlled almost entirely by the development of irrigation. The number of farms irrigated in 1920 was 6605, compared with 4481 in 1910. The acreage irrigated increased from 320,051 in 1910 to 467,565 in 1920. Cotton growing came into considerable prominence in favored localities, notably the Salt River Valley. Fruit growing, especially of citrus fruits and grapes, increased, and vegetable growing for early market was developed locally. The estimated production of the chief farm crops for 1923 was as follows: corn, 898,000 bushels; wheat, 1,092,000 bushels; oats, 678,000 bushels; barley, 1,224,000 bushels; potatoes, 348,000 bushels; and hay, 607,000 tons. Comparative figures, for 1913, were corn, 476,000 bushels; wheat, 928,000 bushels; oats, 301,000 bushels; barley, 1,482,000 bushels; potatoes, 75,000 bushels; hay, 540,000 tons.

Mining. Arizona has a great wealth of mineral resources which have not as yet been fully developed. Its principal mineral products are copper, gold, silver, and asbestos. Of these, copper is by far the most important and valuable, and in its production Arizona far out-ranks any other State. The fluctuation in the value of copper during the War and post-War period was reflected in the copper situation of the State, as will be noted from the following comparative production figures: 1914, 393,017,400 pounds, valued at \$52,271,314; 1915, 459,972,295 pounds, \$80,495,152; 1916, 721,833,169, \$177,570,960; 1917, 712,166,891, \$194,421,561; 1918, 764,855,874, \$188,919,401; 1919, 538,100,844, \$100,086,757; 1920, 588,256,302, \$102,719,160; 1921, 185,034,194, \$23,869,411; 1922, approximately 400,043,128 pounds, valued at \$54,005,822. The peak of production was reached in 1918. The sharp decline from 1920 to 1922 resulted from the general business depression, which limited the demand for copper and also reduced its price. In 1922 there was a recovery, which continued in 1923. An estimate of production in 1923 was 624,000,000 pounds. The output of gold in the State remained practically constant in the decade 1913-23. The production in 1914 was 202,167 fine ounces, valued at \$4,179,155. After a slight decline in 1915 and 1916, it rose in 1917 to 245,174 fine ounces, valued at \$5,068,193, and in 1918, to 262,919 fine ounces, valued at \$5,435,027. The production for 1919-20 was practically the same. In 1921 the output was valued at \$2,930,303, and in 1922, at \$3,524,134. The decline in the last two years was due to the general depression in the mining field. Conditions greatly improved in 1923, however, and indications were that the output of gold in that year would be considerably increased, especially as several new ore bodies had been discovered. Since the silver output in Arizona is derived largely from treatment of the copper ores, it fluctuates with the production of copper. In 1914 the silver output was 4,377,994 fine ounces, valued at \$2,421,031; in 1917, 6,983,913 fine ounces, \$5,754,744; 1919, 5,266,005,

\$5,808,598; 1920, 5,355,303, \$5,837,280; 1921, 2,469,394, \$2,469,394; 1922, approximately 4,531,864 fine ounces, valued at \$4,531,864. As the Pittman Act, regulating the price at \$1 an ounce, expired in the latter part of 1923, every effort was made in the first part of that year to increase the production, and indications were that it would considerably surpass the production of 1922. Arizona is an important producer of lead. The production of this metal during the decade is indicated by the figures for several of the years: 1914, 15,003,068 pounds; 1917, 23,465,445; 1920, 14,599,765; 1921, 6,541,433; 1922, 15,070,894. A small amount of zinc is also produced, as well as a considerable quantity of asbestos. According to the State Geologist, the total production of the mines of Arizona from the beginning of mining to the beginning of 1923 was approximately as follows: copper, 9,966,150,966 pounds; gold, \$121,451,432; silver, \$143,801,602; lead, 140,117,828 pounds; zinc, 110,000,000 pounds; asbestos, 4000 tons; manganese ore, 40,000 tons; molybdenum, 750,000 pounds; precious stones, \$60,000. The total value of mineral production in 1921 was \$30,818,363, compared with \$116,383,335 in 1920, \$112,512,239 in 1919, \$203,992,915 in 1918, and \$60,420,362 in 1914.

Industries. Arizona is not an important manufacturing State, and its chief industries depend largely upon mining, having to do chiefly with smelting and other mineral processes. The growth of its industries from 1909 to 1919 is indicated by the following figures. The number of establishments in 1909 was 311; 1914, 322; 1919, 480. Persons engaged in manufacture in 1909 numbered 7202; 1914, 8014; 1919, 10,347. The capital invested amounted to \$32,872,935 in 1909; \$40,300,365 in 1914, and \$101,486,070 in 1919, while the value of the products in those years was \$50,256,694, \$64,089,510, and \$120,769,112, respectively. The large increase in the value of the products was due chiefly to the change in industrial conditions brought about by the War and therefore is no true measure of the growth of manufactures during the census periods. The most significant evidence of growth is found in the increase in the average number of wage earners and in the horse power used. The percentage of increase in the cost of materials, 135.8, as compared with that for the value of products, 88.4, resulted in an increase of only 13.4 per cent in value added by manufacture. This increase was due to the copper smelting and refining industries, which in 1919 contributed more than two-thirds of the total value of the products for the State. The value of the products of copper smelting and refining during the period was as follows: In 1909, \$41,059,000; 1914, \$53,438,000; 1919, \$94,184,000. Phoenix and Tucson, with 48.8 per cent of the total population of the State, reported 9.0 per cent of the State's products in 1919.

Education. Arizona has been from its earliest history one of the most progressive of the States in educational matters. The Legislature has willingly passed measures to improve the administration and efficiency of the school system. The fifth State Legislature enacted several measures of unusual importance. One of these established a new basis for the distribution of the State school fund and greatly increased its amount; another provided that

the rural schools shall receive from the county fund a minimum of \$1500 for each district employing one teacher and \$3000 for each district employing two teachers. A third measure gave greatly increased powers to the State Board of Education, especially with regard to the management of institutes and certification of teachers; and compulsory school attendance law was strengthened by a measure making possible stricter enforcement in rural districts. The most pressing problem in education in the State was the improvement of the rural schools. A definite step in that direction was taken in providing increased support and requiring higher teaching standards. A constitutional amendment providing for reorganization of the State Department of Education was defeated in the general election in November, 1922, but the discussion aroused by the measure was valuable in centring attention on the defects of the existing system. Vocational education is carried on through the State Board of Vocational Education. During the decade this board conducted very valuable research work and brought about a uniform accounting system for the schools. It also entered into a cooperative arrangement with some of the larger mines and industries of the State for part time class work in the evening for those who are employed. Classes had been organized in trade and industrial work with an enrollment of approximately 2000; and a similar arrangement was being worked out with the Farmers' Bureau of the State. Home economics has been extended into various communities, and a decided interest in the subject has been shown. The enrollment in the high and elementary schools in 1914-15 was 46,069. This had increased in 1922-23 to 69,077. In the high schools in 1921 the total enrollment was 6716. The expenditures from the State school fund for 1920-1 amounted to \$1,115,717, while the expenditures by school districts was \$4,449,883. The percentage of illiteracy in the State decreased from 21.9 in 1910 to 16.3 in 1920. Among the native whites it had apparently decreased from 2.4 in 1910 to 1.4 in 1920; among the Negro population, from 8.4 to 4.8; and among foreign-born whites, from 31.4 to 28.7.

Finance. For finance, see STATE FINANCES.

Political and Other Events. Several events of unusual importance marked the political history of Arizona during the decade 1914-24. In the elections of 1914 George W. P. Hunt was reelected governor and Marcus A. Smith to the United States Senate. A constitutional amendment providing for prohibition was carried by a majority of about 3000 votes. Two years later this amendment was amended and strengthened to meet a decision of the Federal court that the original amendment did not prohibit the introduction and personal use of intoxicating liquors. In the election of 1914 an initiated measure abolishing capital punishment was passed, but two years later the death penalty was restored. The Legislature of 1913 had passed a law prohibiting the owning of land by aliens. This was amended so that it applied only to aliens not eligible to citizenship and was later further amended by special reference to the Japanese prohibition of alien ownership in that empire, so as to be directly aimed at the Japanese. The Legislature of 1913 had passed a law requiring that mining com-

panies and other employers of large bodies of men in hazardous occupations should be limited to the employment of not more than 20 per cent who could not speak and understand the English language. This act was found by the United States Supreme Court two years later to be in violation of the Fourteenth Amendment. In the election of 1916, Thomas E. Campbell, Republican, was candidate for governor against George W. P. Hunt. The election was so close that a recount was necessary. Hunt refused to surrender the office on the face of the returns but a week later gave it up, pending the result of the recount, Campbell in the meantime having been declared by the Supreme Court to be governor de facto. The recount being decided in favor of Campbell, Hunt appealed, and in December of 1916 the Supreme Court reversed the lower court and seated Hunt. In the election of 1916 Henry F. Ashurst was reelected United States Senator. In the presidential election of 1916 Woodrow Wilson received 33,170 votes, compared with 20,524 for Charles E. Hughes. In 1918, Governor Campbell was reelected. He was reelected for a third term in 1920. In the presidential election of that year, W. G. Harding received 37,016 votes and James M. Cox 29,546. On the recommendation of Governor Campbell, a special session of the Legislature was called in April, 1922, and a State financial code was passed. This measure provided that appropriations for the government must be included in a single appropriation bill accompanying the governor's budget. In elections held in November of this year, the Democrats were universally successful. Senator Ashurst was reelected, and George W. P. Hunt was elected governor. Governor Hunt was inaugurated for the fourth time in January, 1923. In his address to the Legislature he laid special stress on the State's Educational problems and placed before the Legislature the Colorado River compact. This compact was negotiated by representatives of six States, New Mexico, Colorado, Nevada, Utah, Wyoming and Arizona. It was aimed to settle questions relating to flood control, power development and irrigation projects on this river. The Legislature failed to ratify the compact. In April, 1924, the Arizona memorial stone was dedicated at the Washington Monument in Washington.

Legislation. An attempt was made in the Legislature of 1915 to pass a substitute measure for the anti-alien laws, but the measure was defeated in the Senate. In 1917 the Legislature revised the laws relating to criminal procedure and provided for mothers' pensions. A special session in 1920 ratified the national woman suffrage amendment. In 1921, measures were passed creating a State child and welfare commission, a soldiers' land settlement commission, and an immigration commission. The Legislature of 1923 passed a law aimed especially at the Japanese, prohibiting the leasing of farm property to aliens ineligible to citizenship.

ARIZONA, UNIVERSITY OF. A coeducational State university at Tucson, Ariz. founded in 1885. The size and activities of the university broadened greatly between 1914 and 1923-24. In the latter year it included the College of Letters, Arts, and Sciences; College of Agriculture; College of Mines and Engineering, College of Education; School of Law; University

Extension Division; Steward Observatory; State Museum, and the Arizona Bureau of Mines. The student enrollment increased from 249 at the beginning of the decade, to 1750 for 1923-24, and 175 in the summer session of 1923. There was a corresponding increase in the faculty, from 43 to 118, and in the number of volumes in the library, from 20,000 to 60,000. Several new buildings were erected during the period: the agricultural building, mines and engineering building, Steward Observatory, the home economics practice house, the greenhouse for the agricultural experiment station, a dormitory for girls, and a dormitory for men. The new College of Education was organized in 1922. General public interest in the institution was shown by the gift of \$100,000 by mining interests to be added to a \$75,000 State appropriation for the erection of a mines and engineering building, and a gift of \$60,000 from Mrs. Lavina Steward, which made possible the erection of the observatory. Two changes were made in the presidency of the university. In the fall of 1914 Rufus Bernard von Klein Smid, A.M., Sc.D., succeeded A. H. Wilde, Ph.D., as president, and was succeeded in turn in 1922 by Cloyd H. Marvin, Ph.D., LL.D.

ARKANSAS. Arkansas is the twenty-sixth of the United States in size (53,335 square miles), and the twenty-fifth in population; capital, Little Rock. The population of the State increased during the decade 1910-20 from 1,574,449 to 1,752,204 or 11.3 per cent. The white population increased from 1,131,026 to 1,279,757, while the Negro population showed an increase from 442,891 to 472,220. The population of Arkansas is very largely native. The native whites numbered 1,265,782 in 1920 as compared with 1,114,117 in 1910, while the foreign-born population decreased from 16,909 to 13,975. The urban population rose from 202,681 to 290,497, while the rural population increased from 1,371,768 to 1,461,707. The largest cities in the State are Little Rock and Fort Smith. The population of the former increased from 45,941 in 1910 to 65,142 in 1920, and that of the latter from 23,975 to 28,870.

Agriculture. As Arkansas is an important cotton-growing State, agricultural conditions in the decade 1914-24 were affected, as in the case of the other southern States, by the devastations of the boll weevil. For a detailed account of the influence of the weevil on agriculture and cotton growing, see *ENTOMOLOGY, Economic: Boll Weevil*. In 1923, in certain districts of Arkansas, the leaf worm defoliated 95 to 98 per cent of the plants, which dried up, and the immature bolls produced practically no crop. The boll weevil attack, however, was less than in 1922, because conditions were less favorable for the insect. In spite of these handicaps, however, the area planted in cotton was practically constant during the decade. In 1913 this area was 2,502,000 acres, with a production of 1,073,000 bales; in 1915, 2,170,000 acres, 816,000 bales; in 1918, 2,091,000 acres, 987,000 bales; in 1921, 2,382,000 acres, 797,000 bales; and in 1922, 2,844,000 acres, 1,040,000 bales. In 1923 the estimated production was 926,000 bales.

While the population of Arkansas increased 11.3 per cent in the decade 1910-20, the number of farms increased 8.4 per cent (from 214,678 to 232,604). In 1910 the acreage in farms

was 17,416,075; in 1920, 17,456,750, an increase of only 0.2 per cent. The improved land in farms increased from 8,076,254 to 9,210,556 acres, or 14 per cent. The total value of farm property apparently increased from \$400,089,303 in 1910 to \$924,395,483 in 1920, and the average value of farm property from \$1864 to \$3974. In interpreting these values, and indeed all comparative values in the decade 1914-24, the inflation of the currency in the latter part of that period is to be taken into account. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of land used for agricultural purposes was 51.8 per cent in 1910 and 51.9 per cent in 1920, while the percentage of improved land increased from 46.4 to 52.8. Of the 232,604 farms in 1920, 112,647 were operated by owners, as compared with 106,649 in 1910; 736 by managers, as compared with 763; 119,221 by tenants, as compared with 107,266. There was an increase in the decade of about 6000 owners and about 12,000 tenants. The white farmers in 1920 numbered 160,322, as compared with 151,085 in 1910; colored farmers, 72,282 as compared with 63,593. The farms free from mortgage in 1920 numbered 64,881; in 1910, 82,321. Those under mortgage numbered 33,990 in 1920, compared with 22,374 in 1910. In 1920 the total number of cattle in the State was 1,072,966, compared with 1,028,071 in 1910; sheep numbered 100,159 in 1920 and 144,189 in 1910. The estimated production of the chief farm crops in 1923 was corn, 36,141,000 bushels; wheat, 770,000; oats, 6,584,000; rice, 5,254,000; potatoes, 1,764,000; sweet potatoes, 3,938,000; and hay, 563,000 tons. Comparative figures for 1913 are corn, 47,025,000 bushels; wheat, 1,313,000; oats, 6,360,000; rice, 3,769,000; potatoes, 1,800,000; and hay, 384,000 tons.

Mineral Production. Arkansas, while not one of the more important of the mineral producing States, has mineral resources of great value. The most notable feature of the mineral production of the State was the development of the petroleum field. The results of this development on a large scale were shown only as late as 1921, since previous to that time the reports of production were included with those of other States. In 1921 the oil production had reached 10,473,000 barrels, valued at \$12,746,000; and this increased in 1922 to 12,712,000 barrels. Coal mining ranked second in importance, and steadily increased in the decade 1914-1924. In 1914 the production was 1,836,540 tons, valued at \$3,158,168; in 1916, 1,994,915 tons, \$3,836,845; 1918, 2,227,369 tons, \$8,172,376; 1920, 2,103,596 tons, \$9,592,000; 1921, 1,227,777 tons, \$5,360,000. The output in 1922 was about 1,110,046 tons. Arkansas is chief among the States producing bauxite, from which aluminum is taken. The production in 1914 was 195,247 long tons, valued at \$976,686; 1916, 375,910 long tons, \$2,011,590; 1920, 481,279 long tons, \$2,897,892; 1922, 266,790 long tons, \$1,682,890. The total value of the mineral products of the State increased considerably in the decade, rising from \$5,787,199 in 1914, to \$14,081,691 in 1918 and \$22,515,412 in 1921. In addition to the minerals already mentioned, natural gas is important.

Manufactures. Arkansas is not an important manufacturing State, but there was a substantial increase in its industrial develop-

ment from 1909 to 1919. The number of establishments in 1909 was 2925; 2604 in 1914; and 3123 in 1919, while the number of persons engaged in manufacture in those years was 51,730, 48,440, and 58,202, respectively. The capital invested in 1909 amounted to \$70,174,345; in 1914, \$77,162,485, and in 1919, \$138,817,974. The value of the products apparently increased from \$74,916,367 in 1909, to \$83,940,587 in 1914, and \$200,312,858 in 1919. The increase of 1914-19 was due in great measure to the changes in industrial conditions brought about by the War. The principal industries, with the value of their product, in the three census periods, were as follows: lumber and timber products, 1909, \$40,640,000; 1914, \$43,115,000; 1919, \$91,852,000; cottonseed oil and meal, 1909, \$7,789,000; 1914, \$9,240,000, and 1919, \$25,304,000; car construction and repair, 1909, \$4,154,000; 1914, \$4,971,000, and 1919, \$11,030,000; rice cleaning and polishing, 1909, \$945,000; 1914, \$1,837,000, and 1919, \$8,990,000. The most important manufacturing cities of the State are Little Rock and Fort Smith. The former had 125 manufacturing establishments in 1909, 149 in 1914, and 242 in 1919; the value of their products was \$6,882,000, \$7,755,000, and \$23,168,000, in those respective years. Fort Smith, in 1909, had 83 manufacturing establishments, 103 in 1914, and 115 in 1919; the value of the products for those years was \$3,739,000, \$4,646,000, and \$14,813,000, respectively.

Education. Educational conditions in Arkansas showed a steady improvement in the decade 1913-23. Important local legislation was enacted during that time; and several important commissions and associations carried on work with excellent results. The Arkansas Illiteracy Commission undertook to give as speedily as possible to all adult illiterates in the State the opportunity of at least learning how to read and write; and the School Improvement Association was exerting its force in the life of many schools and communities in the State. In 1923 there were over 600 organized school improvement associations, with a membership of approximately 15,000. The Legislature of 1919 passed a measure accepting the provisions of the Smith-Hughes Federal Act, providing for vocational education, and levied a \$.0002 State tax for vocational educational work. Educational progress in the State is indicated by the fact that the enrollment in the schools increased from 395,978 in 1910 to 446,525 in 1916 and to 509,351 in 1922, while the average daily attendance increased from 255,135 in 1910 to 292,750 in 1916 and 367,516 in 1922. The census of the Bureau of Education, taken in 1919-20, showed an enrollment in the elementary and kindergarten schools of the State of 455,362, and in the secondary schools, 27,810, or a total enrollment of 483,172. This may be compared with the enrollment in 1922 of 509,351. The total enrollment in the white schools of the State in 1922 was 379,751 and in the colored schools, 129,600. The permanent school fund of the State in 1919-20 amounted to \$1,200,000. The total expenditures for schools in the same year was \$7,706,621; in 1922, \$8,946,237. The percentage of illiteracy in the State decreased from 15.1 in 1910 to 11.5 in 1920, the percentage among those of native white parentage decreasing from 8.5 to 5.7, and among the negroes from 32 to 26.5.

Finance. For finance, see STATE FINANCES.

Political and Other Events. No striking changes were effected in political conditions in Arkansas in the decade 1914-24. The State remained consistently Democratic. Elections were held in 1914 for governor and other State officers and for United States Senator. Governor Hays was reelected. On Jan. 1, 1916, State-wide prohibition went into effect as a result of laws passed by the Legislature of 1915. Senator Clarke died, Oct. 1, 1916, and W. F. Kirby was chosen as his successor. In the same election Charles H. Brough, Democrat, won the governorship. In the presidential election of that year, Woodrow Wilson received 112,282 votes and Charles E. Hughes 47,135. A proposed amendment substituting local option for State-wide prohibition was defeated, and another, for a new primary election law, was adopted. A constitutional convention created by the Legislature of 1917 met on November 19 of that year and after organization adjourned until July, 1918. The right to vote in primary elections was granted to women by the Legislature in 1917, and a "bone dry" amendment to the constitution was adopted. The constitutional convention held its sessions in 1918 and submitted a new constitution to the people, who defeated it in December. In the elections held in 1918, Governor Brough was reelected and J. T. Robinson was elected to the United States Senate. Three constitutional amendments submitted to the people at this election were defeated. Much activity resulted from the War, and between Apr. 1, 1917, and Oct. 30, 1918, Arkansas furnished 63,632 men to the military and naval forces. Camp Pike was established near Little Rock. In October, 1919, five white men and a larger number of negroes were killed in Phillips County, in troubles that resulted in collisions between armed whites and negroes. Five hundred United States troops were sent to the scene of the disorder from Camp Pike. As a result of these disturbances, 86 negroes were convicted on various charges and 12 condemned to death. In 1920, Thomas C. McRae was elected governor, and Thaddeus H. Caraway, Congressman, was elected United States Senator. In the presidential election of this year, James M. Cox received 105,618 votes, and W. G. Harding, 69,874. Constitutional amendments providing for changes in the initiative and referendum, equal suffrage, and an increase in the membership of the Supreme Court were carried; but as a majority of the total vote cast at the election of governor is required, and they failed to receive this, the amendments failed of adoption. In 1921 suit was instituted in the United States Supreme Court to settle a long-standing boundary dispute between Arkansas and Mississippi. In 1922, Governor McRae was reelected; a proposed amendment to the constitution, providing for a new initiative and referendum law, and other amendments relating to taxation and revenue, were defeated. In 1923 a special election was held for a successor to L. E. Sawyer, Congressman, deceased. J. B. Reed was the successful candidate. During this year strikes on the Missouri and North Arkansas Railroad were ended in December as a result of an agreement reached by the parties and the Governor. In January, 1923, serious rioting occurred in Harrison, and on January 18 a committee of 12 took charge of the situation. On May 14,

1923, flood and fire at Hot Springs did damage amounting to over \$20,000,000.

Legislation. Among the more important laws passed during the decade 1914-24 were the following: The Legislature of 1915 passed a State-wide prohibition bill and measures recommended by the commissioners on uniform State laws. In 1917 several amendments were passed in the Legislature, but, as noted above, they failed of adoption. In 1919 the Legislature adopted the prohibition amendment; at an extra session it adopted also the Federal suffrage amendment. At extra sessions many measures were passed to create special road improvement districts. In 1921 the Legislature abolished certain commissions and offices including the corporation commission and the paid penitentiary commission, substituting therefor the Arkansas Railroad Commission and an honorary penitentiary commission. At this session of the Legislature a resolution was adopted for an amendment to permit the taxation of personal property by improvement districts, but it was defeated at the polls. The Legislature of 1923 passed conservation measures for the protection of oil and gas lands, provided for instruction in patriotism in the public schools, made several amendments to the election laws; and passed a uniform stock transfer act.

ARKANSAS, UNIVERSITY OF. A coeducational State institution at Fayetteville, Ark., founded in 1871. Departments at Fayetteville are agriculture, engineering, liberal arts and sciences, and education. The medical department is at Little Rock. The enrollment increased from 665 in 1913 to 1257 for the year 1923-24 and 789 in the summer school of 1923; the faculty was increased approximately 42 per cent, from 80 to 114, and 10,000 volumes were added to the library, making a total number of 45,000 volumes at the end of 1923. Departments added during the decade were home economics, philosophy, journalism, secondary education, school administration, public speaking, agriculture, architecture, and an engineering experiment station. The tax levied for the support of the university was somewhat more than doubled, to \$3001. President, John Clinton Futrell, M.A., LL.D.

ARLISS, GEORGE (1868-). An English-American actor born in London, England, where he was educated. He made his first appearance on the English stage at the Elephant and Castle Theatre, London, in 1887, and subsequently toured in America with Mrs. Patrick Campbell's company. He has played with Blanche Bates, Mrs. Fiske, and other prominent stage artists. Some of his best performances have been in *The Darling of the Gods*, *Leah Kleschna*, *The Devil*, *Dinraeli* and *The Green Goddess* (1921). He has also played leading rôles in several successful screen productions and is the author of *Widow's Weeds*, *There and Back*, *The West End*, *The Wild Rabbit*, *What Shall It Profit?* (with Brander Matthews), and *Hamilton* (with Mary P. Hamilton; 1917).

ARMAMENTS, LIMITATION OF. See WASHINGTON CONFERENCE. For effect on naval design and shipbuilding, see **VESSEL, NAVAL**; **NAVES**; **SHIPBUILDING, NAVAL**.

ARMENIA. Armenia, as the term was generally employed before the War, did not designate a sovereign state. There was no Armenian state in modern times until the Ar-

menian Republic of Erivan arose in 1918. What the name did signify was portions of Turkey, Russia, and Persia inhabited by Armenians. In the six Armenian vilayets of Turkey, i.e. Erzerum, Van, Bitlis, Diarbekr, Mamut-el-Aziz, and Sivas, lived approximately 1,000,000 Armenians, scattered among more than 3,000,000 Kurds, Turks, and other races, chiefly Moslems. Cilicia, styled Lesser Armenia by nationalists, was also claimed by virtue of historical tradition and a large Armenian population. Russian Transcaucasia, chiefly the provinces of Erivan, Elisavetpol and Tiflis, included something over 1,000,000 Armenians, mingled with other races. In addition, perhaps 150,000 Armenians dwelt in northwestern Persia, wherefore the Persian province of Azerbaijan was often included in nationalist dreams of a greater Armenia. Throughout this large area, held under three sovereignties, the Armenians constituted only a minority, if the total population be considered, and only in relatively few districts outnumbered other races. Yet national consciousness, fanned into life by contact with western civilization, demanded independence and unity, insuperable though the obstacles appeared. After the outbreak of the War, the Young Turk government charged the Armenians with pro-Ally sympathy and revolutionary purposes, and on this pretext, the Turks began a brutal and systematic campaign of extirpation and banishment. Massacres took place in the centres where groups of Armenians were to be found, in Bitlis, Sivas, Kharput, and Trebizond. Deported to Syria, Arabia, and Mesopotamia, and gathered in huge concentration camps, they suffered all the privations of hunger and lack of shelter, and they died in great numbers. From 1,000,000 to 1,200,000 were deported, and of these at least half met death by actual murder or as a result of neglect. Many thousands sought shelter in Russian Transcaucasia, and large numbers of the male population fought in the Russian armies. Their war losses must have totaled 100,000.

The Russian advance into Asia Minor in 1915-16 and the fall of Erzerum served to distract the Turks and was the means of saving many Armenians. But the collapse of Russia in 1917 and the Treaty of Brest-Litovsk in 1918 placed the Armenians at the mercy of the Turks once more. The Armenians in Transcaucasia tried to halt the ruin that awaited them by creating the Republic of Erivan, but the Turks swept into Transcaucasia in the spring of 1918, and only the Armistice in the autumn saved the remnants of the Armenians from complete obliteration. The Peace Conference seemed favorable to Armenian hopes. An Armenian delegation, composed of Russian and Turkish Armenians, laid their people's aspirations before the Supreme Council. The creation of an independent Armenia in the midst of Turkish territory, no matter how just, was beset by many difficulties, and attempts were made to induce the United States to accept a mandate over it. The refusal of the American people to involve themselves in Eastern politics and intrigue delayed the settlement of the Armenian question until the completion of the Treaty of Sévres. By this instrument a greater Armenia in Russia and Turkey was provided for in 1920 and President Wilson was chosen to map out the confines of the territory in Turkey. President Wilson made public his

decision in March, 1921, three months after Erivan had fallen before Turkish and Russian invaders. By the Wilson line Armenia was given some 30,000 square miles in the Turkish vilayets of Trebizond, Erzerum, Bitlis, and Van, and a coast-line of 150 miles on the Black Sea, and the port of Trebizond. It was a fair enough award, but unfortunately, it was conditioned on the capability of the Armenians to take possession. Their inability to do this, the appearance of the Turkish Nationalist government at Angora, the alliance between Bolshevik Russia and Nationalist Turkey, the helplessness of the European powers who dared not embark on a new war, rendered nugatory the Treaty of Sevres and wrecked all hopes for an independent Armenia. Meanwhile the entry into Erivan of the Bolsheviks and the creation of a Soviet Republic, Dec. 2, 1920, heightened the indifference of the Allies.

Almost the last hope of the Armenians fell with the evacuation of Cilicia (q.v.) by the French in 1921. In 1919-20 about 500,000 Armenians, placing their faith in French aid, had pushed into Cilicia and put themselves under the protection of French arms. But the Turkish Nationalists turned on the French in force, invaded Cilicia, and took their usual vengeance on the Armenians. It is estimated that 25,000 of them perished here in 1920. The Franco-Turkish Treaty of Oct. 20, 1921, provided for the departure of the French forces, abandoning the Armenians. Finally in 1923 the last chapter was written. By the Treaty of Lausanne a perplexed and war-weary Europe sought relief through the restoration of the status quo, and Turkey in Asia Minor was left intact. The roseate promise of an independent Armenian State was now definitely ended and the Armenians were again Russian, Turkish, and Persian subjects.

Armenian Republic of Erivan. Since 1918 a state belonging to the Transcaucasian Federation and affiliated with the Union of Socialist and Soviet republics. The republic, made up of the former Russian government of Erivan, is, like Georgia and Azerbaijan, situated on the Transcaucasian peninsula and has an estimated area of 15,092 square miles and a population, according to the latest Russian census, of 1,214,319 as against 1,184,600 in 1914. Eighty per cent of the population was rural. The population was largely Armenian and Christian, about 60 per cent, while minorities of Turco-Tatars, Russians, Greeks, Kurds, and Georgians were also to be found. Erivan, the capital, had a population of 110,000; Alexandropol, 70,000. A university with but one faculty, however, was opened at Erivan in 1920.

Industry and Trade. Agriculture engaged the great proportion of the population, wheat, rice, licorice root, tobacco, and wine being the leading products. Prior to the War, Armenia produced up to 150,000 bales of ginned cotton annually, but cotton growing decayed completely after the Bolshevik Revolution. Mining made up the most important economic activity before the War, for here were found copper ore, rock salt, and iron pyrite deposits. In fact, before the War, the Government of Erivan produced 20 per cent of Russia's whole copper output. From 18,000 to 20,000 tons of salt were extracted annually, 6500 tons of copper, and 50,000 tons of iron pyrites. Three-quarters of the mines, however, had no access to rail-

roads. Actually, having no seafront, the country was almost wholly cut off from contact with the outside world, and being compelled to depend for its communications on the single Transcaucasian railway that passed through its territory on the way from Batum to Baku. The country had great industrial possibilities, for it was estimated that 9,000,000 h.p. could be utilized from the water courses.

History. The destinies of Armenians were, after all, to be cast in with the lot of Russia and not the West or the United States. Five days after the collapse of the Russian Empire, on Sept. 20, 1917, Armenia, with Georgia and Azerbaijan, established the Federal Republic of Transcaucasia. The career of this federation was stormy; the sympathies of its members indicated marked dissimilarities; and a break, hastened by the Turkish invasion of Transcaucasia in the spring of 1918, came on May 26-28, 1918. War-torn Erivan was evacuated by the Turks late in 1918; a brief respite followed; and then hostilities were renewed, this time with Georgia, in January, 1919. Meanwhile, without the formality of a popular election, a government keenly nationalistic in tone had been created at Erivan in the Russian Armenian provinces, by the Dashnakzagan party (moderate or Menshevik Socialist), and the country was organized not for reconstruction and peace, but for expansion and war. The Turks and the Kurds were the enemies. Encouraged by the fair promises of the Allied statesmen to believe that Armenia, like Poland, was to be regenerated, Armenians fell easy prey to the war temper. In July, 1919, a high commissioner was despatched to Armenia, and credits were extended to the Dashnakzagan government; in August, Major-General Harbord appeared to ascertain the possibilities of an American mandate over the country; on Apr. 23, 1920, the government was formally recognized by the United States; three days later, the San Remo Conference called on President Wilson to delimit the boundaries of a free and Greater Armenia. No power, however, seemed willing to assume a mandate over Armenia or to give the struggling republic of Erivan the aid of which it stood sorely in need; British troops, having temporarily occupied the region in the winter of 1917-18, had been withdrawn in the following summer, to be replaced by Allied troops after the armistice, which in turn had been evacuated in 1920. The United States Senate, unwilling to follow President Wilson's generous impulse, refused to consider a United States mandate. Britain and France were equally reluctant. Although alternative plans, such as protection by the League of Nations, were discussed, Armenia was left to its own slender resources and extravagant pretensions. Somewhat unreal, therefore, were the paper promises contained in the Treaty of Sevres of Aug. 10, 1920, whereby, out of the major portions of the Turkish vilayets of Van, Bitlis, Erzerum, and Trebizond, a republic was to be erected, and the final act, the drawing of the frontiers on the West, was delegated to President Wilson. It was merely necessary for Armenians to take possession, without aid from the Allies, it is true, but with their good wishes. A general mobilization was ordered, 34,000 men were collected, and a move was commenced on the Turkish provinces by bands of unskilled, undernourished men. To defeat them was a

surprisingly easy task. Kars fell without a struggle, Oct. 31, 1920; a week later, Alexandropol was entered. By Nov. 7, 1920, when a Turco-Armenian armistice was signed, not only were Armenians in flight from the Turkish provinces, but they saw Erivan wholly occupied by the Nationalist Turks. The conduct of the latter was typical: for the six months the country remained in their possession, 140 towns were destroyed, 400,000 people were rendered homeless, the countryside was stripped of every plow, horse, ox, and milch cow. It was Russia, and not the United States or Great Britain, that was able to save something of the Armenian hopes. Meanwhile the Russian Bolsheviks, now acting more or less in concert with the Turks, had massed 10,000 Red troopers at Akstafa on the Northwest frontier, invaded the country, and cooperated with Armenian Bolsheviks in setting up a Soviet Republic. The new government at once signed a provisional treaty at Alexandropol on Dec. 2 with the Turkish Nationalist commander, Kiazym Kara Bekir Pasha. This treaty handed over to Turkey the districts of Kars and Ardahan and renounced all claim to Turkish Armenia. This disaster was confirmed by the Russo-Turkish treaty of Moscow in March, 1921, and by the treaty arranged at Kars the following October between Turkey and the Transcaucasian republics. The temporary restoration of the districts of Karabagh, Zangezor, and Nakhitchevan to Armenia was but an ephemeral and inadequate consolation. A final effort of the Dashnakzagan party to regain power was unsuccessful. On Feb. 18, 1921, through a *coup d'état* Erivan was seized, but by April 2, the party was in flight, and the Soviet reestablished. On April 21, the Turks evacuated what remained of the republic; on October 13, in the above mentioned Treaty of Kars, Armenia was recognized by Turkey. Russian aid was profuse but, in the face of the great suffering, ineffective. In 1921, as a result of the evacuation of Cilicia (q.v.) by the French, it was reported that Erivan was filled with 400,000 Turkish Armenian refugees. Russia sent clothing, agricultural implements, 1,500,000 gold rubles for the purchase of grains and animals from Persia, medicines and nurses; yet in 1922 alone the death toll in Erivan was 150,000 from starvation and cholera. There was, during 1922-24, an application to local problems purely, for under the Soviet leaders the hope of the greater Armenia had been forsaken: the Armenian national home was in Erivan. Kars, Ardahan, and the Armenian vilayets of the former Ottoman Empire had definitely reverted to Turkey, and Turkish possession of them was tacitly recognized by the Allies when they signed the Treaty of Lausanne with Turkey in 1923, from which the Sèvres clauses on Armenia were quietly omitted. Nor was the tiny Republic of Erivan itself really independent. From the Red invasion, it had been overshadowed by the power of Moscow, and at the end of 1921 it had been reintegrated in a Federal Transcaucasian Republic which entered into the Alliance of Socialist Soviet Republics, dominated by Moscow, by the treaty of Dec. 30, 1922. See RUSSIA, and WAR IN EUROPE, Turkish Front.

ARMIES AND ARMY ORGANIZATION.

Military organization comprises the correct and systematic arrangement of the man power and economic resources of a nation to provide that

unity of effort essential to success in war. It is employed to carry out the military policy of a nation, which is formulated for the protection and promotion of its national policies. Military organization is divided into the organization of land forces whose mission it is to carry out in the field the military policy of the nation, and the organization of noncombatants and of industries to provide equipment, munitions and supplies to enable the land forces to fulfill their mission. Previous to the War the major European powers and Japan in the Far East had carried military organization to a high degree of development, while the United States, with no definite military policy, was in a period of transition.

During the first three years of the War, the increase in fire power due to improvement in rifles and machine guns, the increased mobility and rate of fire of heavy artillery, the development of aeroplanes not only for observation and reconnaissance but for bombing and combat, the introduction of grenades, light mortars and tanks, and the utilization of gas and other chemical agencies, gave rise to the formation of small units to take advantage of these additional tactical opportunities, but resulted in no radical reorganization either by the Central Powers or the Allies. In the United States, during this period, trouble with Mexico caused the mobilization of a large part of the Regular Army and the National Guard on the Mexican border and the organization of an expeditionary force which conducted a campaign in Mexican territory. There resulted a grouping of units which made possible some training and experience in the manœuvring and supply of larger units, and although little or no definite preparation was made for the possible contingency of entry into the War, the foundation was laid for the expansion which became necessary after that contingency materialized.

The establishment of Military Training Camps, first for college students and then for business men in 1915 and 1916, resulted in the partial training of many citizens who formed the nucleus of the body of officers required when the emergency arrived. When the United States entered the War it became apparent that the forces to be raised should be organized and equipped to utilize to the fullest extent the newly developed weapons and should conform as far as practicable to the organization of the Allies' forces, in conjunction with which the troops would operate. The available forces at the outbreak of the War were the Regular Army and the National Guard, but the prompt enactment of the Selective Service Act provided means for expanding these forces to war strength beyond the natural expansion by enlistment and for the creation of new units to the full extent of the man power of the nation.

The armed forces of the United States were, therefore, organized primarily into three components: first, the Regular Army; secondly, the National Guard; and thirdly, the National Army. The last was provided with officers in the higher commands from the Regular Army and in the lower grades from the officers' reserve corps and from graduates of officers' training camps which were immediately established. These forces were all organized under new tables of organization prepared after a study

of the organization of the Allied armies; the basic unit was a division of some 28,000 officers and men. The division was made up of a division headquarters, two infantry brigades, a field artillery brigade, a division machine gun battalion, a field signal battalion, an engineer regiment, and divisional trains. An infantry brigade was composed of a headquarters, two infantry regiments, and one machine gun battalion. The artillery brigade was composed of a headquarters, two 75 millimeter gun regiments, one 155 millimeter howitzer regiment, and a trench mortar battery. An infantry regiment was composed of a headquarters and three battalions with four rifle companies of 250 men, a supply company, and a machine gun company, each. An artillery regiment comprised a headquarters and two battalions of three four-gun batteries, a headquarters company and a supply company, each. An engineer regiment was composed of a headquarters and two battalions with three companies of 250 men each. The divisional trains comprised a headquarters and military police company, an ammunition train, a supply train, an engineer train, usually attached to the engineer regiment, a sanitary train, and a mobile ordnance repair shop, attached to the ammunition train.

The road space occupied by a division was $30\frac{1}{4}$ miles with foot troops marching in column of squads.

General headquarters, reserve, army, and corps troops comprising heavy artillery units, engineer units of various kinds, pioneer infantry, and service units, were organized and assigned as required and as they were available. Engineer, quartermaster, signal, and various other special units were organized for service in the base and intermediate zones and along the lines of communication. The divisions so organized proved unwieldy and lacked mobility, their transportation was complicated, their entry into and withdrawal from battle was difficult, deployment was retarded, and the smaller units could not be adequately supervised by the division commander and his staff. They had great striking and penetration power and under the conditions on the Allied front they proved very effective. In 1920 the National Defense Act of 1916 was thoroughly revised in the light of war experience, and a definite military policy for National defense was adopted; provision was made for the maintenance of a small and highly trained peace establishment consisting of the Regular Army, the National Guard and the organized reserves, all so organized and trained as to be readily expanded to war strength in emergency. Provision was further made for voluntary military training of citizens through reserve officers' training corps established at various high schools, colleges and universities, and by means of annual civilian military training camps.

The Regular Army constitutes a permanent military force. Its peace-time strength was limited by Congress in 1924 to 12,000 officers and 125,000 enlisted men. The National Guard is, first, the organized militia of the State to which it belongs, and secondly, a component of the army of the United States in time of war. The National Guard is so organized and trained under supervision of the Federal authorities that when mobilized in time of war it will constitute with the Regular Army the first line of defense. The organized re-

serves, comprising the officers' reserve corps and the enlisted reserve corps, composed of citizens who voluntarily accept commissions or enlistments, are grouped into skeleton organizations for rapid expansion in time of war. In time of peace the regular army, the National Guard and the organized reserves are organized, so far as practicable, into brigades and divisions, and for purposes of administration, training and tactical control, the continental area of the United States in 1924 was divided on a basis of military population into nine corps areas. The Regular Army, owing to its limited strength, is assigned to the corps areas according to military necessities; the National Guard and the organized reserves are distributed so that each corps area contains two divisions of the National Guard and three divisions of organized reserves and various corps and army troops. In a major emergency the complete mobilization would provide land forces consisting of six field armies with a total of 2,000,000 men, each corps area furnishing one Regular Army division, two National Guard divisions and three organized reserve divisions and corps and army troops according to their varying military population, skeletonized units being brought to war strength by enlistment and the operation of selective service. In a major emergency mobilization would be effected progressively, the Regular Army and the National Guard being first mobilized and moved to the theatre of operations, followed by the mobilization of the reserves, including the necessary troops for lines of communication and the interior.

The amended National Defense Act of 1920 further provided for the organization of a general staff in the War Department, modeled after the general staff which operated in France with the American Expeditionary Forces during the War. It consists of the chief of staff, a deputy chief of staff, and four divisions dealing with personnel, intelligence, operations and training, and supply: these divisions are designated, respectively, G-1, G-2, G-3, and G-4. The duties of the general staff, as defined in the Act, are to prepare plans for national defense and the use of the military forces for that purpose, and for the mobilization of the manhood of the nation and its material resources in emergency, to investigate and report on all questions affecting the efficiency of the army of the United States and its state of preparation for military operations, and to render professional aid and assistance to the Secretary of War and the chief of staff. To carry out one phase of these duties a war plans division has been constituted, to study and develop plans for defense; this is so organized that in case of a major emergency it could take the field as the staff of general headquarters in the theatre of operations. In time of peace, command and administration are carried out through the nine corps areas; no commanders are appointed or staffs organized for units greater than a division.

Subsequent to the adoption of the amended National Defense Act of 1920, a board of officers was assembled who defined a general plan of organization for the army of the United States as provided for in the Act. The strategical and tactical organization of the military forces, it was recognized, might include a general headquarters, groups of armies, corps or divi-

sions, depending on the theatre of operation, the general strategical situation and the size of the forces engaged. Under the plans outlined by the special board of officers, tables of organization were prepared by the general staff and put into operation. Tables were prepared for such general headquarters reserve, army, and corps troops as might be required in a major emergency, and which should be included in the organized reserves. A typical organization of an army comprises two or more corps temporarily assigned; two cavalry divisions; heavy artillery from the general headquarters reserve; a brigade of anti-aircraft artillery; an air service consisting of headquarters, an observation group, and an attack wing; and certain special troops of the signal corps, engineer corps, medical corps, and Ordnance corps, with the requisite trains. A typical organization of a corps comprises two or more divisions temporarily assigned, an artillery brigade of three regiments of 155 millimeter howitzers and a regiment of 155 millimeter guns, with an observation (flash) battalion and an ammunition train, an air service of two observation squadrons and four balloon companies, an anti-aircraft regiment, a medical regiment, an engineer regiment with three auxiliary battalions, and the requisite trains.

In order to meet the objections to the division as organized during the War, the new tables of organization provided for a reduction in strength to about 20,000 officers and men. This reduction was secured by transferring the regiment of heavy artillery to the corps, reducing the strength of the companies in the engineer regiment to 100 men and the strength of a rifle company in an infantry regiment to 200 men, with a corresponding reduction in the number of machine guns, but leaving the percentage of machine guns to rifles the same. This reduction in strength was in line with the changes in European armies based on the experience of the War. A division so organized still occupies a road space with foot troops marching in columns of squads of about 27 miles, and it is probable that further reduction in the strength of a division will be made in the future, without making any reduction in the strength of a battalion.

The retention of the two-brigade four-regiment organization has to a certain extent sacrificed manœuvring and mobility to striking power, but in view of the modern tactics of organization in depth, the three-unit scheme was not adopted until the battalion was reached in organization. Since it was recognized that the machine gun was purely an infantry weapon, the machine gun battalions of the former organization were abandoned, and machine gun companies were organized in each battalion.

An infantry division as now organized comprises two infantry brigades of two regiments each, a field artillery brigade of two regiments of 75 millimeter guns, one combat regiment of engineers, an observation air squadron, a medical regiment, and special troops consisting of a signal company, a light tank company, an ordnance company, a service company, a military police company, and the requisite trains. A cavalry division comprises two cavalry brigades, each having two regiments and a machine gun squadron; a battalion of horse artillery of 75 millimeter guns; a combat en-

gineer battalion, mounted; an ambulance company, and the requisite trains. An infantry regiment comprises a headquarters, a service company, a howitzer company; three battalions, each of three rifle companies; and a machine gun company. An artillery regiment comprises a headquarters, a headquarters battery, a service battery, and two battalions of three batteries and one combat train each. A cavalry regiment comprises a headquarters, a headquarters troop, a service troop, and two squadrons of three troops each. An engineer regiment comprises a headquarters, a headquarters and service company, including the engineer train, and two battalions of three companies each. A medical regiment comprises a headquarters, a service company, a collecting battalion of three companies, an ambulance battalion of one animal-drawn ambulance company and two motorized ambulance companies, a hospital battalion of three motorized hospital companies, and a veterinary company.

The increase in strength of units and the addition of new and improved weapons have made increasingly difficult the problem of supervision and administration; consequently tables of organization now provide for staff officers with functions similar to general staff officers down to and including battalions, except that in brigades, regiments, and battalions the functions of the adjutant and the personnel division are combined under one officer. To provide trained officers for staff positions the National Defense Act has directed the formation of an eligible general staff list composed of officers of suitable training and experience and all staff appointments in the larger units down to and including divisions are made from this list. See ARTILLERY; STRATEGY AND TACTICS.

ARMIN, FRIEDRICH SIXT VON (1851-). A German general, born at Wetzlar. In 1917 he was appointed Chief-in-Command of the Fourth Army in Flanders which, in 1918, took Armentières and Kemmel Hill. See WAR IN EUROPE, *Western Front*.

ARMISTICE, THE. See WAR IN EUROPE, *Western Front*.

ARMISTICES. See WAR, DIPLOMACY OF THE.

ARMORED CRUISER. See VESSEL, NAVAL.

ARMORED SHIP. See VESSEL, NAVAL.

ARMOUR, (JONATHAN) OGDEN (1863-). An American capitalist and merchant born in Milwaukee, Wis. He left Yale University in 1883 to enter his father's business, Armour and Company, one of the "Big Five" packers of the United States. After Armour became head of the company in 1901, sales grew approximately from \$250,000,000 in 1910 to \$1,038,000,000 in 1919, with a total net income ranging from \$9,808,305 to \$27,186,124. A suit was impending in 1920 for violation of the Sherman Anti-Trust law, but an agreement was reached with the United States government whereby Armour and Company, as well as other big packers, should restrict their business to meat-packing alone and sell out their interests in public stockyards, public cold storage warehouses, etc.

ARMSBY, HENRY PRENTISS (1853-1921). American agricultural chemist born at Northbridge, Mass. (see VOL. II). Among his more recent activities may be noted his services as member of the Agricultural Committee of the National Research Council (1917) and as dele-

gate to the Inter-Allied Scientific Food Commission (1918). He is a recognized authority on animal nutrition. His later works include *The Nutrition of Farm Animals* (1917) and *Conservation of Food Energy* (1918).

ARMSTRONG, EDWARD COOKE (1871-). An American educator (see VOL. II). After heading the Romance Department at Johns Hopkins for seven years, he became professor of the French language at Princeton in 1917. During the War he served as national recruiting secretary for the Foyer du Soldat and as national director of French instruction in the training camps (1918). After the armistice of 1918 he lectured at the University of Bordeaux.

ARMSTRONG, HELEN MAITLAND (1869-). An American artist, born at Florence, Italy. She was the daughter of the United States Consul General in Italy. Her early education was at home; later as a pupil of Rhoda Holmes Nicholls, she studied at the Art Students' League. She also studied with Irving R. Wiles and William M. Chase. Her work includes the designing and painting of many stained glass windows, mosaics and mural decorations. She is a junior partner in the firm of Maitland, Armstrong and Company. Among her works are the windows of All Saints' Chapel, Biltmore, N. C., and windows in the Memorial Chapel of Mrs. O. H. P. Belmont, the armory of Mrs. Belmont's New York house, the New York Church of the Ascension and St. Michael's Church, and five in the chancel of the chapel at Sailors' Snug Harbor, Staten Island.

ARMY. See ARMIES AND ARMY ORGANIZATION.

ARMY INTELLIGENCE TESTS. See MENTAL MEASUREMENT; RACE PROBLEMS.

ARNHEIM, FRITZ (1866-). A German historian and traveler, born in Berlin and educated at the Universities of Berlin and Halle. In the course of his studies he made prolonged tours through Sweden, Belgium, and Norway (1900-12), and subsequently lectured on these countries. He became editor of *Mitteilungen an der Historischen Literatur* (1915) and co-editor of *Schwedische Blätter* (1920). His numerous works on historical subjects, literature, etc., include *Der Hof Friedrichs des Grossen* (1912); *Schweden* (1917); and *Artellung Skandinavischer Staaten in der Illustrierten Weltgeschichte* (1920).

ARNOLD, BION JOSEPH (1861-). An American electrical engineer (see VOL. II); During the years 1914-21 he reviewed plans for steam railway terminals for the city of Chicago and advised the officials of Boston, Des Moines, Omaha, Winnipeg, and many other cities of the United States in regard to traction matters. He was a member of the Naval Consulting Board during the War and commanded the Engineer Reserve Corps in 1917. He was transferred to the regular army in December, 1917, with the rank of lieutenant-colonel in the Aviation Section, Signal Corps. He made reports on the aluminium situation and controlled the development and production of aerial torpedoes. He was commanding major, then colonel, of the Aviation Section, Officers' Reserve Corps, in 1919.

ARNOLD, JULEAN (HERBERT) (1876-). An American commercial attaché for China. He was born in Sacramento, Cal. and educated

in the University of California. In 1902 he was commissioned by President Roosevelt student interpreter to China, and from 1904 to 1906 was vice and deputy consul general and mixed court assessor in Shanghai. He was vice and deputy consul in Foochow in 1906 and consul at Tammi, Formosa (1906-08), at Amoy, China (1908-12), at Chefoo, China (1912-14). He was consul general at Hankow from 1914 to 1915, becoming American commercial attaché for China in the latter year. He received various decorations from the Chinese government. An enthusiastic promoter of more extensive trade relations between the United States and China, he is the author of numerous magazine articles on China, and the compiler of the *Commercial Handbook of China*. In 1918 he was chairman of the American delegation to the China Tariff Revision Commission, as well as organizer and field representative of the American Red Cross in China.

ARNOLD, RALPH (1875-). An American geologist, born at Marshalltown, Iowa. He was graduated at Leland Stanford Junior University in 1899. Meanwhile he served as an assistant in geology until 1902, when he entered the service of the United States Geological Survey passing through the subordinate grades until 1908, when he became a consulting geologist. During these years he devoted his attention to the Tertiary paleontology and stratigraphy of the western coast of North America and thus acquired an intimate knowledge of the geology and paleontology of the California oil fields. In 1909 he retired from the survey to enter on the private practice of his profession as an oil expert; he became an accepted authority on the oil resources of the world. He gave courses of lectures on petroleum at Chicago (1914) and at Harvard and the Massachusetts Institute of Technology (1915). In 1914 he became an associate editor of *Economic Geology*. Dr. Arnold is the author of numerous papers, the more important of which have appeared as publications of the United States Geological Survey or as memoirs of the California Academy of Sciences.

ARNOUX, ALEXANDRE (1884-). A French novelist born at Digne (Basses-Alpes), France. He is the author of realistic stories and of a fantastic play. His style is alert, lively, dramatic. His works include *L'Allée des Morts*, poems (1906), *Au Grand Vent*, poems (1909), *La Mort de Pan*, drama (1909), *Le Roman Littéraire IV*, with D. Flaboché (1912), *Abisag ou l'Eglise Transportée par la Loi* (1918), *Indice 33*, awarded the Prix de la Renaissance (1922), *La Nuit de Saint-Barnabé*, describing Parisian urchins (1920), *La Légende du Roi Arthur et des Chevaliers de la Table Ronde*, a translation of Malory (1920), and *Huon de Bordeaux*, a fairy melodrama (1922).

ARRAS, BATTLE OF. See WAR IN EUROPE, Western Front.

ARRHENIUS, SVANTE (1859-). A Swedish chemist (see VOL. II). Among his later books are *Quantitative Laws in Biological Chemistry* (1915), *The Destinies of the Stars* (1918), and *Chemistry and Modern Life* (1919).

ARSONVAL, ARSENE D' (1851-). A French physician, physiologist and physicist. He was co-discoverer with Hertz, Tesla, and E. Thomson of high frequency electrical cir-

cuits and sole originator of their use in the treatment of disease. Every piece of apparatus for this purpose was separately invented by him, and the application of the method is known as arsonvalization. Born at La Borie (*Haute-Vienne*), he was educated in Limoges and received his medical degree from the University of Paris in 1877. He began his career as assistant in the laboratory of Claude Bernard and in 1882 was made director of the newly created laboratory of biological physics in the *Ecole des Hautes Etudes*. In 1889, he collaborated with Brown-Séquard in the pioneer research into the internal secretions. In 1894, he was appointed professor of medicine in the *Collège de France*. Beginning in 1881 and through the ensuing quarter century he published a continuous series of articles on electrophysiology in all of its aspects. His pioneer work on the action of high frequency circuits on man and animals was done during 1890-95. In 1903, assisted by Chauveau and others, he produced his magistral work *Traité de Physique Biologique*. D'Arsonval seems to have been singularly indifferent to publicity and priority claims, although when the diathermic circuit was introduced he is said to have shown that he had anticipated the discovery by many years. He became vice-president of l'Académie des Sciences in 1916, and its president in 1917.

ARTHUR, JULIA (1869-). An American actress, born at Hamilton, Ont. (see VOL. II). On her return to the stage in 1914 after an absence of 14 years, Miss Arthur acted the rôle of the woman in *The Eternal Magdalene* at the Forty-eighth Street Theatre, New York. Other of her appearances were in *Liberty*

Aflame (1917), *Out There* (1918), as Mrs. Cheveley in *An Ideal Husband* (1918), and as Lady Macbeth in *Macbeth* (1921).

ARTHUR'S PASS-TUNNEL. See TUNNELS.

ARTIFICIAL GEMS. See MINERALOGY.

ARTIFICIAL SILK. See SILK, ARTIFICIAL; CHEMISTRY, ORGANIC.

ARTILLERY. The dictum of the great Napoleon that artillery has been and always will be the determining factor of armies and peoples was abundantly confirmed by battle experience of the decade 1914-24. One of the outstanding lessons of the War was the increasing relative importance of artillery in modern warfare. The combatant troops of all the nations engaged in this greatest of all conflicts insistently demanded not only more artillery, but artillery of greater power and increased mobility. With entire populations of nations engaged in the struggle, scientific, engineering, and manufacturing knowledge was focused on the production of more and more powerful weapons to a degree never before experienced. The natural result of this condition of affairs is the great array of more powerful ordnance which owes its existence to the stimulus given inventive genius by the World War.

In addition to greater range and greater mobility, the modern artillerist demands greater rapidity of fire; greater permissible elevation, with a view to possible use against aircraft; all-around fire or the nearest practicable approach to it, in order to avoid constant shifting of the entire gun carriage; increased quickness of going into action and limbering up for quick

EXPENDITURE OF ARTILLERY AMMUNITION IN RECENT WARS

Previous Wars Compared with One Month of World War

YEAR	WAR	ARMY	ROUNDS EXPENDED DURING WAR
1859	Italian	Austrian	15,326 |
1861-65	Civil	Union	5,000,000 ■■■■■
		Prussian	36,199 |
1866	Austro-Prussian	Austrian	96,472 |
		German	817,000 ■
1904-05	Russo-Japanese	Russian	954,000 ■
1912-13	Balkan	Bulgarian	700,000 ■
1918	World War	Brit. & Fr.	12,710,000 ■■■■■ One Month ^a

Expenditures for One Year, Civil and World War

YEAR	WAR	ARMY	ROUNDS EXPENDED FOR ONE YEAR
1864 ^b	Civil	Union	1,950,000 ■
1918 ^c	World War	U. S.	8,100,000 ■■■
1918 ^c	World War	British	71,445,000 ■■■■■■■■■■■■
1918 ^c	World War	French	81,070,000 ■■■■■■■■■■■■

^a Average, year ended Nov. 10, 1918. ^b Year ended June 30, 1864. ^c Year ended Nov. 10, 1918.

EXPENDITURE OF ARTILLERY AMMUNITION IN MODERN BATTLES

YEAR	BATTLE	DAYS' DURATION	ARMY	ROUNDS OF ARTILLERY AMMUNITION EXPENDED
1863	Chickamauga	2	Union	7,325 |
1863	Gettysburg	3	Union	32,781 |
1870	St.Privat	1	German	39,000 |
1904	Nan Shan	1	Japanese	34,047 |
1904	Liao Yang	9	Russian	134,400 ■
1904	Sha Ho	9	Russian	274,360 ■
1915	Neuve Chapelle	3 ^a	British	197,000 ■
1915	Souchez	1 ^b	French	300,000 ■
1916	Somme	7 ^c	British	4,000,000 ■
1917	Messines Ridge	7 ^c	British	2,753,000 ■
1918	St.Mihiel	4 ^b	U. S.	1,093,217 ■

Artillery preparation lasted: a, 35 minutes. b, 4 hours. c, Intermittent 7 days.

abandonment of untenable positions; and interchangeability of the gun with its companion howitzer of a slightly larger calibre on combination gun-howitzer mounts in order to simplify supply and maintenance problems in the field. Manifestly these conflicting requirements involve considerable compromise. The ingenuity of ordnance engineers has therefore been directed toward securing the most desirable combination of characteristics. To arrive at this result, practically all of the War Departments

of the nations involved in the conflict, as soon as the Armistice afforded proper opportunities, made a special effort to review the artillery situation not only in their own armies but in the armies of all nations involved in the War. In the United States Army this desire to benefit by the lessons of the strife just ended, led to the convening of a Board of Officers with instructions to make an exhaustive study of the entire artillery situation, and then to recommend the types and calibres of artillery which

RATES OF ARTILLERY FIRE PER GUN PER DAY IN RECENT WARS

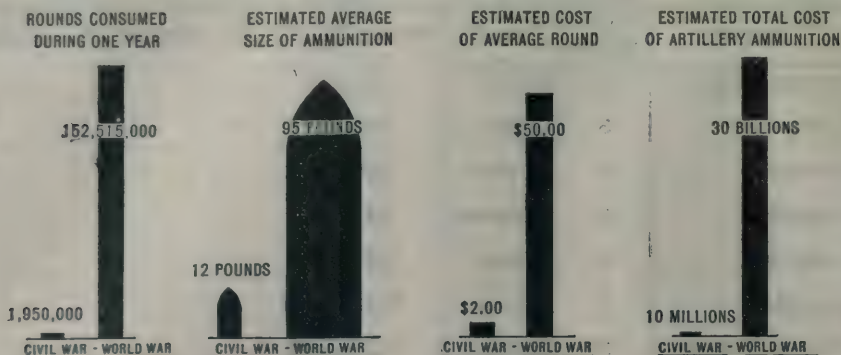
WAR	ARMY	APPROXIMATE ROUNDS PER GUN PER DAY
1854-56, Crimean	Brit. & Fr.	5* ■
1859, Italian	Austrian	.3 |
1861-65, Civil	Union	4 ■
	Austrian	2.2 ■
1866, Austro-Prussian	Prussian	.8 |
1870-71, Franco-Prussian	German	1.1** ■
1904-05, Russo-Japanese	Russian	4 ■
1912-13, Balkan	Bulgarian	7 ■
World War		
September, 1914	French	8** ■
Jan. 1 to Oct. 1, 1918	Italian	8** ■
Jan. 1 to Nov. 11, 1918	United States	30** ■
Jan. 1 to Nov. 11, 1918	French	34** ■
Jan. 1 to Nov. 11, 1918	British	35** ■

* Siege of Sebastopol

** Field gun ammunition only.

COMPARISON OF ARTILLERY AMMUNITION VALUES

CIVIL WAR - WORLD WAR



should be developed for future armament. Similarly constituted Boards of Officers representing the armies of the Allied Powers made extended visits to the United States in the years immediately following the War, admittedly or presumably engaged in similar research. Few of the great nations of the world disclose the details of their ordnance designs, but under the present form of government and existing institutions of the United States, it would be quite impossible to keep secret information of this nature except in time of war. It is probable, however, that the information in regard to recent developments in artillery design published in the United States represents in the main a fair gauge of progress in similar directions in other countries, inasmuch as ordnance information was freely interchanged among the Allied Powers, and successful attempts were made to secure similar information from the authorities of the Central Powers after the Armistice. The following descriptions of artillery matériel may, therefore, be taken as typical of the state of the art of ordnance design and manufacture throughout the world.

Light Field (Division) Artillery. Prior to the War, weight was the determining factor in the design of division artillery. Motor traction had not arrived at a degree of dependability which would justify its employment in manœuvring artillery over varying terrain. The main reliance was still on animal transport, as it had been for the preceding century. Assuming that a horse could pull 650 pounds at all gaits and that a six-horse team was the maximum number that could be manœuvred effectively, 3900 pounds became the maximum weight for any complete single unit of division artillery. Within this limit the ordnance engineers of all countries strove to arrive at the best combination of range, striking velocity and explosive effect on burst. In the United States Army a division field gun 3 inches in calibre, firing a projectile weighing 15 pounds, was adopted as standard, and other countries varied only slightly from these figures. In order to achieve greater hurting effect a heavier projectile carrying a larger explosive charge was needed. Since the degree of mobility of the division gun must be maintained, it was found necessary to design a companion piece, the division howitzer, using a projectile approximately twice as heavy as that of the gun and attaining approximately the same range by providing for greater elevation of the howitzer

carriage than provided by the gun carriage, thereby avoiding the increased weight which would have resulted through strengthening the gun to fire the heavier projectile at low angles of elevation.

During the War, motor transport was developed to a high degree of dependability, and the maximum permissible weight of divisional artillery units was considerably increased. Accordingly, the Calibre Board of the United States Army laid down these requirements for ideal divisional artillery:

REQUIREMENTS OF THE CALIBRE BOARD FOR LIGHT FIELD (DIVISION) ARTILLERY

	Gun	Howitzer
Calibre	About 3 inches	105 millimeter
Weight of projectile	Not over 20 pounds	30 to 35 pounds
Maximum range	15,000 yards	12,000 yards
Carriage to permit elevation of	80°	65°
Traverse	360°	360°
Weight	Not over 4500 pounds	Not over 4500 pounds
Range with normal or reduced charge	11,000 yards	
Rate of fire, rounds per minute	20	

Carriage to be interchangeable for gun and howitzer.

Perfection of split-trail type recommended.

Wheels to have rubber tires when motorized.

Development of self-propelled mounts recommended.

Simple firing mechanism, preferably of lanyard type, desired.

One type of breech block for both gun and howitzer.

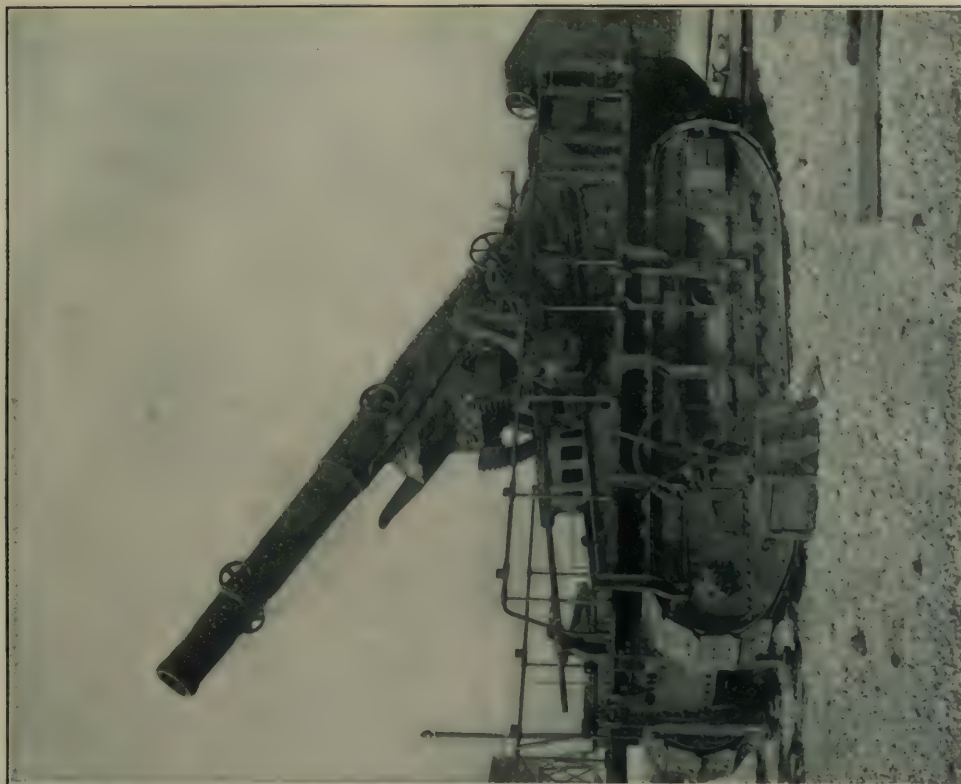
For normal use, a maximum speed of 12 miles per hour.

Division guns and howitzers which gave the required ranges within the prescribed limits of weight were designed and successfully fired, the increase in range over that of pre-War types having been attained principally by improvements in the contour of the projectile and by increasing muzzle velocities of the pieces. Increased velocities necessitated corresponding increases in length of the piece, for the division gun 131.7 inches in the new design as compared with 97.8 inches in the pre-War type. Increased length of the piece in turn made it necessary to support it as near the breech as possible in order to avoid the necessity of digging holes in the ground, to permit recoil of the gun when fired at high elevation. The consequent unbalancing of the gun requires the addition of an equilibrator system to maintain ease of manual elevation. Fortunately

ARTILLERY

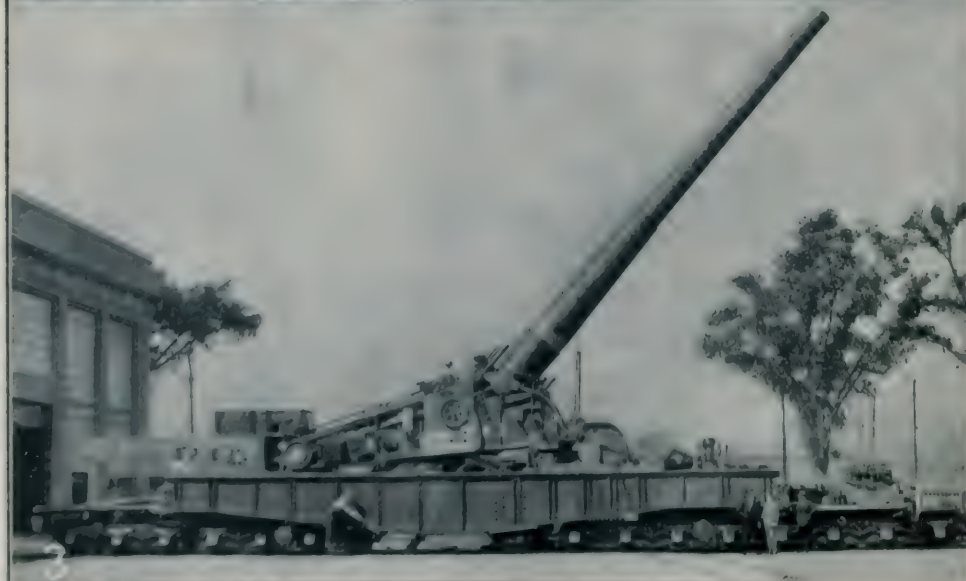


75-mm. Gun, M 1920, on Carriage No. 1 M 1920.
Rear View. 80° Elevation. 0° Traverse.



UNITED STATES ARMY ARTILLERY
240-mm. Howitzer on Mark IV Caterpillar Mount
Side View

ARTILLERY



PHOTOGRAPHS, ORDNANCE DEPARTMENT, UNITED STATES ARMY

UNITED STATES ARMY ARTILLERY

1. EIGHT-INCH HOWITZER NO. 2, 1920, MARK I, Mounted on an 8-inch Howitzer-155-millimeter Gun Carriage, 1920 E, Elevation 45 degrees.
2. A 155-MILLIMETER GUN ON TRAILER MOUNT.
3. FOURTEEN-INCH GUN ON RAILWAY MOUNT.

the increased weight due to the equilibrator system and the increased length of bore is more than offset as far as mobility is concerned by the introduction of dependable motor transport in place of animal transport.

The requirement for a maximum elevation of 80 degrees was due to a desire to provide for possible use against aircraft and added nothing to the maximum range inasmuch as elevation in excess of 45 degrees tends to decrease range rather than to increase it. In order to provide for angles of elevation greater than 45 degrees it was necessary to increase the capacity and therefore the weight of the equilibrator system, to provide variable recoil with consequent increased complication and weight of the equilibrator system. While entirely practicable from an engineering and manufacturing standpoint, complication of design necessary to meet requirements which were outside of the ordinary functions of the piece led to a lowering of the maximum required elevation in the ideal mount from 80 degrees to 45 degrees, at which elevation practically maximum range is secured. Similar experiences led to the reduction in the requirements for maximum elevation of the howitzer from 65 degrees to 45 degrees. A traverse of 360 degrees as originally prescribed for the ideal division gun and division howitzer was likewise caused by a desire to provide a piece suitable for use against aircraft, but this requirement was abandoned in favor of two types of carriages, the split-trail, which permits considerable changes in azimuth without moving the gun carriage, and the box-trail, which permits only a limited change in the azimuth of 10 degrees but reduces complications of design and decreases weight and cost.

The requirement of a carriage to mount interchangeably, both the 75 millimeter gun and its companion piece, the 105 millimeter howitzer, was due to the feeling that it would expedite manufacture in the shops and simplify maintenance in the field. Strict adherence to this requirement, however, necessitated a combination carriage much heavier than either a specially designed gun carriage or howitzer carriage alone. Inasmuch as the howitzer mounted on the combination carriage required elevation mechanism of only 65 degrees, it did not fully utilize the weight of that part of the mechanism needed to provide the 15 degrees greater elevation for the gun. Further, as the howitzer imposed upon the carriage greater firing stresses than the gun, the combination carriage was of necessity made stronger and, therefore, heavier than was absolutely needed when mounting a gun. The need for all possible mobility not only en route but while being manned in action was found to outweigh the theoretical advantages which might be obtained by interchangeability of mounting, and it is entirely probable that in the future the division gun and the division howitzer will each have its specially designed carriage in order to keep the weight down to a minimum and thereby effect the greatest degree of mobility without decreasing power.

The increased application of motor transport to military problems permitted not only the hauling of greater loads at a speed equal to that of animal transport but greatly increased the speed at which these increased loads can be moved. These increased speeds in themselves affected artillery design by necessitating the

rubber-tiring of wheels and in many cases spring-supporting of loads, which had never been found necessary before. Here as elsewhere, no advantage is obtained without an off-setting disadvantage. The application of rubber tires to artillery wheels increases the total weight of the unit by several hundred pounds. Great progress was also made in the design and manufacture of self-propelled mounts for division artillery. Requirements of an ideal mount were set by the Calibre Board at a maximum speed of 12 miles per hour and a maximum weight not to exceed the capacity of a light pontoon bridge, or 9000 pounds. It is an interesting commentary on the rapid advances in automotive engineering that within three years of the establishment of this required maximum speed, a self-propelled mount for 75 millimeter guns or 105 millimeter howitzers actually attained a maximum speed of 30 miles per hour or two and a half times what was deemed possible of attainment when the Calibre Board established its requirements.

Medium Field (Corps) Artillery. These characteristics for ideal Corps artillery pieces were established by the Calibre Board:

MEDIUM FIELD (CORPS) ARTILLERY

	Gun	Howitzer
Calibre	Between 4.7 in. and 5 in.	About 155 mm.
Weight of projectile .	Not over 60 lb.	Not over 100 pounds
Maximum range	18,000 yd. super-charge	16,000 yd.
Range, normal charge	12,000 yd.	Zones
Elevation	- 5 to + 80°	- 5 to + 65°
Traverse	360°	360°
Maximum rate of fire	6 rounds per minute	5 rounds per minute

Generalities:

A split-trail carriage should be developed for howitzer interchangeable, if practicable, with that for gun.

Maximum speed of 8 miles per hour.

Wheels for carriage should be rubber-tired.

Transport fully motorized, with wheel trailers for long rapid hauls.

Weight limit, 12,000 pounds for wheeled vehicles, and 15,000 pounds for caterpillars.

The objections to unnecessarily high elevation and 360 degrees traverse as well as to the interchangeable requirement for the carriage proper are the same as discussed above for division artillery, but the disparity in stresses imposed upon the mount by the corps gun and corps howitzer is even greater than that of the division gun and the division howitzer. Since the carriage had to be designed to mount the howitzer successfully, it was possible to design a gun of even greater power than was at first held to be ideal, and still to adhere to the desired degree of mobility. Accordingly a gun firing a 50 pound projectile to a maximum of 20,500 yards has been found practicable. Self-propelled mounts for either the 4.7 gun or the 155 millimeter howitzer with a maximum speed of 15 miles per hour have been designed, manufactured and successfully tested.

Heavy Field (Army) Artillery. Of still larger calibres are the army artillery where ideal characteristics were formulated as follows:

	Gun	Howitzer
Calibre	About 155mm.	About 8 inches
Weight of projectile .	Not over 100 lb.	Not over 240 lb.
Maximum range	25,000 yd.	18,000 yd.

	Gun	Howitzer
Range, normal charge	18,000 yd.	Zones
Elevation	Zero to 65°	Zero to 65°
Traverse	360°	360°
Type of projectiles	H. E. Shell	H. E. Shell

Self-propelled caterpillar unit desirable for 155mm. gun.

Certain proportion should be retained on rubber-tired wheel mounts.

It is desirable to develop a carriage which can be used interchangeably for 155 mm. gun and 8 in. howitzer.

Maximum speed of S. P. caterpillar 6 m.p.h.; wheel mounts, 12 m.p.h.

Conventional caissons for this calibre are obsolete.

Transport: All of this type should be motorized.

Ammunition vehicles to correspond should be developed.

Requirements of heavy field artillery as given above can be met except in regard to maximum elevation of 65 degrees and traverse of 360 degrees for the reasons previously discussed under division and corps artillery. Unlike the preceding classes, however, it is entirely practicable to design a carriage on which the 155 millimeter gun and 8 inch howitzer can be mounted interchangeably.

REQUIREMENTS FOR SUPER-GUNS

	Guns		Howitzers	
Calibre	8 or 10 in.	14 in.	12 in.	16 in.
Length in calibres	50	50	20	25
Weight of projectile	240-510	1,400	700	1,600
Maximum range	35,000	40,000	25,000	30,000
Elevation	0° to 50°	0° to 50°	25° to 60°	25° to 65°
Traverse	360°	360°	360°	360°
Type of projectile	H. E.	H. E.	H. E.	H. E.
Time for occupying position—				
Prepared	1 to 4 hrs.	8 hours	1 hour	1 hour
Unprepared	1 shot, 2 minutes			
Maximum rate of fire	Stand-ard, 60°	Stand-ard	Stand-ard	Stand-ard
Gauge of Track	cm.—24 in.	12-in.		
Ammunition for all cannon:	Smokeless, flashless.			
Related zone charges for howitzers.				
Fuses:	Bore safe, instantaneous, and selective delay.			

Of the super-guns listed above, a 14 inch 50 calibre gun on a railroad mount has been designed, manufactured and successfully tested. The 16 inch 25 calibre howitzer has also been successfully fired from a barbette carriage. This howitzer can be used in combination with the railroad mount for the 14 inch 50 calibre gun.

Coast Defense Artillery. The superiority of land fortifications over battleships where land guns have approximately the same range as those on the ships has always been accepted by artillery authorities. The failure of the joint British and French naval attacks on the Turkish coast defenses at the Dardanelles and the lack of success which attended the constant shelling of hastily erected German defenses on the Belgian coast, supplemented by bombing from the air, strengthened the contention that battleships cannot hope to attack with success coast fortifications provided with armament of approximately equal power. However, due to the increased elevation and the correspondingly greater range of guns mounted on battleships built since the War, artillery intended for coast defense purposes must of necessity be provided with carriages permitting elevation to develop the maximum range of the piece. In 1914 the American 14 inch 40 calibre gun

mounted on a disappearing carriage and the 12 inch long range mortar were typical of standard heavy coast defense armament. Through the development of airplane carriers to accompany attacking fleets, and the steeper angle of fall of projectiles fired at the 30 degrees to 40 degrees elevation now required for long range naval fire and provided in recent designs of battleships, the protection formerly given to guns mounted on disappearing carriages by extensive concrete emplacements was materially diminished. This consideration, together with the difficulty encountered in providing the required high angles of elevation on disappearing carriages, resulted in the adoption of the simpler barbette carriage for future installations. The best example of modern high-powered coast defense artillery is probably in the 16 inch 50 calibre gun mounted on a barbette carriage following designs of the United States Army Ordnance Department. This gun is of wire-wound construction, is approximately 70 feet in length over all, and with its recoil band weighs about 200 tons. It is equipped with a drop breech-block of the Smith-Asbury type, operated by compressed air. The normal charge for this gun consists of 850 pounds of smokeless powder, giving a maximum interior pressure of 38,000 pounds per square inch. With this charge a range of 50,000 yards is given an armor-piercing projectile weighing 2340 pounds and capable of penetrating 14 inches of battleship armor at all ranges. The barbette carriage on which this gun is mounted is simple and rugged in design; yet it has adequate provision for rapid and accurate manœuvring of the gun. The recoil of the gun is controlled by four recoil cylinders symmetrically located and integral with the cradle. The energy generated on discharge of the piece is dissipated by forcing oil through throttling grooves in the wall of each cylinder as the piston rods and heads securely fastened to the recoil band of the gun move to the rear with it. The piston rod pull amounts to 1,250,000 pounds for every 40 inches of recoil, so that the recoil cylinders dissipate 4,567,000 foot-pounds of energy each time the gun is fired. To insure the rate of fire of one round per minute, a power rammer is located on the racer near the breech of the gun. The powder charge and projectile are brought up to the carriage on special cars and rammed home by means of an electric motor actuating the rammer through hydraulic speed gears. The carriage is equipped so that all operations are normally performed by electric or mechanical power, but the mechanisms are so arranged as to permit manœuvring by hand power in emergencies.

German Long Range Guns. All military weapons are appraised, in general, on the basis of the amount of destruction they can cause. If the performance of the German long range guns used for the bombardment of Paris from Mar. 23 to Aug. 9, 1918, are judged on the usual basis, they must be set down as failures. The casualties caused by them averaged only about two and a half per round, notwithstanding that a thickly populated city was being bombarded. The property damage per round fired was approximately that of an ordinary 6 inch shell and in the aggregate was of negligible military value. However, these guns were not primarily weapons of destruction but were rather psychological weapons, for their purpose was served

when the German High Command was able to say without fear of contradiction that their troops were bombarding Paris by artillery fire. At first, no mention was made in their communiqués that super guns of much greater range than had ever before been even proposed for use in battle were responsible for the artillery bombardment.

The known fact that Paris was under fire of German artillery served two purposes. First, it greatly heartened the German civilian population as well as troops in the field with the knowledge that the ultimate goal had practically been reached. Secondly, it caused consternation among the civilian population of the Allies, who could not at first believe but that the Germans had succeeded in arriving at the gates of Paris. Before it was learned that the shells were coming from guns situated more than 75 miles from the city, a considerable exodus of Parisians to the South and West of France threw such a load on the railroad systems that a serious interference with the movement of supplies and troops was narrowly averted, but when the French technical experts had succeeded in reconstructing the projectile from fragments found at the point of burst and had deduced from their angle of fall the exterior ballistic characteristics which must have been used to produce the observed results, the situation was immediately relieved.

Although over 300 shells fell in the environs of Paris, none of them was known to have failed to explode. Exact information in regard to the ammunition remained unavailable. The guns themselves were withdrawn into Germany and broken up prior to the Armistice. Although the terms of this undertaking provided for delivering one of these pieces to the Allies, Germany never lived up to the agreement, and exact information as to the design of the gun and carriage still remains in the sole possession of the small group of Germans who conceived and successfully carried out this spectacular performance. As an artillery curiosity, this type of gun attained a range never before considered possible and also demonstrated that greater range could be attained at an angle of 50° elevation than the previously accepted 42° or 43°, provided that extremely high muzzle velocity was used and the projectile attained extremely high altitudes early enough in its flight to get full benefit from the more highly rarefied strata of air, instead of attempting to force the projectile against denser strata of air encountered at lower altitudes.

The following table gives the characteristics of the German Long Range Gun as computed by Maj. J. Maitland Addison of the British Army and in a parallel column, the reconstructed characteristics as determined by the French General Staff.

	British	French
1. Range in miles	76	76
2. Maximum height in miles ...	23.9	23.7
3. Time of flight in seconds ...	177	177
4. Muzzle velocity, ft. per second	5,000	5,620
5. Angle of elevation	50°	48°-39'
6. Velocity of Vertex, ft. per second	2,267	2,270
7. Velocity point of fall, ft. per second	2,626	2,380
8. Ballistic coefficient	10	8.78
9. Angle of fall	54-40	54-51
10. Weight of projectile in pounds	330	265
11. Calibre in inches	8.3	8.66
12. Weight of powder in pounds ...	400	441
13. Length in calibre	130	168

SUPP.—8

	British	French
14. Maximum pressure, lbs. per sq. in.	47,000	57,000
15. Volume of powder chamber in cu. in.	22,000	21,400
16. Volume of bore in cu. in.	70,700	88,500
17. The breech construction to be either of a number of powder chambers in the gun itself or a specially designed cartridge case to give successive or prolonged explosions of increment powder charges.		

Bibliography. The most satisfactory source of information on modern artillery is the current issues of the magazine *Army Ordnance* published at Washington by the Army Ordnance Association. There are also various official pamphlets published by the War Department. Few if any authenticative treatises dealing with modern artillery were produced after the Great War. See EXPLOSIVES; ORDNANCE; TRENCH WARFARE; ARMIES AND ARMY ORGANIZATION; STRATEGY AND TACTICS.

ARTS AND LETTERS, AMERICAN ACADEMY OF. A society founded in 1904 by seven members of the National Institute of Arts and Letters in emulation of the French Academy. The membership is limited to fifty; vacancies are filled by election by the members from the National Institute on the basis of a lifetime achievement in literature, painting, sculpture, architecture, or music. Twice during the decade the gold medal of the Academy was awarded: to Dr. Charles W. Eliot, president emeritus of Harvard University, in 1915, and to Mrs. Schuyler Van Rensselaer, for distinction in literature. In 1921 the Academy received the gift of a four-story building at West 81st Street, New York, which it occupied to February, 1923. The Academy also received a gift of \$200,000 for the purpose of erecting a building at 633 West 155th Street, New York; the corner stone was laid by Marshal Foch in 1921 and the building was completed and opened in 1923. The centennial of the birth of James Russell Lowell was celebrated in 1919, and the tercentenary of the birth of Molière was commemorated in 1922.

The complete list of members in 1924 was as follows: John Singer Sargent, Daniel Chester French, James Ford Rhodes, William Milligan Sloane, Robert Underwood Johnson, George Washington Cable, Henry van Dyke, William Crary Brownell, Arthur Twining Hadley, Henry Cabot Lodge, Edwin Howland Blashfield, Thomas Hastings, Brander Matthews, George Edward Woodbury, George Whitefield Chadwick, George de Forest Brush, William Rutherford Mead, Bliss Perry, Abbott Lawrence Lowell, Nicholas Murray Butler, Paul Wayland Bartlett, Owen Wister, Herbert Adams, Augustus Thomas, Timothy Cole, Cass Gilbert, Robert Grant, Frederick MacMonnies, William Gillette, Paul Elmer More, Carl Melchers, Elihu Root, Brand Whitlock, Hamlin Garland, Paul Shorey, Charles Adams Platt, Archer Milton Huntington, Childe Hassam, David Jayne Hill, Lorado Taft, Booth Tarkington, Charles Dana Gibson, Joseph Pennell, Stuart Pratt Sherman, John Charles Van Dyke. On the death of William Dean Howells, who had been president of the Academy since its foundation, William Milligan Sloane, formerly chancellor, became president, and was succeeded in the chancellorship by Brander Matthews, who resigned in 1924, and was in turn succeeded in the chancellorship by Nicholas Murray

Butler. Robert Underwood Johnson was secretary throughout the period.

ARTZYBASHEF, MIKHAIL PETROVICH (1878-), Russian novelist (see VOL. II). He produced little after 1914, but his earlier works were translated into English, and his reputation spread to Anglo-Saxon countries. *Sanin* was translated in 1915, as was also *U poslednei chertiy* (*The Breaking Point*). *Voina* was put into English in 1918 as *War*. Other works brought before the English-reading public were *The Savage* and the plays, *Jealousy*, *Enemies*, and *The Law of the Savage* (1923).

ARZ VON STRAUSSBURG, ARTHUR BARON (1857-). An Austro-Hungarian general, born at Hermannstadt, Transylvania. At the beginning of the War he commanded the 15th Division on the Russian front, and later the command of the 6th Army Corps was given to him. Acting in conjunction with General Freiherr von Roth, he was successful in halting the Russian offensive. In 1915 he was associated with Mackensen in the vicinity of Przemyśl and later took Brest-Litovsk. In 1916 he commanded the 1st Army and defended Transylvania against the Rumanians. He was appointed to succeed Conrad von Hotzendorf as chief of the general staff of the Austro-Hungarian armies.

ASAKAWA, KWAN-ICHI (1873-). An American university professor and author of works on Japan. He was born at Nihonmatsu, Japan, and educated at the Fukushima Middle School, Waseda University (Tokyo, Japan), Dartmouth College, and Yale University. He was lecturer on the history and civilization of Eastern Asia at Dartmouth College in 1902; professor of English at Waseda University, 1906-7; and instructor in the history of Japanese civilization in Yale University, 1907-10. He became an assistant professor at Yale in 1910. He carried on special investigations in Japan, 1906-07 and 1917-19. He is author of many works on Japan of sound, dispassionate scholarship. These include *The Early Institutional Life of Japan* (1903); *The Russo-Japanese Conflict—Its Causes and Issues* (1904); *The Origin of Feudal Land-Tenure in Japan* (1914), and *Some Aspects of Japanese Feudal Institutions* (1918). His works also include contributions to the publications *Japan* edited by Capt. F. Brinkley (1904); the *History of Nations Series* (1907); *China and the Far East* (1910); *Japan and Japanese-American Relations* (1912); and *The Pacific Ocean in History* (1917).

ASCH, SHOLOM (1880-). A Yiddish playwright and popular producer of fiction who came to the United States at the age of 30 after establishing a reputation as a novelist and dramatist in Germany and Russia. In 1907 Max Reinhardt produced his *God of Vengeance* in Berlin. The beauty and poetry of Asch's early work in novel and sketch are due to a certain literary naïveté enabling him to express himself most completely. His plays are considered inferior to his other work. As a dramatist he takes great liberties with his forms, but as a craftsman he has the requisite elements of the art. His later dramatic pieces include *Die Familie Grossglück*, *Der Bund der Schwachen*, *The God of Vengeance*, *Jephthah's Tochter*, and *Shabbethai Zebi*. Other published works include *Uncle Moses*, *Mottke the Vagabond*, and other stories of Jewish life. As an

artist Asch is rather to be classed with the modern Russian novelists and playwrights than with any of his Yiddish contemporaries.

ASCHAM, JOHN BAYNE (1873-). A Methodist Episcopal clergyman and author, born at Vanlue, Ohio, and educated at Ohio Wesleyan University, Harvard University, and Boston University, in Italy and Germany, and at the American School of Oriental Research in Jerusalem. He entered the ministry in 1897 and was ordained in 1899. He served in various churches in Ohio and was chaplain with the American army in France, at Allerey, 1918-19. He was special visitor from the American Waldensian Aid Society to the Waldensian Church of Italy in 1921, and in the same year he was delegate to the Fifth Ecumenical Methodist Episcopal Conference in London. Besides being a contributor to religious journals, he is author of *Help from the Hills* (Cincinnati, 1910); *A Syrian Pilgrimage* (New York, 1914); *The Religion of Israel* (New York, 1918); *The Religion of Judah* (New York, 1920), and *Apostles, Fathers, and Reformers* (New York, 1921).

ASCHE, OSCAR (1872-). An Australian actor, born at Geelong. He was educated at the Melbourne Grammar School and studied for the stage at Christiania, Norway. His first appearance was at the Opéra Comique. Subsequently he played Shakespearean repertory for eight years with F. R. Benson and joined Sir Herbert Tree's company in 1902. In the following year he acted with Ellen Terry in *The Vikings*. With Otho Stuart he managed the Adelphi Theatre in 1904; in 1907 took over the management of His Majesty's Theatre in London. Tours of Australia and South Africa followed. It was in 1916 that he appeared as Abu Hasan in his own play *Chu-Chin-Chow*, which reached its 2238th performance in July, 1921, thereby breaking all records of previous stage successes. With F. Norreys Connell he wrote *Count Hamnibal* (1910); he is also the author of *The Spanish Main* (1915), *Chu-Chin-Chow* (1916), *Eastward Ho!* (1919), and *Mecca* (1920).

ASHANTI. A British protectorate in West Africa on the Gulf of Guinea, included in the Gold Coast Colony. It has an estimated area of 12,000 square miles, and in 1921, a population of 407,000, of whom 400 were Europeans. Though administratively Ashanti is an independent unit with a local judicial system in which the natives play an increasingly important part, economically it is to be considered a division of the Gold Coast. Railroad revenues and custom duties are all credited to the entire colony, with the result that the two territories cannot be disassociated (see GOLD COAST). Startling growth appeared in the native industry of cocoa-culture, the output increasing from 9000 tons in 1913 to 44,000 tons in 1921. The result was an increase in native prosperity and the appearance of private property. On the other hand, the gold output steadily dwindled, the 1921 yield having been 85,000 ounces (valued at £361,300), as compared with the 1911 yield of 124,000 ounces (valued at £530,800). The native population consistently remained tranquil; schools were spreading through the protectorate; about 400 miles of motor road were built; European imports increased. In short, Ashanti was an example of a native African state rapidly on the road toward Europeanization.

ASHFIELD, ALBERT HENRY (1874-). An English politician born at Derby. He was educated at technical schools in the United States, and after successful American experience in railway management, he returned to England to undertake important positions in the same field. In 1916 he was included in Lloyd George's government as president of the Board of Trade (1916-19), for business rather than political reasons. He was knighted in 1914.

ASHLEY, ROSCOE LEWIS (1872-). An American author of works on civics and history. He was born at Rochester, N. Y., and educated at the University of Rochester and Columbia University. He has been a member of the executive committee of the National Council of Teachers of Social Studies. His special interest has been the improvement of high school courses and texts. He has published *The American Federal State* (1902); *American Government*, for use in secondary schools (1910); *Ancient Civilization* (1915); *Early European Civilization* (1916); *Medieval Civilization* (1916); *Modern European Civilization* (1918), *The Practice of Citizenship* (1922), and other works.

ASHMUN, MARGARET ELIZA (?-). An American writer of stories for girls and books for English study. She was born at Rural, Wis., and educated at the Stevens Point (Wis.) Normal School and the University of Wisconsin. After teaching in schools, she was instructor in English at her alma mater from 1907-12. Besides contributing to magazines, she is author of several English textbooks, and *Stephen's Last Chance* (1918); *Marion Frear's Summer* (1920); *Topless Towers* (1921); *Including Mother* (1922), and *Support* (1922).

ASHURST, HENRY F. (1875-). United States Senator from Arizona, born at Winnemucca, Nev., and educated at the University of Michigan. He began the practice of law in 1897 at Williams, Ariz., and was admitted to practice before the Supreme Court of the United States in 1908. He was district attorney of Coconino County, Ariz., 1905-08. During these years he was active in politics. He was elected to the Legislature of Arizona in 1897, 1899, and 1903, and in 1899 was the youngest man who ever held the office of Speaker of such a body in the United States. In 1911 he was elected to the United States Senate on the Democratic ticket and was re-elected in 1917. He was active in the debates in the Senate, and was at many times member of important Senate committees.

ASIA. See **EXPLORATION, Asia**; **ETHNOGRAPHY.**

ASIA MINOR. See **TURKEY**; **SMYRNA**; **ARMENIA**; **CHILICIA**; and other divisions. See also **ARCHAEOLOGY.**

ASIR. See **ARABIA.**

ASKWITH, GEORGE RANKIN (1861-). An English lawyer and arbitrator in industrial disputes, born in Morley, Yorks, and educated at Marlborough and Brasenose College, Oxford. He was knighted in 1911 in recognition of the services he rendered his government. He was conciliator in many trade disputes, and in 1907 he was Assistant Secretary of the Board of Trade, in 1911 chairman of the Industrial Council and chairman of the Fair Wages Advisory Committee (1909-1919), president of the Middle Class Union (1921), and president of the

British Federation of Iron, Steel, and Triplate Merchants (1920-22). He was raised to the peerage in 1919.

ASPHALT. The production and manufacture of asphalt in the United States in the years 1914-24 involved native asphalt and related bitumens. Of these substances, 92,604 short tons valued at \$750,713 were produced in 1913, but this production had increased to 327,792 tons, valued at \$2,253,180, coming principally from Utah, Oklahoma, Texas, California, and Kentucky. In addition, considerable asphalt was manufactured in the United States from petroleum, both domestic and Mexican. With the growth and extension of the western oil fields an important industry was developed in recovering petroleum asphalt from crude petroleum oils of so-called asphalt-base obtained from California, Texas, and the mid-Continent fields of the United States, while crude oil from Mexico was also treated for this purpose at the various refineries. Three main processes were employed in the United States, steam refining, air refining, and a combination of steam and air refining. The largest amount was supplied by the use of the last process, which produced a ductile asphalt with highly cementatory qualities.

In 1913 the asphalt manufactured from domestic petroleum sold at the refineries, in the United States amounted to 436,586 short tons, valued at \$4,531,657. An important increase was effected by 1922, when the output was 805,145 short tons, valued at \$10,385,925. In the latter year California was the principal producer, with nine operators; Texas had three, and Illinois five. Fourteen American manufacturers were producing asphalt from petroleum of domestic origin exclusively, and 10 from petroleum of Mexican origin.

The imports of asphalt and bitumen which came into the United States free of duty in 1923 amounted to 129,138 tons, valued at \$1,079,906. In 1922 Barbados, Trinidad, and Tobago supplied the United States with 85,480 short tons valued at \$721,891, and Venezuela with 37,449 short tons valued at \$247,920, out of a total of 124,639 short tons valued at \$1,000,463. In 1922, 57,362 short tons of unmanufactured asphalt to a value of \$1,344,440 were exported, along with manufactured material worth \$1,261,125, including 58,845,352 square feet of roofing asphalt valued at \$870,200. This made a total value of asphalt manufactured and unmanufactured, exported from the United States, of \$2,605,565.

The asphalt and asphaltic materials manufactured in the United States from petroleum and sold at the refineries were used for paving, roofing, waterproofing, mineral rubber, road oil, and other purposes. In most of these fields demand had increased in the 10 years, and the corresponding industries had developed. See **PETROLEUM**; **ROADS AND PAVEMENTS.**

ASSOCIATION TESTS. A technique devised by the Swiss psychiatrist, Dr. C. G. Jung, for probing into a patient's neuroses. A list of words is read to the patient, who is asked to respond each time with the first word that comes to mind. By charting the time of response and by studying the patient's demeanor for any symptoms of emotion, the psychiatrist is able to get an insight into the type of ideas which worry him and by means of these to diagnose his condition. Dr. Jung also uses the

association test in preparation to the interpretation of a dream.

ASQUITH, HERBERT HENRY (1852-). A British statesman and former prime minister (see Vol II). The months following the outbreak of the War found Mr. Asquith, as premier, beset by many vexing problems. The question of conscription, the placing of the country's industries on a war footing, the turbulence of labor, and the series of unfortunate military expeditions, notably the Dardanelles campaign, on which the military command had embarked, embarrassed his ministry and aroused general discontent. In May, 1915, as a result of popular pressure, he was compelled to form a Coalition government, which included most of the prominent Unionist leaders and two Labor members. Mr. Asquith's hesitations and delays, however, estranged many of his colleagues, with the result that Winston Churchill, Sir John Simon, and Sir Edward Carson resigned from his cabinet in dissatisfaction. Meanwhile his position rapidly became insupportable as a result of the loss of Lord Kitchener, who had been one of the mainstays of his government, failure to terminate the War speedily, and his inability to tighten the lines of the German blockade. The end came with the sudden resignation (Dec. 5, 1916) from his cabinet of Lloyd George, who had become identified by the country with a programme of vigorous aggression. Mr. Asquith's resignation soon followed, and thus ended a premiership of nine years. Until the end of the War he supported the Coalition from the front opposition bench, but his decision to champion the Liberal principles once more met with a setback in his defeat in Lloyd George's khaki campaign of 1918. In 1920 he returned to Parliament as the result of a by-election. From then to 1922 he labored unceasingly in the interests of his party, but how little he had succeeded in restoring its prestige was shown by the election of November, 1922, when Labor moved up to second place and thus became the party of opposition. In 1918 Mr. Asquith published *Occasional Addresses*, a volume of his speeches, and *The Genesis of the War* in 1923.

ASQUITH, MARGOT (TENNANT) (1864-). English society was very much perturbed when Mrs. Asquith's *An Autobiography* appeared in 1920. By a few it was regarded as remarkable, while others refused to take her publication as anything but a bid for publicity through impertinent self-esteem. She is the wife of Herbert Asquith, former premier of England.

ASTOR, NANCY WITCHER LANGHORNE, VIS-COUNTESS, (1879-). An American by birth and the first woman member of the British Imperial Parliament. She was the daughter of Chiwell Dabney Langhorne of Virginia and is the wife of Viscount William Waldorf Astor. When she won the election in Plymouth as Coalition Unionist candidate, it was not as a woman wholly ignorant of politics that she took her place in the House of Commons. She had always taken an active interest in her husband's former constituency. By her devotion to the welfare of English women and the younger generation, and her vivacious personality, the former Nancy Langhorne has received the admiration of her native and adopted country.

ASTRONOMY. The period 1914-24 witnessed rapid extensions of astronomical knowledge; new and powerful methods of investigation, leading to accomplishments formerly un-

dreamed of, opened up whole new fields of inquiry and provided data for the solution of many problems of astronomy which used to be regarded as hopelessly beyond the power of man to solve. One of the most significant features of contemporary astronomical research is its tightening connection with the sciences of physics and chemistry; scores of illustrations might be advanced to show how often the clue to fundamental physical and chemical problems may be found in the stars, and, conversely, how frequently advances in pure physics aid in the solution of astronomical problems. Close relations are now maintained at Pasadena, Cal., between the Mount Wilson Observatory, the Gates Chemical Laboratory, and the Norman Bridge Physical Laboratory, to the great mutual advantage of astronomy, physics, and chemistry.

The Solar System. Sun. The spectroheliograph, enabling photographs to be taken in the light of a single chemical element at any desired level in the solar atmosphere, has revealed many remarkable details of structure entirely lost in ordinary photographs, which confuse all levels and the light from all elements in one picture. Investigations with this instrument, by Hale and others, have demonstrated that sunspots are great whirling or vortical storms in the solar atmosphere. The motion of the vapors overlying the spots is radially outwards from the centre of the spot in the lower levels and inward in the higher levels; renewed visual investigation of spot structure is needed to harmonize this low level outflow with the visual appearance of inflow in the penumbra. The actual vortex appears to be deep-seated, beneath the photosphere, with its top near the reversing layer; the inflow from the chromosphere, which causes the vortices exhibited by the hydrogen flocculi, is a secondary effect produced in the high levels, where the direction of whirl may be independent of that of the spot vortex below.

Shortly after J. J. Thomson and others had shown that negatively and positively electrified particles must occur in great numbers in a hot gaseous body like the sun, Hale, by means of the Zeeman effect, found that a magnetic field existed in and about every sunspot. This field presumably is produced by the vortical whirling of charged material, preponderantly of one sign, although no Stark effect has been detected in the solar spectrum and it seems almost certain that no electric field exists in the spots. The strength of the magnetic field increases, up to a maximum of 3500 gauss, with the diameter of the spot. "Invisible sunspots" have actually been detected at Mount Wilson by searching for evidences of their Zeeman effect in promising regions, and this confirms the view that a spot represents a vortex which becomes visible only when cooling due to expansion is sufficiently great to produce a perceptible decrease in the brightness of the photosphere. The sun has been found to possess a general magnetic field also, the intensity of which diminishes rapidly with altitude above the photosphere; its maximum intensity is about 50 gauss.

Sixty per cent of the spots are definitely bipolar; they consist of two spots or groups of spots of opposite magnetic polarity, as if they represented the two ends of a single vortex filament; 30 per cent of the remainder show a tendency toward the bipolar type. Before the

sunspot minimum of 1912, the western member of each pair in the northern solar hemisphere was of South or negative polarity, the eastern member of North polarity, and vice versa in the southern hemisphere; these conditions were exactly reversed in the spots of the next cycle, the western members in the northern hemisphere being of North polarity; and another reversal, back to the conditions existing prior to 1912, took place at the minimum of 1923. Assuming, as seems probable, that the sign, as yet unknown, of the dominant charge is the same in all solar vortices, opposite polarities indicate opposite directions of whirl; and the reversal of polarities at minimum represents a periodic reversal of direction of whirl. The true period of solar changes is hence 22 years instead of 11.

Four belts are prolific in prominences, two of which coincide with the sunspot zones; and although the number of prominences is roughly proportional to the number of spots, O. J. Lee and Mr. and Mrs. Maunder have shown that there is rarely any direct association between the two phenomena, as was formerly thought to be the case. The corona continued to be a puzzle. Strong polarization, extending to more than a solar diameter from the limb at the eclipse of June 8, 1918, was found, indicating the presence of reflected sunlight. The usually prominent green line in the spectrum was hardly visible at the eclipse of Aug. 21, 1914, while a previously unknown intense red line appeared. Many faint lines in the solar spectrum were identified with the lines composing the bands of various compounds.

Solar Radiation Studies. At the Astrophysical Observatory of the Smithsonian Institution, instruments and methods for measuring the intensity of solar radiation were constantly improved. Two additional stations were established, at Calama, Chile, and on Mt. Harqua Hala, Ariz. The striking accord between individual observations taken simultaneously at different stations during a period of two years seems to show conclusively that the sun is a variable star, to a considerable per cent. The solar constant is low during years of solar quiescence and high during the years of sunspot activity; and in addition to this 11-year variation, it exhibits irregular fluctuations extending over periods of a few days or weeks.

It has been observed that when sunspots form or grow or are brought into view by the solar rotation, higher radiation values occur on the same day; but low values occur when spots transit across the central diameter of the solar disk, as if veiling coronal rays of diminished transparency extended out nearly radially from the spots. After taking into account this inequality of radiation in different directions, measurements of the variations in the brightness of Saturn show almost exact correlation with the fluctuations in the solar radiation.

Planets and Satellites. The radiation, exclusive of reflected sunlight, emitted by the planets, has been found to indicate large rises in temperature under the influence of solar radiation for the surfaces of Mars and the moon; Jupiter and Saturn have higher temperatures than could be maintained by solar radiation alone; the surface temperature of Mercury appears to be about the same as that of the moon, indicating a short period of rotation and a negligible atmosphere. Spectroscopic

studies of Venus have resulted in conclusive proof of the absence of both oxygen and water vapor above the visible cloud surface. Nearly 1000 minor planets have permanent numbers at the present time. It is now certain that no intra-Mercurial planets exist. A ninth satellite of Jupiter, moving in a retrograde direction in an orbit interlocked with that of the eighth satellite, was discovered by Nicholson at the Lick Observatory in 1914.

Comets and Meteors. No comets conspicuous to the naked eye put in their appearance between 1914 and 1924. The earth narrowly escaped a collision with Pons-Winnecke's comet in June, 1921. There is no evidence at present of any comet having entered the solar system from without; all appear to travel in genuine ellipses of extreme eccentricity. H. N. Russell has shown that the supposed cometary families of Saturn, Uranus, and Neptune have little or no foundation in fact; that of Jupiter, however, is genuine. Hoffmeister presented evidence tending to show that the majority of meteors are sporadic bodies that have entered the solar system from without and are traveling in strongly hyperbolic orbits.

The Sidereal Universe. Past researches on the fundamental problems of sidereal astronomy had to deal with data limited to a comparatively small number of stars; this is rapidly ceasing to be the case. The Harvard Observatory had completed the Henry Draper catalogue, which contains the positions, magnitudes, and spectral types of over 225,000 stars, covering the whole sky and extending in places to the tenth magnitude or below. Work on the Astrographic Catalogue, the Kapteyn Selected Areas, and other great projects was rapidly nearing completion in 1924. Through the use of photography, the determination of stellar magnitudes (photographic and photovisual), color indices, and trigonometric parallaxes was greatly accelerated; and the number of known proper motions and radial velocities was steadily increasing. Accurate measurements of the heat from the stars are now possible by the use of Coblentz's improved thermocouple; and Abbot, with a spectrophotometric apparatus capable of detecting temperature differences of 1/100,000,000 degree, has determined the spectral energy distribution and effective temperatures of several of the brighter stars.

The most spectacular achievement was the measurement, at the Mount Wilson Observatory, of the angular diameters of several stars by means of an apparatus (devised by Michelson) consisting essentially of a 20-foot interferometer attached to the 100-inch reflector. On the night of Dec. 13, 1920, Betelgeuse was found to have a disk 1/20 of a second of arc in diameter; the parallax is not known accurately, but the star cannot be less than 200,000,000 miles in diameter. Antares and Arcturus have been found to be 400,000,000 and 21,000,000 miles in diameter, respectively.

Physical Conditions in the Stars. Over 99 per cent of the stars fall into the spectral types B, A, F, G, K, and M on the Harvard Classification (corresponding to Types I-III of Secchi), which form a continuous and linear series; this is strong evidence that the principal differences in stellar spectra arise in the main from the variation of a single physical condition in the stellar atmospheres, and it is now generally agreed that this condition is temperature. If

we could gradually heat up a red star, the numerous metallic lines would fade out and the lines of helium, nitrogen, etc., would appear.

Saha, of the University of Calcutta, has shown that this would take place without any change whatever in the chemical composition of the stellar atmospheres, and he has thus cleared up some of the most puzzling problems of solar and stellar spectra. For example, the H and K lines of calcium, which are produced in the highest levels of the solar atmosphere far above the luminous region of sodium, magnesium and other lighter elements, are the enhanced lines due to a calcium atom which has lost one electron, the fundamental line of neutral calcium being that at wave length 4227; in the high levels of the chromosphere, where the ionization, which is only partial at the higher pressures of the lower levels, becomes complete, neutral calcium disappears, while the lines representing the ionized atoms remain conspicuous; but the lines corresponding to the ionized atoms of the other elements present fail to appear because they happen to lie in the extreme ultraviolet.

The percentage of ionized atoms depends upon temperature and pressure. As we pass from the cooler to the hotter stars we find the easily ionized atoms of the metals losing one electron. As the percentage of ionized atoms grows, the ordinary lines of the metals grow weak and vanish, while the spark lines appear and strengthen; at still higher temperatures the ionized atoms lose a second electron and pass into a state in which they give rise to practically no lines at all in the visible spectrum, while the lines of hydrogen and helium, difficult to excite at low temperatures, appear. The stellar spectra unfold to us in an unbroken sequence the physical phenomena which succeed each other as the temperature varies from 3000° to perhaps 30,000°C.

The spectral lines are produced in the outermost, highly rarefied regions of stellar atmospheres. It is now possible to find the order of magnitude of the pressures existing in the solar and stellar reversing layers; St. John, Fowler and Milne find it to be negligibly small—perhaps that of the gas in the vacuum arc—contrary to what was formerly supposed. The surface temperatures are also computable and run from about 16,000°C. for spectral type B2 to 3000°C. for K5. Deep in the interiors of the stars the temperatures probably run to millions of degrees.

The *absolute magnitude* of a star is defined as the magnitude it would have if at a distance corresponding to a parallax of 0.1 seconds of arc. Obviously, the *apparent* magnitude depends jointly on the absolute magnitude and the real distance of the star, and the absolute magnitude in turn is determined by the intrinsic luminosity per unit surface area and the size of the star. It is to be expected that stars having the same type of spectrum, and hence the same temperature, will have the same surface brightness; if they differ in absolute magnitude, it will be by virtue of a difference in size. The differences in the sizes of the stars are mainly due to differences in density; for in striking contrast to the enormous range of observed stellar luminosities, corresponding to a light ratio of over 100,000,000 to one, stands the comparative uniformity of stellar masses, as the

study of the binary systems has shown. With very few exceptions, the masses of the stars lie between $\frac{1}{2}$ and 15 times that of the sun, the majority of them between $\frac{1}{2}$ and two times the sun's mass. It is found that stars of the same spectral type, but differing in absolute magnitude, exhibit slight differences in the character and intensity of those spectral lines that are peculiarly sensitive to the physical conditions under which they are produced; these variations in the lines are brought about by the differences in density and depth of the stellar atmospheres. By a study of the spectra of stars of known parallax, curves may be drawn connecting the differential intensities of selected lines with absolute magnitude, by spectral types, and then applied empirically to deduce the absolute magnitudes; and hence the parallaxes, since the apparent magnitudes can be measured, of other stars. This method, worked out by Adams and Kohlschütter, has been extended to practically all spectral types; and completely independent determinations of spectroscopic parallaxes at Mount Wilson and at Victoria are in good agreement except for the late type K stars. The most far reaching result of the study of the data provided by these new methods of sounding interstellar space has been the discovery of the existence of two great classes of stars to which the names giant and dwarf have been applied.

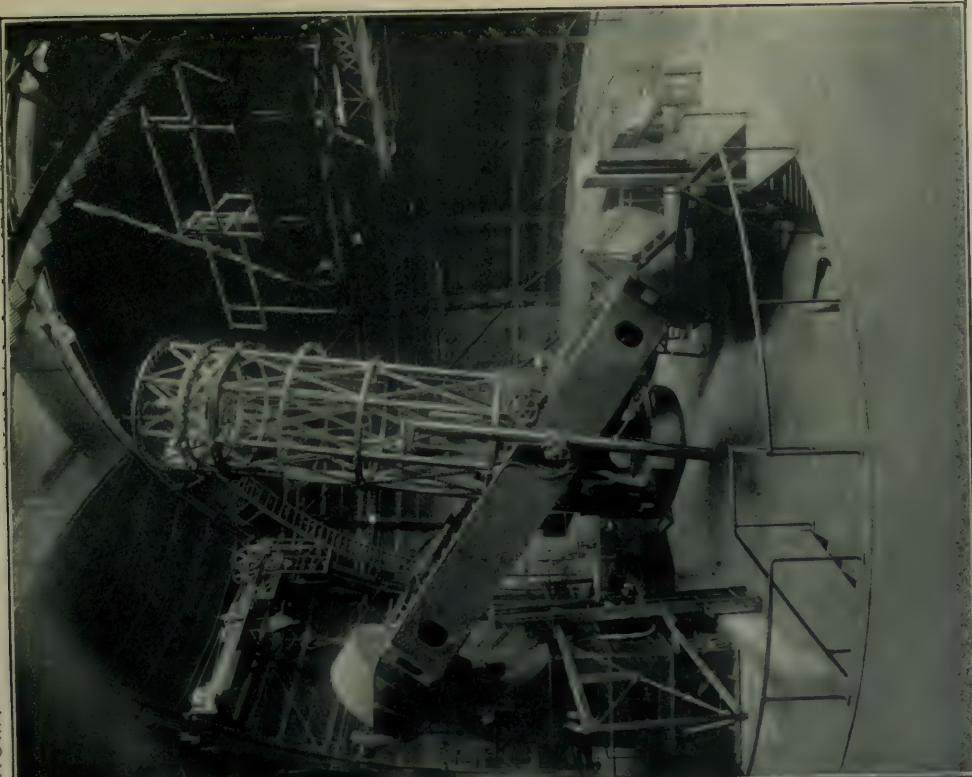
If absolute magnitudes, obtained by whatever method, be plotted against spectral type, the stars show a well marked division into two distinct groups. One group consists of stars of great intrinsic luminosity, varying little in absolute magnitude from type to type; the other consists of stars whose brightness falls off rapidly with increasing redness. The two groups are distinctly separated in types K and M, all K and M stars being either very faint or very bright, none intermediate, but are partially intermingled in type F and thoroughly so in type A, all B and A stars being very bright. On the basis of these and many other facts, Russell and Hertzsprung independently put forth the giant and dwarf hypothesis about 1914, although somewhat similar views had been maintained for some time by Lockyer, the evidence favorable to which is now overwhelming. A mass of hot gas, isolated in space, radiates heat and consequently contracts; Homer Lane in 1870 showed that so long as the density is low enough for the ordinary gas laws to be obeyed approximately, the temperature of the mass must rise with contraction, beginning to fall only when the density begins to approach that of a liquid. Hence, starting as an immensely inflated tenuous gaseous mass, of density perhaps 1/100,000 that of our sun, a star condenses, its temperature rises, and its original reddish color changes through yellow to white; the first of the above groups of stars, the giants, comprises the stars in this ascending stage of evolution; their absolute magnitudes depend but little on spectral type, because their rising temperatures compensate for the decreasing surface areas. Finally a critical point is reached, at a density of one or two tenths that of our sun, the temperature begins to fall, and the color goes through yellow to deepening shades of red as the star approaches final extinction; the second of the above groups, the dwarfs, comprises the stars on this descending branch; here the decreasing temperature and

ASTRONOMY



COURTESY OF THE DOMINION ASTROPHYSICAL OBSERVATORY

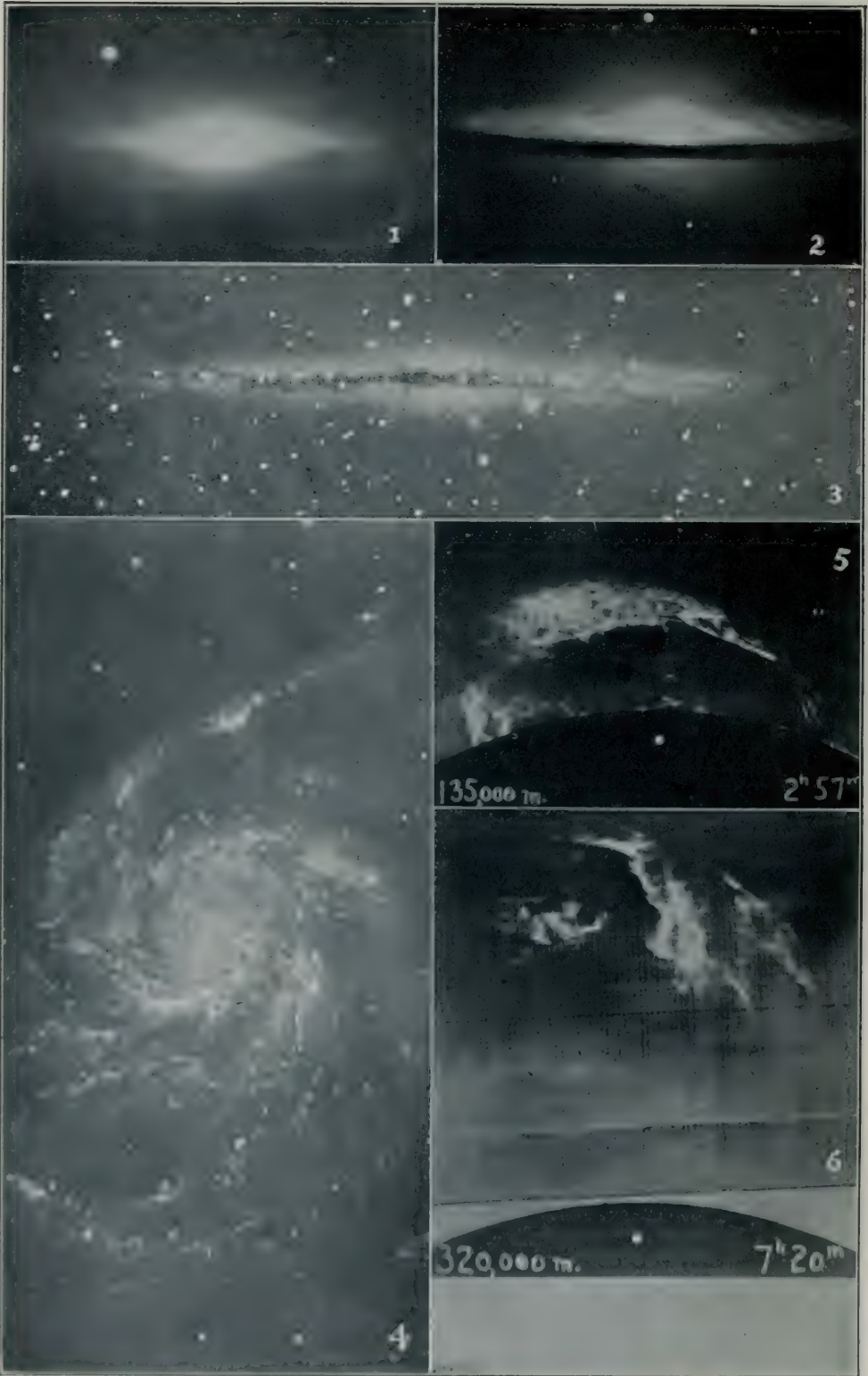
The 72-inch Reflector of the Dominion Astrophysical Observatory, Victoria, B. C.



COURTESY OF THE MT. WILSON OBSERVATORY

The 100-inch Hooker Reflector of the Mt. Wilson Observatory, California

LARGE REFLECTING TELESCOPES



NEBULÆ ILLUSTRATING SUCCESSIVE STAGES OF EVOLUTION ACCORDING
TO THE THEORY OF J. H. JEANS

1. N. G. C. 3115.

2. N. G. C. 4594.

3. N. G. C. 891.

4. M 101.

(Courtesy of the Mount Wilson Observatory)

All except the last lie in space so that we view them edgewise.

5 & 6. Two successive views of the extraordinary solar prominence of May 29, 1910, showing heights attained. White dot represents size of earth. (Courtesy of Yerkes Observatory)

diminishing surface area cause a rapid fall in brightness with advancing type.

During the life history of a star, any given temperature is passed through twice; the maximum temperature is associated with middle age. It depends on mass, how far up in the spectral series a star gets on the ascending stage; it is well known that on the average the hot stars are more massive than the cool ones; a star of small mass is a poor self-heating affair. At maximum, the surface temperature of a star may be anything up to about 25,000°C. The average space-velocities of the stars increase continuously from type B to type M; in addition, there is a progressive dependence of velocity on absolute magnitude, the faintest stars having the greatest average speed.

The energy radiated by the stars is brought to their surfaces, not by convective transfer of matter, as was formerly supposed, but as first pointed out by Sampson, mainly by radiation and absorption within the star. At any point within, the gases settle down to the temperature at which they radiate an amount of energy equal to that which they absorb from the radiation flowing through from below; radiation pressure plays a fundamental part in the dynamic equilibrium of the stars. A complete theory of the radiative equilibrium of giant stars has been developed by Schwarzschild and Eddington. At each point there is equilibrium between the gravitational compressive force due to the weight above, and the expansive forces of gas pressure and of outward radiation pressure.

A typical giant star is a mass of gas with average density about that of our atmosphere, swollen to at least 1000 times the bulk of the sun. The energy of atomic motion constitutes a great store of heat, but not the principal part of the star's total energy. The ether inside the star is full of radiation waves hastening in all directions; these waves are encased in the material, which prevents them from leaking into outer space except at a slow rate. An ether wave may thread the maze for hundreds of years before finding its way out at the surface. Of course, all hot bodies possess this double store of material heat and ethereal heat, but in all bodies with which we are directly familiar the ethereal portion is a most insignificant part of the whole—only in the giant stars does it rise to importance.

This intense ethereal energy inside the star exerts a strong pressure, distending the star, and bearing to some extent the weight of the overlying layers. For a star of mass half that of the sun, it may be shown that 0.044 of the weight is supported by radiation pressure; for one of mass five, 0.457 of the weight is so supported. Shortly beyond this point, practically all the weight is thus supported, so that larger masses will in this way be rendered unstable. All over the universe we find that the actual stellar masses do not in general exceed those at which radiation pressure begins to play the dominant part. The theoretical diameters of the giant stars may be computed, and the values found are in good agreement with those that have been measured. This provides a final proof of the giant and dwarf theory, for it is inconceivable in the light of present known facts that the vast bulks of the giants can be due to anything other than the diffuseness of the matter composing them.

A star must have some source of energy other than that coming from contraction in order to keep up its vast stores of material and ethereal energy and to maintain its radiation. Delta Cephei would have to increase in period by 1 per cent in 40 years if its radiated energy came solely from contraction, whereas in reality the decrease is only 0.08 second per year; geologic evidence requires some source of energy other than contraction for solar radiation, likewise. In all probability this source is the release of sub-atomic energy when the complex chemical elements are built up from the simpler ones under the extreme conditions of pressure and temperature existing within the stars; modern physics shows that in such a process 0.8 per cent of the mass disappears, probably to reappear as vast amounts of ethereal energy.

Variable Stars. Among the brightest and most massive of stars are the Cepheid variables, most of which are of spectral types F and G. The type, and presumably, therefore, the surface temperature, changes during the variation, the change in brightness being due to the periodic heating and cooling. The most plausible explanation of Cepheid variation is the pulsation hypothesis of Shapley, which postulates a regular dilation and contraction of the star. The semi-amplitude of the oscillations necessitated by observed spectroscopic radial velocities in Cepheids is from 4 to 14 per cent of the radii.

A remarkable relation between absolute magnitude and period has been found for the Cepheids by Miss Leavitt. The globular clusters and the Magellanic Clouds contain many Cepheid variables, and this relation affords a means of determining their distances; the validity of the results is supported by so much corroborative evidence that the reliability of the method seems clearly established.

Nova Aquilæ III, discovered during the total solar eclipse of June 8, 1918, was the most brilliant nova since Kepler's Star of 1604; normally an irregular variable of the tenth or eleventh magnitude, it attained a brightness of -0.5 magnitude on June 9. Nova Cygni III, normally a faint star below the fifteenth magnitude, rose to magnitude 3.5 on Aug. 20, 1920. So far as can be ascertained, novæ are dwarfs before the outbreak; no satisfactory theory of the outburst has yet been proposed, but it must be essentially a mere surface phenomenon.

Nebulæ. The nebulæ may be divided into *planetary* nebulæ, whose true character is still largely enigmatical, although their spectra indicate them to be composed of luminous gases; *diffuse*, or irregular, nebulæ, practically confined to the Milky Way and Magellanic Clouds, and lying in general at moderate distances; and *regularly-shaped* nebulæ, which appear of all forms from circles or spheroids, through moderate ellipses and greatly flattened ellipses drawn out at the ends of their major axes, sometimes almost to sharp points, to the various forms of spirals. The irregular nebulæ are always associated with stars, usually with the very hottest stars. It was formerly supposed that these stars had just been born, and were immediate products of condensation of the nebulæ; but we have now learned that these hot stars are in reality at the middle of their life. About half the diffuse nebulæ show a gaseous spectrum; the remainder show a continuous spectrum crossed by dark lines, as if they were

opaque and reflected the light of the neighboring stars.

Whenever the spectra of both nebula and associated stars can be obtained, they are found to be identical; furthermore, if the stars are of the hottest types, the nebula shows a gaseous spectrum, but if the stars are of a cooler type a continuous spectrum with dark lines is exhibited by the nebula. Quantitative luminosity measurements by Hubble have solved the outstanding problem of the source of nebular luminosity by showing that the nebulae derive their light from the associated stars. A gaseous nebula is stimulated in some way and set shining by the stellar radiations, while an opaque one reflects the light of the stars.

There are many large tracts of obscuring matter in some regions, particularly in the Milky Way—great dark nebulae, clouds of exceedingly minute dust particles—which cut off the stars behind; probably no hard and fast division exists between dark or faintly luminous nebulae and bright irregular gaseous nebulae; in fact, in some cases we can trace one grading into the other. It appears that only stars at the very highest temperatures are capable of lighting up surrounding nebulosity, which would otherwise remain invisible or else appear as a dark marking on the sky.

For a time the spirals were generally looked on as external galaxies, island universes, perhaps millions of light-years distant; in recent years, however, the trend of evidence is distinctly against this hypothesis, and toward a true nebulous character and more moderate distances for these objects. The spirals have extraordinarily great radial velocities, in general recessive. By comparing photographs taken at intervals of several years, van Maanen and others have detected internal motions in the arms, consisting of motion outward combined with a rotation of the whole nebula in periods of from 50,000 to 200,000 years; Jeans, however, has found it impossible to account for the observed motions on any hypothesis of matter moving under the law of gravitation. The spirals are often hundreds of light-years in diameter, but are much smaller than galaxies; and M33 appears to be only about 6000 light-years distant. The density of the nuclei is incredibly small, perhaps less than that of the gas in the best vacuum obtainable in the laboratory.

The curious phenomenon of stationary calcium lines in the spectra of many spectroscopic binaries has revealed the existence in interstellar space of great absorbing clouds of quiescent calcium vapor, at rest relatively to the stars. Miss Heger has recently discovered that the sodium D lines in Delta Orionis also are fixed in position.

Structure of the Universe. The exceptional progress made in recent years in the accumulation of extensive and accurate statistical data concerning the objects composing the sidereal universe has rendered necessary considerable revision of older views on the size and arrangement of the galactic system. We live in a finite universe, containing perhaps some 1,500,000,000 suns altogether, in which, it has been shown, the stars thin out quite perceptibly within distances reached by telescopes of moderate size. It is generally agreed that the stellar universe as we know it, or galactic system, is a disk-shaped organization of stars,

of planetary, diffuse, and dark nebulae, and of loosely-organized open star clusters of great variety; all these objects concentrate, as we see them, along the region of the Milky Way, which is almost entirely a mere depth effect. The globular clusters, though not in the Milky Way, are also affiliated with the galactic system; while the spiral nebulae, which emphatically avoid the Milky Way, are outside the most populous regions of space.

After the vast gap beyond the confines of the solar system, we come first to our nearest stellar neighbor, Proxima Centauri, discovered in 1916 by Innes, at a distance of 24 million million miles, then to Alpha Centauri at 25 million million miles, Munich 15,040 at 36 million million, Lalande 21,185 at about 47 million million, and Sirius at 50 million million. Within 100 light-years of the sun the stars appear to be scattered with fair uniformity in space, to the number of about 6200. Beyond lies a steady succession of stars, mostly fainter than the sun, nebulae, clusters, and starclouds, until finally we reach the globular cluster N. G. C. 7006, which Shapley finds to be 200,000 light-years distant and hundreds of light-years in diameter. To all appearances, the star cloud N. G. C. 6822 is still more remote, outside the bounds of our stellar system entirely. According to Shapley, its distance is about six million million million miles, a distance which light occupies one million years in traversing.

There still exists some difference of opinion as to the distances of the more remote clusters and star-clouds, as to scale of the total galactic system. One of the great outstanding researches of the decade, an extensive study of known globular clusters carried out by Shapley with the aid of the period-luminosity relation for the Cepheids, the characteristics of the B-type stars, etc., from which the distribution of the clusters in space has been determined, has shown that a third of the known clusters are more than 100,000 light-years distant, and that the star-clouds of the galaxy extend at least as far as the furthest clusters. Shapley concludes that the diameter of the universe is at least 300,000 light-years. In the older views, of which H. D. Curtis, Schouten, and others were still adherents in 1924, the diameter of the universe is under 30,000 light-years. Quantitatively, Shapley's results are admittedly approximate, but to reduce them tenfold would be to work havoc with a vast and beautifully concordant body of modern astronomical fact and theory which was not available when the former views were originated.

In the system outlined by the globular clusters as determined by Shapley, the galactic plane is still a plane of symmetry and flattening, though the clusters extend to great distances both above and below this plane, to eight kiloparsecs on the average, the parsec being a distance, 3.26 light-years, corresponding to a parallax of 1 second of an arc. The system is elongated in plan, and the sun is near one end of it, so that practically all the clusters are in one hemisphere; the dense star-clouds, numerous novae, etc., in the direction of Sagittarius, indicating a much greater depth for the system in that direction, confirm this conclusion. The sun is fairly centrally placed in a local subordinate star-cloud (about 90 parsecs from the centre, according to Charlier) of about 1000 parsecs diameter, imbedded in

and moving through the general star fields of the Milky Way, but this cloud is 50,000 light-years from the galactic centre. Stars of type B down to the sixth apparent magnitude are almost exclusively members of the local cloud. The central plane of the local cloud, which may be detected in the distribution of stars over the sky, is not coincident with the galactic plane by 10 to 15 degrees. The local cloud may possess an absorbing medium, but if so it must fall off rapidly beyond, for the existence of color indices (photographic minus photo-visual magnitudes) from -0.5 to 1.9 in cluster stars just as in the nearer stars shows that the general absorption of light in space is negligible.

Only very uncertain and tentative theories can be formulated regarding the exact space distribution and motions of the stars. Kapteyn's attempts along this line are the best known. Mathematical researches on the dynamics of the stellar system, largely along the lines of statistical mechanics, seem to indicate that the universe is not in a steady state, has not yet reached equilibrium, and is probably collapsing toward some more permanent form.

The motions of the stars are quite complex. Strömberg finds that Kapteyn's first stream among the type A stars may be identified with the Taurus group, and his second with the Ursa Major group; the remaining stars belong to a central group of small systematic motion, the $\frac{1}{2}$ group of Halm, and with which the type B stars probably are associated. The giants of type F to M form a single group with a small systematic motion relative to the commonly adopted origin and an ellipsoidal velocity distribution, the ellipticity diminishing with spectral type to very small values for late K and M stars; the dwarfs also form a distinct group with regard to their motions.

Celestial Mechanics. E. W. Brown's Lunar Theory, developed according to the methods of G. W. Hill, was completed by the publication of the lunar tables in 1920. No terms of appreciable significance have been omitted, yet the moon still deviates unmistakably from its predicted position. The irregular deviations are at least partly due to irregular variations in the rate of rotation of the earth. The secular acceleration is undoubtedly due to the effects of tidal friction, which causes a direct acceleration of the moon's orbital motion, as well as a spurious acceleration due to increase in the length of the day; the researches of Fotheringham have shown that the solar and lunar accelerations can be accounted for by a slowing down of the rate of rotation of the earth by $1/800$ second per century, and Jeffreys and Taylor have shown that tidal friction in shallow seas is fully capable of doing this. Finally, there is a long period term in the mean longitude of the moon the cause of which is unknown.

Important investigations relating to the registration and prediction of tides, the dynamic theory of tides and tidal currents, and the meteorological effects on tides, were carried out by Proudman and Doodson at the Tidal Institute of the University of Liverpool, founded in 1919. One of their most successful efforts resulted in the construction of a more accurate map of the co-tidal lines in the North Sea and the Irish Sea; Sterneck's map of the co-tidal

lines of the North Sea (1920) was thus shown to be much closer to the facts than the previous map of R. A. Harris.

Theory of Relativity. In the realms to which modern experimental physics has introduced us, phenomena transcending all the previous experience of man are encountered; and many of our scientific theories, which, being merely logical structures resting ultimately on axioms drawn from past experience, must always be regarded from an essentially pragmatic point of view, prove, as might have been expected *a priori*, incapable of subsuming under themselves the sequences of phenomena here perceived as taking place. New conceptual schemes for the representation of the phenomena of the physical universe perceived to date must be constructed; and one of these, Einstein's Generalized Theory of Relativity, is of particular interest to astronomers because it substitutes for Newton's Law of Gravitation another law, and since the three crucial tests of the theory are all of an astronomical character.

In the face of strong opposition, much of it of an untenable nature, however, the Theory of Relativity gradually compelled wider and wider recognition and acceptance solely by its merit. The continued agreement of this theory and its predictions with facts has been of such a nature that a logical and impartial consideration of the evidence available and its character as a whole indicates a probability of the ultimate complete vindication of Einstein's views. In any event, the new and powerful methodology and point of view of the theory, the peculiar nature of which has unfortunately been the cause of much misconception concerning relativity, are permanent acquisitions of inestimable value, regardless of how the form of the theory itself may have to be modified in order to accord with fact.

Einstein's law of gravitation, besides explaining all that Newton's law explains, accounts for the most conspicuous of the exceedingly few instances in which Newton's law has failed, viz., the anomalous motion of the perihelion of Mercury; every other explanation so far suggested has been shown to be untenable. The theory of relativity also predicts that a ray of light passing close by a massive body should be bent from a straight line; photographs of the stars around the sun taken at the time of a total eclipse should show these stars in slightly different positions from those they normally occupy. The observations of the British expeditions during the eclipse of May 29, 1919, and of the Lick Observatory expedition during the eclipse of Sept. 20, 1922, have proved beyond reasonable doubt that a deflection of the amount called for by Einstein's theory actually exists; here again, all alternative explanations have been found inadequate. The theory of relativity also calls for a slight shift, toward the red, of the lines in the solar spectrum; this is the most difficult prediction to test, because such a multitude of factors influence the positions of the spectral lines. Different investigators arrived at contradictory results for some time, but finally, after an extremely thorough and extensive investigation at Mount Wilson, St. John obtained observational results according in general with those obtained earlier by Evershed and somewhat later by H. D. Curtis. St. John and Evershed conclude that the results show that after all other effects

have been allowed for, differences remain between solar and laboratory wave length of the order called for by the Einstein theory. Curtis does not accept this interpretation of the facts.

Cosmogony. Apart from the comparatively small number of planetary nebulae, Cepheid variables, long-period variables such as Mira Ceti, and a few other objects, the nature and interpretation of which are still enigmatic, all known celestial bodies can be arranged in one single continuous sequence, which is approximately a sequence of increasing density, beginning with nebulae of incredible tenuity and ending with solid stars as dense as iron. There can be but little doubt that this sequence is evolutionary, for as a body radiates heat its density increases until it can increase no more.

In the difficult field of modern cosmogony, where mathematics, physics, astronomy, and geology dispute the sovereignty, the masterly researches of J. H. Jeans stand out preëminently. At some stage in the history of a star it must be completely gaseous, for only by the effect of radiation pressure in a gaseous mass can we explain why 90 per cent of the stellar masses lie between a half and five times the mass of the sun. Jeans has shown that the nebular hypothesis, with some modifications and reservations, may be made to explain nearly everything except our solar system, which it was specifically invented to explain. The heavens have indeed been searched in vain for objects showing the rings required by the Laplace-Roche theory of the evolution of a rotating incompressible fluid mass; but numerous nebulae show the flattened and lenticular forms indicated for the early stages by this theory; others show lenticular centres with definite indications of detached matter around an equatorial sharp edge, but this detached matter is in the form of spiral arms.

Spectroscopic examination of the regular nebulae shows in every case a rotation with a high velocity about an axis which appears in the sky as the shortest diameter of the nebula. Now Jeans has proved that the classic "figures of equilibrium" will not be materially different for even highly compressible gases in the case of slow rotation; but as the rate of rotation increases through shrinkage, a compressible mass will finally, if the central density exceeds three times the mean density, take on the shape of a bi-convex lens, with a sharp equatorial edge. Further adjustment of equilibrium to increasing rate of rotation is no longer possible by mere change of shape; additional shrinkage involves an actual break-up of the nebula, the excess of the angular momentum beyond that which can be carried by the shrunken mass being thrown off into space by the ejection of matter from the equatorial sharp edge.

Since the nebula is not alone in the universe, the equatorial edge will be deformed from a perfectly circular shape through the attraction of other bodies, and this deformation, however slight, will cause the ejected gas to stream out from two antipodal points on the equator, into spiral arms. This causes the dark equatorial band observed in nebulae which are viewed edge on. The ejected matter comes in time to dwarf the central nucleus in size, until finally there is little nucleus left.

The gigantic scale on which ejection takes

place is such that gravitative attraction overcomes the expansive influence of gas pressure and is able to hold the jet together as a compact stream; the issuing filament will break up into separate aggregations, which give rise to the lumpy appearance of the arms of spirals. Dynamic theory enables us to calculate the size, mass, and distance apart of these aggregations; a comparison between their distance apart, as calculated in kilometers, and their angular distances apart as we observe them in actual nebulae, leads to the distance of these nebulae, and the resulting estimates of nebular distances are in good agreement with those obtained in other ways; furthermore, in every nebula for which the calculation can be made, the calculated mass of a single condensation proves approximately equal to the mass of the average star.

In many nebulae, the observed knots in the arms take the form of pronounced condensations, and in the outer regions of some nebulae these condensations have further developed into detached and almost star-like points of light. The family of stars thus born out of a single nebula may be millions in number; they may either mingle with the general mass of the stars, giving rise to a cluster such as the Great Bear group, or, if the original nebula was sufficiently remote from the main universe, they may form a separate colony, such as the Hercules cluster. These alternatives perhaps represent the two extremes of a continuous chain of possibilities. Quite possibly the main mass of the stars may be a collection of clusters, each originated out of a single nebula, now so intermingled that it is difficult to detect the separate groups. Kapteyn's two star streams may be two intermingled moving clusters; the third stream of B and C stars found by Eddington and Halm, which Charlier has found to have the shape of a round biscuit lying parallel to the Milky Way with its diameter 2.8 times its thickness, has just about the shape and position that dynamic theory shows any cluster of stars of common origin ought to have after having been knocked about *ad infinitum* in our universe of stars.

The above evolutionary process is essentially, at least in its early stages, that imagined by Laplace, except that it is on an incomparably grander scale. Each of the condensations, however, as it starts off into space, is a gaseous nebula about the size and mass postulated by Laplace; but dynamic theory proves that on account of the difference in scale, matter ejected from such a nebula could not condense into filaments, still less into detached masses, but would merely constitute a diffuse atmosphere about the parent mass. As the latter shrunk by radiation, the constancy of angular momentum would, until it had shrunk to a certain critical density, merely demand that more and more gas should be transferred to this atmosphere. A cataclysmic period would then ensue, from which the mass would emerge as a binary star with the two components almost in contact. As development went on, the two components would move apart, the orbits become more eccentric, the components themselves might repeat the process of fission, and so on. The distance which any particular system goes along this course would depend in effect on the amount of rotation with which it was originally endowed. Both theory and observation agree that not many systems stay out the whole course; prob-

ably only half the stars in the sky are binaries, and only a tenth this number are multiple systems.

Nowhere in this scheme is there a place for anything in the least degree resembling our solar system. However, it is to be expected that off the normal course of evolution would exist branch lines to which a few systems would be turned by some exceptional circumstance, such, for instance, as the close approach of two stars. It seems that the solar system must be added to those classes of objects which do not appear to fit in with any normal evolutionary scheme; our sun may be the only star attended by planets, our earth the only body in the universe capable of supporting life. A stellar collision, or an approach close enough for tidal disruption to take place, is an exceedingly improbable event; but it may have happened that our system had a tidal origin. At least, such an encounter would give rise, as Jeans has shown, to a system strikingly resembling ours in many ways.

Miscellaneous. The 100-inch Hooker reflector was put into regular operation at Mount Wilson in 1919; the Dominion Observatory at Victoria, B. C. with a 72-inch reflector, was opened in 1918.

Turkey adopted the Gregorian calendar in 1916; Russia in 1918, Greece and all adherents of the Eastern Orthodox Churches in 1923. The Julian Calendar is now followed only by the Ruthenian Catholics or Uniates of the Russian Ukraine. The question of the reform of the present calendar was much agitated, but nothing definite was done.

International scientific organizations were all badly disrupted by the War. To carry on international coöperation in scientific work, the International Research Council was organized after the War. The International Astronomical Union, a division of the Council, was organized at Brussels in July, 1919, and held a meeting at Rome in 1922.

Necrology. The following eminent astronomers died during the decade: Sir Norman Lockyer, Aug. 16, 1920; Percival Lowell, Nov. 12, 1916; Karl Schwarzschild, May 11, 1916; E. C. Pickering, Feb. 3, 1919; S. W. Burnham, Mar. 11, 1921; J. C. Kapteyn, June 18, 1922; E. E. Barnard, Feb. 7, 1923.

Bibliography. Of books published in this period, the following are of unusual significance in different departments of astronomy: H. S. Jones, *General Astronomy* (London, 1922); Newcomb-Engleman, *Populäre Astronomie*, 6th ed. (Leipzig, 1921); T. E. R. Phillips, ed., *Hutchinson's Splendor of the Heavens* (London, 1923); R. G. Aitken, *The Binary Stars*, (New York, 1918); K. Schiller, *Einführung in das Studium der Veränderlichen Sterne* (Leipzig, 1923); J. Bosler, *L'Evolution des Etoiles* (Paris, 1923); H. C. Plummer, *Introductory Treatise on Dynamical Astronomy* (Cambridge, 1918); H. Andoyer, *Cours de Mécanique Céleste*, vol. 1, (Paris, 1923); J. H. Jeans, *Problems of Cosmogony and Stellar Dynamics* (Cambridge, 1919); T. C. Chamberlin, *The Origin of the Earth* (Chicago, 1916).

ASTROPHYSICS. See ASTRONOMY; PHYSICS.

ATAVISM. See HEREDITY.

ATHEARN, WALTER SCOTT (1872-). An author and professor of religious education at Boston University. He was born at

Marengo, Iowa, and educated at the State University of Iowa and the University of Chicago. He began his career as a public school principal in Iowa, and after holding professorships of religious education he became in 1919 director of the School of Religious Education and Social Service. He has written numerous books on religious education which include *Religious Education and American Democracy* (1917), *Making Democracy Safe for the World* (Chicago, 1918), *A National System of Education* (New York, 1920), and *Ten Lessons on the Organization of the Modern Sunday School* (St. Louis, 1921).

ATHERTON, GERTRUDE FRANKLIN 1857-). An American novelist (see VOL. II). Mrs. Atherton has continued her prolific authorship with her characteristic verve. She published *Perch of the Devil* in 1914; *California—an Intimate History* (1914); *Before the Gringo Came* (1915); *Mrs. Balfame* (1916); *The Living Present* (1917); *The White Morning* (1918); *The Avalanche* (1919); *Sisters-in-Law* (1921); *Sleeping Fires* (1922); and *Black Oxen* (1923).

ATHLETICS. Interest in athletics of every description increased at a remarkable rate during the period 1914-1924 despite the fact that the World War intervened to curtail participation in sports among the peoples of many nations. Perhaps the most striking feature of recent athletic history has been the growing popularity of international competition, along with the adoption of sports by countries in which formerly they were practically ignored. At the close of the period, it is true, the United States and the British Empire were still leading in their devotion to athletics of all sorts but other countries were rapidly falling into line and promising soon to threaten Anglo-Saxon supremacy, France, Italy, Spain, Japan, the Philippines, Sweden, Norway, Denmark, Finland and even the youthful Czecho-Slovakia having taken up athletics on a scale never attempted before.

Another noticeable development has been the increased participation in sports among women, Olympic Games (q.v.) for women having been held for the first time at Paris in 1922. The popularity of golf and tennis, particularly, with women has led to several international competitions in these sports. International rivalry between women swimmers has also been keen.

Several new world records were established in track and field athletics since 1914. James E. Meredith of the University of Pennsylvania ran the quarter-mile in 47½ seconds and the half-mile in 1 minute 52½ seconds in 1916 and Norman S. Taber of Brown University set a new record of 4 minutes, 12½ seconds for the mile the same year. Edward Gourdin of Harvard University made the longest broad jump yet accomplished in 1921, his leap having been 25 feet, 3 inches.

Special articles on the various branches of athletics or sports such as BASEBALL, BASKETBALL, FOOTBALL, GOLF, TENNIS, etc., will be found under those titles.

ATHLETICS, TRACK and FIELD. This particular branch of sports leads all others in the progress made during the ten-year period ending with 1924. The growth in popularity and the achievements as measured by the amazing large number of new records established

which have characterized track and field athletics furthermore have not been confined to any one country. This fact may be attributed largely to the constantly increasing interest attracted by the Olympic Games (q.v.).

A complete summary of the new standards set in this sport would require more space than is available. The most that can be done is to select a few outstanding names and performances from the long list evolved from 1914 to 1924.

Among the runners who have distinguished themselves are James E. Meredith, Charles W. Paddock, Joie W. Ray and Norman S. Taber of the United States and Paavo Nurmi of Finland. Meredith eclipsed all past performances by covering 440 yards in 47% seconds and 880 yards in 1 minute, 52% seconds. Both of these new records were made in 1916.

Paddock ran 220 yards in 20% seconds in 1921. Taber negotiated the mile in 4 minutes, 12% seconds in 1916. Nurmi, specializing in the longer distances, ran three miles in 14 minutes, 8% seconds and also set new times for 2000, 3000, 5000 and 10,000 meters. All these achievements came in 1922. Ray, a consistently remarkable runner, owes his chief fame to the figures he established in 1923 for two miles. They were 9 minutes, 8% seconds.

Athletes from Canada and Denmark divide the honors in walking. George H. Goulding of Canada covered seven miles in 50 minutes, 40% seconds in 1915. G. Rasmussen of Denmark in 1918 outdid all previous walking efforts for practically every metric distance from 3000 to 15,000 meters and N. Petersen of the same country lowered all former marks for 20,000 and 25,000 meters.

E. Beeson of the United States surpassed all rivals in the running high jump by leaping 6 feet, 7% inches in 1914 and in pole vaulting Charles Hoff of Denmark attained the height of 13 feet, 6 inches in 1922.

E. J. Thomson of Canada tied the record of 14% seconds for the 120-yard high hurdles in 1920 and also established the new time of 14% seconds for the 110 meter high hurdles the same year. J. K. Norton of the United States went over the 440-yard hurdles (3 feet) in 54% seconds in 1920.

The United States excelled all other nations in relay racing. In 1921 a team consisting of B. D. Wefers, jr., H. Ray, F. K. Lovejoy and Edward Farrell ran 440 yards in 42% seconds and 880 yards in 1 minute, 27% seconds. During the same year another American quartette, C. D. Rogers, Lawrence Brown, Earl Ely and Robert Maxam sped one mile in 3 minutes, 16% seconds and in 1922 G. F. Meredith, E. W. McMullen, J. C. Holden and L. A. Brown ran two miles in 7 minutes, 49% seconds and Howard Yates, G. McGinness, B. Patterson and R. Wharton traveled four miles in 17 minutes, 45 seconds.

The participation of women in track and field athletics on a wider scale than ever before was a noteworthy feature of the 1914-24 period. The Amateur Athletic Union of the United States gave its first official sanction to a women's national championship in 1923 and the competitions were held in Newark, N. J. An Olympic Meet for women also was held at Paris in 1922. Twelve new world and Olympic records were set during the Olympic Games (q.v.) of 1924, of which seven were accepted by the International Amateur Federation.

ATLANTA. The capital of Georgia. The population of the city rose from 154,839 in 1910 to 203,550 in 1920; to 222,963 by estimate of the Bureau of the Census for 1923, and to 249,300 by local estimate in 1924. The area of the city was increased to 29 square miles by the annexation in 1922 of the neighboring town of Kirkwood. Three hundred acres in the residential section were razed by fire in 1917 with a loss of \$5,000,000. Building operations increased from \$3,685,663 in 1916 to \$20,584,734 in 1922 and to \$27,094,912 in 1923, while real estate values rose 35 per cent between 1918 and 1923. The bank clearings of the city increased from \$574,164,917 in 1910 to \$2,791,411,000 in 1923. A comprehensive zoning ordinance with racial segregation districts was adopted in 1923. The city spent \$4,000,000 to extend the public school system, the same amount for the reconstruction and extension of the sewer system, \$2,850,000 for improvements in the department of water works, \$750,000 for a large viaduct from Spring Street to Terminal Station, and \$400,000 for a centrally located public market. Fulton County built a court house in the city at a cost of \$1,200,000.

Two universities were opened during the period, Emory University of the Methodist Episcopal Church, South, which moved to Atlanta in 1914, and Oglethorpe University, which was closed shortly after the Civil War, reopened in 1916. A new hospital conducted by Emory University was completed in 1924 at a cost of \$2,000,000. Three large new hotels were built, costing \$6,500,000, \$1,250,000, and \$1,000,000. A colossal memorial to the Confederacy was being carved by Gutzon Borglum on the face of Stone Mountain, a great monolith of smooth solid granite near Atlanta. The finished work was to represent Lee and Jackson at the head of their armies; in January, 1924, the head of General Lee was unveiled.

ATMOSPHERE. See METEOROLOGY.

ATOMS, ATOMIC THEORY. See CHEMISTRY; PHYSICS.

ATONALISM. See MUSIC.

ATTENTION. The development of the psychology of attention, 1914-24, has shown the two-fold nature of the problem. On the one hand attention can be expressed in terms of physical conditions, the conditions which attract or distract attention, and on the other hand it can be assimilated to subjective interest with peculiar laws of its own. The experiments of Dallenbach and Bowman sought to measure the importance of size, form, and intensity of stimulus as determinants of attention, but these relationships seem to be largely empirical and do not obey any comprehensive law. They also indicated that attention varies with the different modalities of sensation, attention to touch being highest, with sound and light following in the order named. Liddell (*American Journal of Psychology*, 1920 vol. xxx, p. 241) sought to verify the theory that attention waves in vision are due on the one hand to the adaptation of the part of the retina stimulated and on the other to eye movements. By using the Dodge apparatus he photographed the eye movements simultaneously with the disappearances and appearances of minimal light. The result showed no correlation between the movements and the fluctuations of attention. The waves appeared to continue while the eyes were stationary, while movements neither brought back the light

during periods of no sensation nor prevented its disappearance during the periods of visibility.

In France and Italy attention was studied from the point of view of subjective interest. Professor Janet (*Journal de Psychologie*, 1921, vol. xviii, p. 140) on the basis of his observations of neurasthenics brought out the intimate relation between the oscillations of nervous tension and the emotional condition of the subject. Rignano also championed an affective theory of attention. See ACTION; PERCEPTION.

ATTERBERG, KURT (1887-). A Swedish composer, born at Göteborg, Dec. 12, 1887. After graduation as a civil engineer, in 1910, he studied composition in Stockholm with A. Hallen for one year, when he won the state stipend enabling him to continue his studies at the Hochschule in Berlin and with Schillings at Stuttgart, in conducting. He conducted symphony concerts in Stockholm, Göteborg, and Malmö, and in 1920 made a very successful tour of Germany as conductor of his own works. His compositions, avoiding all modernistic extravagances, have placed him in the front rank of Swedish composers. He has written five symphonies, a concert overture in A minor, a violin concerto, a cello concerto, *Vastkustbilder* and a *Rhapsody* for orchestra, a symphonic poem for baritone and orchestra, a *Requiem*, incidental music to Didring's *Jefta*, a pantomime-ballet (*Der Seinerherde*), and an opera, *Hervorath der Harfner* (Stockholm, 1921).

ATTERBURY, GROSVENOR (1869-). An American architect, born in Detroit. He graduated from Yale in 1891 and studied architecture at Columbia University and in Paris. He made a special study of town planning and industrial housing. His best known work is in connection with the development of the Forest Hill Gardens in Long Island, founded by the Russell Sage Foundation. He also planned several industrial communities. He was architect for the restoration of the New York City Hall, and for other important buildings in New York, Philadelphia, and other cities. He was an Associate of the National Academy and was chairman and director of the War Industry Housing Commission of the National Housing Association during the War. He served with the Army Educational Commission in France and was supervising architect of the A. E. F. University at Beaune, France.

ATTERBURY, WILLIAM WALLACE (1866-). An American railway official (see Vol. II). During the War he was decorated many times for his invaluable service in directing the construction and operation of United States military railways in France. He was appointed commanding brigadier general in 1917. After 1919 he returned to the corporate service of the Pennsylvania Railroad and later devoted himself to the study of foreign railway systems.

ATTERIDGE, HAROLD RICHARD (1886-). An American playwright and librettist. He was born at Lake Forest, Ill., and educated at the University of Chicago. He is well known as the author of many popular musical comedies, and especially of *The Passing Show* (New York, 1912-19). Following are some of his works, all written in collaboration: *The Honey-moon Express* (New York, 1913); *Dancing Around* (New York, 1914); *Maid in America* (New York, 1915); *Robinson Crusoe, Jr.* (New

York, 1916); *Over the Top* (New York, 1917); *Sinbad* (New York, 1918); *Monte Cristo, Jr.* (New York, 1919); *The Little Blue Devil* (New York, 1919); and *Bombo* (New York, 1921).

ATTRIBUTE. In psychology, a unit of experience supplanting an earlier unit sensation. The impossibility of producing in the laboratory a pure sensation and the necessity of introspecting only on the attributes of sensational experience, such as quality, duration, intensity, etc., led to a revision of terminology. Psychological experience is regarded by the Titchener school as a process of which we are able to observe only the changing attributes. See PSYCHOLOGY.

ATWOOD, ALBERT WILLIAM (1879-). An American writer and lecturer on financial topics, born at Jersey City and educated at Amherst College. He was financial editor of the *New York Press* (1906-12) and in 1915 joined the faculty of the School of Journalism of Columbia University. He contributed financial articles regularly to a number of magazines, including the *Saturday Evening Post*, *McClure's Magazine*, and the *Review of Reviews*. He was the joint author with Thomas Conway, Jr., of *Investment and Speculation* (1911); *How to Get Ahead* (1917); *The Exchanges and Speculation* (1917); and *Putnam's Investment Handbook* (1919).

ATWOOD, WALLACE WALTER (1872-). An American geologist, born at Chicago, Ill. He was graduated in 1897 at the University of Chicago. Meanwhile he began his career as a teacher of physiography in Lewis Institute in Chicago, whose director he became in 1900. He returned in that year to his alma mater and in 1910 became associate professor of physiography and general geology. In 1913 he was called to the chair of physiography in Harvard and remained there until 1920, when he accepted the presidency of Clark University with the chair of physical geography. As early as 1901 he became connected with the United States Geological Survey, in which since 1909 he has held the rank of geologist; he has had a similar relation since 1906 to the Illinois Geological Survey. His many researches have included studies on the physical geography of the Devil's Lake Region and of the Evanston-Waukegan Region of Illinois. The glaciation of the Rocky Mountain Region has received his attention, especially that of the Uintah and Wasatch mountains, and he has written a monograph on the economic geology of Alaska, especially the coal resources.

AUDITION. Among the significant developments of 1914-24 in the psychology of audition was a new theory of audition by Sir Thomas Wrightson published in his *Inquiry into the Analytical Mechanism of the Internal Ear* (1918). On the basis of new histological researches he argued against the tenability of Helmholtz's resonance theory and advocated the substitution of a pressure-balance theory of hearing. Much experimentation and discussion were devoted to the determination of the attributes of sound. Watt in his *Psychology of Sound* (1917) pleaded for a uniformity of attributes in all sense modalities. He accounted for pitch by the attribute of order and regarded volume as extensity. He brought forward a theory of auditory space paralleling the space of vision. Ogden, discussing the work of Koehler and Revesez, would have psychologists ac-

cept the attributes of pitch, volume, intensity, duration, and, probably, brightness. On the other hand Rich's experiments (*American Journal of Psychology*, 1919, vol. xxx, p. 121) seemed to point to the identity of pitch and brightness, but to make tonality a separate attribute. The existence of an after-image in audition analogous to the after-image of vision was called into question by H. G. Bishop (*American Journal of Psychology*, 1921, vol. xxxii, p. 305). Tones, he found, have a characteristic modified ending which depends for its intensity upon the intensity of stimulus and for its insistence upon intensity and duration of stimulation. Localization, investigated by H. M. Halverson (*American Journal of Psychology*, 1923, vol. xxxiv, p. 178), is found to be dependent both on difference of phase and on intensity, with the phase relation more important. See PSYCHOLOGY, EXPERIMENTAL.

AUER, JOHN (1875-). An American physiologist born at Rochester, N. Y. He graduated from the University of Michigan in 1898 and four years later received his degree of doctor of medicine from Johns Hopkins. During the period 1908-21, he was an Associate Fellow of the Rockefeller Institute and conducted research into many physiological and pharmacological subjects, in part in association with Dr. Meitzer. Since 1921 he has been professor of pharmacology at the St. Louis University School of Medicine.

AUER, LEOPOLD. A Hungarian violinist and teacher (see VOL. II). On Mar. 23, 1918, he made his American debut in New York, where he settled permanently as a teacher. In the fall of 1919 he undertook the regular instruction of a master-class for two months, September and October, at the Chicago Musical College. Among his numerous pupils the most famous are Heifetz, Elman, Zimbalist, Kathleen Parlow, and Cecilia Hansen. The fundamental principles of his method were published by his pupil Maia Bang in her *Elementary Violin Method* (New York, 1920). He himself wrote a more extended treatise, *Violin Playing as I Teach It* (New York, 1921), and is the author of *My Long Life in Music* (1923).

AUGSPURG, ANITA (1857-). An active worker and lecturer in the German women's movement and in municipal and communal reforms. She came from a long line of lawyer ancestors, residents of Bavaria, and after studying drama and appearing for a short time on the stage, took up law and practiced for some years in Munich. She was identified with propaganda for radical reforms concerning women and children. Later she studied agriculture and managed her own large estate.

AULARD, (FRANÇOIS VICTOR) ALPHONSE (1849-). A French historian (see VOL. II). Professor Aulard was active both during the War and after the Armistice. His work falls under two heads. On the one hand he continued his scholarly researches as a historian of the French Revolution, and on the other he sought to popularize the lessons of history in their bearing on the problems of war and peace. His scholarly works include the *Recueil des Actes du Comité du Salut Public*, which by 1918 he had carried forward to the year 1796; *Paris sous l'Empire*, three vols. to the year 1809 (1910); *Lettres et Bulletins de Barentin à Louis XVI, avril/juillet 1789* (1915); and the *Dictionnaires des Conventionnels de Auguste*

Kuscinski (1916-1919). In 1919 he published a volume of historical interpretation, *La Révolution Française et le Règne Féodal*. His popular work comprises a volume of war articles, *La Guerre Actuelle Commentée par l'Histoire* (1916), and two series of public courses at the Sorbonne on the French tradition, *La Paix Rature d'après la Révolution Française et Kant* (1915) and *Le Patriotisme Français de la Renaissance à la Révolution*. Since the Armistice, Professor Aulard has thrown his influence on the side of political liberalism. He was a candidate to the Chamber of Deputies in 1919, running as *Républicain Socialiste*, but was defeated in the overwhelming victory of the Bloc National. By his articles in *l'Ère Nouvelle* and *Progrès Civique*, by his speeches, and by his representation of France in the League of Nations Assembly, he has sought to bring about a reconciliation between France and the new democratic Germany.

AULTMAN, DWIGHT EDWARD (1872-). An American army officer, graduated from the United States Military Academy in 1894 and promoted through the grades so that he reached the rank of brigadier-general of the United States Army in 1921. He was sent on a special mission to Germany in 1914-15, was instructor in the Army War College (1916-17) and went to France as commander of the Fifth Field Artillery (1918). He was at the General Staff College in 1919.

AUSTIN, MARY HUNTER (1868-). An American author and playwright (see VOL. II). Only after profound reflection did Mrs. Austin publish the results of her study of Indians in the western deserts of America. Her recent works, characterized above all by uncommon breadth of sympathy, include *Love and the Soul-Maker* (1914); *The Man Jesus* (1915); *The Man Who Didn't Believe in Christmas*, a play, produced in New York (1916); *The Young Woman Citizen* (1918); *Outland* (1919); a chapter on *Aboriginal Literature in Cambridge History of American Literature* (1919); and 26 *Jayne Street* (1920).

AUSTRALIA. A self-governing British dominion including the island continent with its dependencies. The six states, New South Wales, Victoria, Queensland, South Australia, Western Australia, and Tasmania, and the two territories, Northern Territory and Federal Territory, which make it up, comprise an area of 2,974,581 square miles, and a population in 1922, exclusive of aborigines, of 5,634,552. In 1911, the inhabitants numbered 4,455,105. By the 1911 census there were 108 males to 100 females; by the 1921 census, the ratio had fallen to 103.3 males to 100 females. Immigration was slow, to the disadvantage of the development of the Commonwealth, which has unbounded natural resources and the ability to support a population as great as that of the United States. During 1911-21 the excess of immigrants over emigrants was only 166,977, as compared with 46,695 in 1911 alone. In 1921, net immigration was only 15,789. The population was almost wholly of British origin (97 per cent), highly literate, and well-to-do. The country's development had taken an unfortunate turn in the concentration of population in the cities and with the increasing application to industrial activities, to the neglect of the agricultural. For the Commonwealth, 62 per cent of the population was urban in

1921; 42 per cent of the total population was gathered in the six capital cities alone, as against 38.05 per cent in 1911. The capital cities, with their metropolitan populations in 1921 (1911 population in parentheses), were Sydney, N. S. W., 899,099 (629,503); Melbourne, Vic., 766,506 (588,971); Brisbane, Qld., 210,032 (139,480); Adelaide, S. A., 255,481 (189,646); Perth, W. A., 154,866; Hobart, Tas., 52,391 (39,937). As a result, Australia's problems of health, education, and social relations were largely those of an industrial society, not those of an agrarian one.

Agriculture. Up to 1920, 40 per cent of the total acreage of the Commonwealth was still unoccupied; only 5.73 per cent had been actually alienated; and 51 per cent was held under leases. Of the 109,074,863 acres alienated in the fiscal year 1921-22, 15,363,999 acres were under crops. This compares favorably with the crop acreage of 11,893,838 for 1910-11. The following table gives acreage and production of principal crops for 1912-13 and 1921-22.

Crop	Acreage		Yield	
	1912-13	1921-22	1912-13	1921-22
Wheat	7,339,651	9,719,070	91,981,070 bu.	129,088,806 bu.
Oats	874,284	737,830	16,116,712 "	12,123,078 "
Corn	314,686	305,200	8,356,158 "	7,840,446 "
Hay	3,217,041	3,005,057	3,372,596 long tons	3,905,428 long tons
Sugar Cane	155,567	197,293	1,135,141 "	2,436,890 "

Pastoral activities remained highly important. The figures for live stock for 1913 and 1921 were: sheep, 85,057,402 and 82,226,470; cattle, 11,483,882 and 14,530,081; horses, 2,521,983 and 2,439,444; pigs, 800,505 and 960,385. The wool yield in 1912-13 was 648,851,913 lb.; in 1921-22, 628,664,435 lb.; butter, in 1912-13, 198,758,238 lb.; and in 1920-21, 261,722,367 lb. It was not until 1922 that the wool industry showed an approximation to pre-war conditions. Heavy stocks had accumulated because of war conditions, a diminished world demand, and the fall in prices. Only in 1922, as a result of the heroic operation of the British-Australian Wool Realization Association, es-

largely affected by the high prices of coal and coke, the high transport and labor costs, and the high smelting charges. Coal production, however, did not fall off. In 1914, 12,445,073 tons were mined, and in 1922, 12,403,133 tons; about 90 per cent of the total yield came from New South Wales. From 1917 to Dec. 31, 1922, the industry was controlled by the government, and prices and wages were fixed.

Manufacturing. Here was to be seen the Commonwealth's greatest advance during the period surveyed. From 1911 to 1921 the number of employees in Australian factories increased from 312,000 to 387,000, the amount of wages paid rose from \$118,200,000 to \$245,700,000, and the values of output advanced from \$518,700,000 to \$1,267,500,000. Aided by the heavy protective tariff of 1920, manufacturers were able to weather the 1920-21 trade depression successfully. Foodstuffs, machinery, clothing, textiles, etc., remained leading industries. Imports of the following declined over the period, because local manufacturers began to supply

the domestic market: textiles and wearing apparel, confectionery, cement, toilet articles. There were government bounties for the manufacture of iron and steel and the production of shale oil. On the last, for example, £16,292 was paid on 1,737,845 gallons in 1920-21.

Commerce. The trade record over the period, for certain years, showed (conversions at par for 1913. \$3.96 for 1920-21, \$4.45 for 1921-22): imports for 1913, \$387,918,000; for 1920-21, \$638,827,000; and for 1921-22, \$449,733,000; exports for the same years, \$365,537,000, \$515,420,000, and \$569,375,000. Trade by principal commodities (in thousands of dollars);

Imports				Exports			
Commodities		1913	1921-22	Commodities		1913	1921-22
Textiles			\$107,947	Butter		\$17,350	\$35,545
Timber		\$14,710	11,317	Wheat, unprepared		38,871	127,467
Chassis for motor cars			13,042	Wool		127,877	213,491
Corn and flour			7,083	Flour		9,082	24,564
Tobacco		5,421	10,383	Gold			15,594
Tea		6,465	9,128				

tablished in 1921, was the large supply disposed of. During the period 1914-24 an increasing interest was manifested in cotton culture. In 1920 only 166 acres were under cotton; in 1923, the estimated acreage was 40,000. Bounties and a fixed price aided in the encouragement of the industry. There were bounties, too, on rice, coffee, cigar tobacco leaf, fibres, oil, dried fruits, sugar, and combed wool for export. See also RECLAMATION, LAND.

Minerals. The gold production continued steadily to decline, dropping in value from \$45,570,244 in 1913 to \$15,429,734 in 1921. The same was true of silver and lead (1913, \$22,924,566; 1921, \$6,822,164), copper (1913, \$15,888,482; 1921, \$3,563,115), and tin (1913, \$6,791,737 and 1921, \$1,840,840). All these were

The origin of imports showed interesting changes over the period. For 1911, 1919, and 1921-22, the percentages from the United Kingdom were 59, 37, and 51; from British possessions, 12.8, 22.1, and 13.6, according to estimates; from the United States, 11.5, 27.3, and 19. It is evident that the gains made by the United States during the War could not be entirely maintained. In the following commodities, first place was maintained by that nation in 1921-22: patent leathers, agricultural implements and machinery, motor cars, hardware, ironmongery, surgical instruments, linoleum, arms and munitions, and clocks. Exports were similarly apportioned for 1913 and 1920-21: United Kingdom, 44.3 and 51.1 per cent; British possessions, 12.6 and 19.7 per cent; and the United States, 3.3

and 7.5 per cent. Nothing indicated better how well Australian trade held its own than the tonnage figures for the period. In 1911, 4,093,220 tons entered as compared with 4,559,964 tons in 1921-22; and 4,991,581 tons cleared Australian ports in 1911 as compared with 4,520,909 in 1921-22. On June 30, 1923, the Commonwealth possessed 49 steamships of 252,524 gross tons, valued at £14,156,938; the first purchase was made in 1916. In August, 1923, a Federal Shipping Board was created to take over management.

Communications. From the 17,842 miles of lines in the Commonwealth in 1912, of which 16,898 miles were government-owned, railways increased to 25,956 miles (23,147 miles government-owned) in 1921-22. The leading difficulty confronting the Commonwealth was the variety of gauges in use. It was decided during the period to adopt a single standard gauge of 4 feet 8½ inches, but the cost was so great (\$277,000,000) that the work had to be deferred. Inasmuch as many of the railways were for developmental purposes, operating expenses continued to exceed revenues. The loss in operating the Commonwealth railways for 1920-21 was £455,200; while the loss to the state railways for the same year was reported as £4,013,146. A transcontinental railway from North to South, over 1000 miles in length, was under construction. Something of the progress made in railway building may be ascertained from the activities of a single year, 1922-23, i.e. miles of railway under construction and authorized in the different states: Victoria, 52 and 12; New South Wales, 783 and 100; Queensland, 552 and 1423; South Australia, 139 and 29; Western Australia, 136 and 229. By 1923, 143 miles had been electrified in Victoria, and Sydney was applying itself to the same task. Another interesting development was the work on a subway in the city of Sydney, at a cost of £5,000,000.

Finance. For 1911-12, revenues for the Commonwealth were £20,548,520, and expenditures £14,724,097. For 1921-22, these had reached £64,897,046 (revenues) and £77,930,426 (expenditures); and for 1923-24 revenues were estimated at £54,688,250 and expenditures at £54,641,098. An analysis of the 1921-22 budget reveals the changed character of government financing. Whereas before the War about two-thirds of the revenue was derived from customs, in the later year the proportions were: customs, 26.6 per cent; income tax, 26 per cent; excise tax, 16 per cent; land tax, 3.5 per cent; war-time profits tax, 2 per cent. The debts of the Commonwealth and the states increased enormously because of the War. In 1914 the total debt of the Commonwealth and states was £337,000,000; by June 30, 1923, the Commonwealth public debt was £410,996,316, and those of the states, £523,489,339. In fact, the total war expenditure for the seven years ending June 30, 1922, was £477,498,000, of which £135,340,000 was charged against revenue, while the remainder came from loans. Before the War (1906-13), the Commonwealth borrowed, for productive purposes, £3,401,237; during 1914-21, £12,656,407 was borrowed toward the same end. For the same periods, state borrowings totaled £88,471,724 and £146,295,100. The Commonwealth Bank, opened in 1913, had in 1921, £70,705,875 in deposits. On July 31, 1922, the Commonwealth had in circulation

£53,390,809 in notes, against which the gold reserve was 44.08 per cent of the total.

History. The year of the War's outbreak saw the installation of a Labor government in Australia. Mr. Cook's ministry had worked under the handicap of a Labor majority in the Senate since 1913, with the result that the new problems of war and Labor's increasing independence forced the dissolution of Parliament. In the elections of September, 1914, Labor's victory was impressive, the poll showing 41 seats to 33 for the Liberals in the lower house and 31 seats to 5 in the upper. Mr. Fisher now headed the cabinet. Under W. M. Hughes, who succeeded in October, 1915, Australia assumed a place of prominence in imperial if not in international affairs, for Australia was being watched with growing attention. Under Mr. Hughes's direction, Australia, once so completely indifferent to the purposes of imperialism, became the veritable storm-centre of imperial politics and presented the curious spectacle of a country, in spite of its distance from the main theatre of the War, rent by international dissensions. In all this the premier was the focal point. From 1915 to 1922 it may be said that his personality dominated the affairs of the Commonwealth. In 1916, on his return from England, he showed himself a die-hard, in spite of his Labor antecedents. His policy, plainly announced, called for a war waged to the finish; compulsory military service for home defense and overseas operations; imperial trade protection, and a closer imperial partnership. To Mr. Hughes it appeared that Australia's war effort was languishing, and that only the energetic measure of conscription could remedy the fault. At the outbreak of the War, Australia had seemed the most loyal of all the dominions. In September, 1914, an expedition had been equipped and despatched to German New Guinea and there had met with an easy and instantaneous success. Before the month was out, German New Guinea, German Samoa, and the Bismarck Archipelago were all in Australasian hands. Australians, in a steady stream, had left the country to fight at Gallipoli, in France, and in Palestine. But by 1916, it was plain that voluntary enlistments were diminishing. In June and July these were totaling only 6000 monthly. It was, therefore, to get out the 300,000 troops he had promised London that Mr. Hughes decided to resort to a conscription referendum. And it was here, too, that he met an organized opposition and was compelled to part company with his old party and even see himself expelled from it. The bitter campaign which preceded the vote showed that Labor was unalterably opposed. Four colleagues resigned before the balloting started. When the vote was finally announced, it was seen that conscription had been defeated: 1,146,000 against and 1,085,000 for. Around these two elements, therefore, the subsequent political struggles were to gather. On one side was the increasing intransigency of Labor; on the other was the fixed determination of Mr. Hughes and the conscriptionists to see the War through to a successful conclusion. In February, 1917, Hughesites and Liberals constituted a coalition government under the name Nationalist party, with Mr. Hughes as premier. In the general elections of May 5, 1917, the Nationalist party was returned, but with reduced majorities. Labor was recalcitrant. Strikes, which had be-

come frequent in 1916, took on a virulent form in 1917; many of them were protracted. For instance, the railway men of New South Wales went out in 1917 for six weeks and involved thousands of workers in allied industries. Nothing showed this temper better than the decisiveness with which Mr. Hughes' second conscription referendum was defeated in December, 1917. The majority this time was almost 200,000; that in New South Wales alone was 140,000. Thenceforth Labor's tone was almost revolutionary. Mr. Hughes steadily refused to resign in the face of his promise to regard the referendum vote as a test of confidence. Labor, in retaliation, issued a manifesto stigmatizing the War as of capitalist origin and calling for an immediate peace conference on the basis of evacuation of territories and self-determination; refused to cooperate in the speeding up of recruiting; and in June, 1918, at its annual convention, passed resolutions demanding an immediate cessation of hostilities. In the same month the important Australian Labor Conference met to congratulate Russia on the success of her revolution and to present a programme of peace terms as far-reaching as that of the British Labor Party. On this hostile note the War came to a conclusion.

For her size and resources, Australia's war effort was extraordinary. Recruiting brought 417,574 men under arms; of these 329,682 saw overseas service. Australians fought in France, at Gallipoli, and in the Near East. The small Australian fleet had been active, as witness the destruction of the *Emden* by the *Sydney*. Casualties showed 58,471 killed and died, 4264 prisoners, and 150,241 wounded. The attitude toward the returned soldier was generous. Employment was found for 121,339 ex-service men up to April, 1922, and of these, 22,444 were settled on the land, at a cost to the Commonwealth of £31,513,130. Besides, the Reparation Department provided pensions for 222,537 men, while £30,000,000 was distributed in gratuities. As far as the Commonwealth was concerned, the War cost £288,000,000. The country was organized for war service at home, too. Two measures, a National Defense Act and the War Precautions Act, provided for the calling of the full man power for local service, in the first case, and in the second, for the transference of every activity to a war basis. Under this dispensation the government proceeded to fix prices in every state, introduce a moratorium in the interest of debtors, and establish pools for leading products. Legislation, on every conceivable subject, could be put through by the mere gazetting of a regulation. As a result of this prerogative, two important tendencies manifested themselves. The government at times assumed arbitrary powers, interfering in freedom of speech and assembly and going so far in 1920 as to check a labor strike. Again, operating under the same act, it aided in the creation of a wheat pool (1915) and a wool pool (1916) for the handling and marketing of these commodities which played so important a part in the country's economic well-being. Wheat, for the five seasons of 1915-20, was sold largely to Great Britain, and 500,000,000 bushels were handled in this way. As for wool, in the four seasons 1916-20, 2,280,000,000 pounds were disposed of. The wool pool, under another form, a company called the British-Australian Wool Realization Association, succeeded in disposing

of the heavy carry-over stocks by 1922, so that even a profit accrued to the Australian growers. The result of all this was a very perceptible air of prosperity during 1916-20. Banks declared increased dividends and enlarged their capital; Australian companies sought investments abroad; and the annual agricultural shows were attended by record-breaking crowds.

At the Peace Conference Mr. Hughes displayed an extreme imperialistic attitude, and curiously enough, won the commendation of Englishmen rather than of Australians. His advocacy of a White Australia, through his objection to the Japanese amendment to the League of Nations covenant for the acceptance of the principle of racial equality, and his firmness with Germany, gave him an imperial reputation, while his position at home steadily weakened. Australians were beginning once more to display a greater concern over their local affairs, and their apathy with regard to larger issues was marked. In the period 1919-24, these matters were to the fore: Australian unification; the position of labor; economic and financial reconstruction. During the war period, but more particularly after, a large group of the population sought an aggrandizement of the Commonwealth's powers at the expense of the several states. During the War, the need for central agencies for the regulation of trade, commerce, prices, etc., was plainly perceptible, and Mr. Hughes was the leading advocate of centralization through the agency of constitutional amendments. But war measures gave him the powers he demanded, so that as the War progressed his interest diminished. From 1918 on, Labor became the leading champion of the movement; a powerful central government could more nearly control industry, effect common treatment of wage problems, and bring nationalization of key industries closer to realization. The result was that in the elections of December, 1919, Labor took its stand wholly on two referenda whose purpose was the incorporation of constitutional amendments aiming at such centralization. The measures were defeated, but agitation continued unchecked. Again, the post-war period showed a tightening of the lines of conflict in the body politic. Up to 1919, by the acceptance of the principle of a white Australia, the championing of a high protective tariff, and the favorable reception accorded the work of the Commonwealth Court of Conciliation, Labor had made a direct bid for middle-class support. The leading force was the Australian Workers' Union, organized like the American Federation of Labor on craft lines, and this body consistently applied itself to the formation of political programmes that could give offense to neither small shopkeepers nor small farmers. But the growing affluence of one section of the community, its increasing conservatism, and its hostility to the workers, gave impetus to a new radicalism. Industrial action rather than political gained currency, so that in 1919 the Left Wing of New South Wales Labor split off from the Australian Labor Party to champion the idea of the one big union. The creed became so popular that at the 1921 conference of the Australian Labor party, a plain attempt was made to win back the insurgents through the adoption of a radical programme. Industrial unionism was endorsed, the socialization of industry advocated, and the stamp of approval given a doctrine that was altogether

Marxian in its insistence upon class loyalty. Nor was Labor the only group to stress class feeling. The farmers, in 1919, for the first time entered the political scene with a party of their own, the Country party, and began to play an important rôle in the post-war elections. Their special concern was to combat the Socialist proposals of the Labor party and to oppose the further extension of the eight-hour day. Very perceptible hostilities thus appeared. The workers continued to flout the rulings of the Court of Conciliation, went on strike frequently, and demanded the establishment of a basic wage throughout the Commonwealth. On the other hand industry looked askance at the Court, too, for its inability to level down wages in times of stringency, as in 1921 and 1922. This profound disagreement was shown in the failure of the Economic Conference of February, 1922, to bring to a truce the two contending parties. Even Mr. Hughes, usually sanguine, confessed the inadequacy of the existing machinery.

Politics reflected these antipathies. Mr. Hughes was confronted by three hostile parties. Labor, the Liberals, and the Country Group. He decided, therefore, to hasten the general elections, and on Dec. 10, 1922, he went to the country on the record of his Nationalist administration during its six years in power. The results showed, in the lower House, 27 Nationalists, 29 Labor, 14 Country, 4 Liberal; in the upper, an increase of 11 seats for Labor to eight for the Nationalists. Mr. Hughes was discredited, and five of his ministers were defeated, so that on Feb. 3, 1923, he resigned. A new government was formed as a result of a Nationalist-Country-Liberal coalition, with Stanley M. Bruce as premier. The prevalence of new men was shown by the fact that seven cabinet members had had no previous Parliamentary experience, while Mr. Bruce had first been elected to Parliament in 1918, and Mr. Page, the Country leader, in 1919. The administration's programme accepted the necessity for unification in labor matters, taxation, and public works development, and advocated a strong defense programme and greater application to the problems of immigration and land settlement. Little of this was realized by 1924, for the government's leading concern was the keeping of Labor from power. In this they were temporarily successful, but early in 1924 the Country party ceased to support the Nationalist-Liberal coalition in state elections, and thus permitted Labor victories in Queensland, Tasmania, and West Australia. In the broader sphere of imperial politics, Premier Bruce showed himself no whit less aggressive than his predecessor. Representing Australia in the Imperial Conference which met at London in October, 1923, Mr. Bruce made an outspoken plea for the adoption by the mother country of a protective preferential tariff which would give Australian and other colonial producers of meat and grain an advantage over American exporters, who, he declared, were driving Australian growers out of business. On May 9, 1921, Australia established its civil administration in the former German possessions of Kaiser Wilhelm's Land (German New Guinea), Bismarck Archipelago, and the Solomon Islands, which had been assigned to Australia by the League of Nations under a Class C mandate, dated Dec. 17, 1920. The mandate permitted the Commonwealth to ex-

tend its laws to the mandated territory, but not to establish fortifications there. The governors-general over the period reviewed were: Sir R. Munro-Ferguson (1914-20) and Lord Forster (1920-). See also NAVIES OF THE WORLD.

Economic Conditions. In 1910, there were 482 trade unions with 302,119 members. During the War the increase was steady, so that in 1920, the 388 unions in existence had 684,540 members. The inability of the Conciliation Courts to cope with labor unrest is revealed by the following figures:

Year	Strikes	Workers Engaged	Days Lost
1913	208	33,493	623,528
1917	444	173,970	4,599,658
1919	460	157,591	6,308,226
1921	359	104,833	1,030,271

The war period, in particular, was characterized by strikes of long duration, many of them aimed at the government. In 1917, there were strikes among the railroad workers, the wharf laborers, and the seamen. In 1920, the teachers of Western Australia joined forces with the civil servants and went on strike to force a higher wage. The miners of the Broken Hill Association were out from May, 1919, to November, 1920. Prosperity was general during the period up to 1921, when the world depression made its mark on Australian industry, too. Prices rose during 1919, 1920, and 1921, to 186.33, on the index figures of 100 for 1914, but by 1922, they had dropped to 154. Wages were readjusted accordingly, and, in fact, remained higher in 1922 than prices. See EXPLORATION.

AUSTRALIA, EARLY PEOPLES OF. See ETHNOGRAPHY.

AUSTRIA, LOWER. A province of the Republic of Austria. In 1910 it had an area of 7654.4 square miles and a population of 3,531,814. In 1923, its area was 7451 square miles and its population 1,478,697. See AUSTRIAN REPUBLIC.

AUSTRIA, UPPER. A province of the Republic of Austria. Its area in 1910 and 1923 was 4620.3 square miles. Its population in 1910 was 853,006; in 1923, 873,702. See AUSTRIAN REPUBLIC.

AUSTRIA-HUNGARY, or THE AUSTRO-HUNGARIAN MONARCHY. In October, 1918, the Austro-Hungarian Monarchy collapsed. Out of its former constituent elements, the Austrian Empire and the Hungarian Monarchy, emerged a group of succession states whose territories were made up in whole or in part of the old Austrian and Hungarian provinces. Of these succession states, the following were formed entirely of Austrian and Hungarian territories: The Republic of Austria, the Kingdom of Hungary, and the Republic of Czechoslovakia. The new states of Poland, Jugo-Slavia, were formed, in part, of Austro-Hungarian territories. (See HUNGARY, CZECHO-SLOVAKIA, POLAND, JUGO-SLAVIA, as well as RUMANIA and ITALY, which also made territorial gains as a result of the dissolution of the Dual Monarchy, and TIROL, GERMAN SOUTH; KLAGENFURT BASIN, BURGENLAND, FIUME-ADRIATIC CONTROVERSY, BANAT, TRANSYLVANIA, GALICIA, and TESCHEN, ZIPS, AND ORAVA, scenes of territorial disputes arising out of the peace treaties.) In the article below will be found these discus-

sions: foreign policy of Austria-Hungary during the years 1914-18 (which is based to some extent on the researches and writings of the well-known Austrian historian, A. F. Pribram, notably his *Austrian Foreign Policy, 1908-18*; internal political history of the Austrian Empire, 1914-18; Economic history of the Austrian Empire, 1914-18. There is also an account of the history of the Austrian Republic, 1918-24. Hungary, 1914-24, is treated under the title HUNGARY.

Foreign Policy of Austria-Hungary, 1914-18. As a result of the Balkan Wars the Dual Monarchy suffered considerable loss of prestige. The weakening of its position in the Balkans, and the triumph of Serbia in the second Balkan War, were circumstances as unfavorable to the security of the Habsburg monarchy as they were favorable to the development of a violently anti-Serbian and anti-Slavic policy at Vienna, where it was keenly realized that among the 24,000,000 Slavic subjects of the Emperor-King no small number sympathized with Pan-Serbian and Pan-Slavic aims. In Serbia, the Viennese statesmen saw a direct menace to the Jugo-Slav provinces of Bosnia, Croatia-Slavonia, Dalmatia, and Carniola; and behind Serbian-Jugo-Slav nationalism they fancied they perceived a menacing Russian Pan-Slavic design which, if not balked, would culminate in the dismemberment of the polyglot Danubian monarchy. To regain prestige and influence in the Balkans seemed vitally necessary. But Austro-Hungarian diplomacy tried in vain to compose agreements between Bulgaria on the one hand and Rumania, Turkey, and possibly Greece, on the other. These efforts proved fruitless because of the divergent interests and the mutual distrust of the Balkan states. In fact they served to estrange Rumania and Bulgaria from Vienna, as the rapprochement between Rumania and Russia showed, following the meeting of King Charles and Czar Nicholas at Constanza on June 14, 1914. The treaty between Bulgaria and Turkey fell through, and so did the compromise between Rumania and Bulgaria and the attempt to bind Greece closer to the Triple Alliance. These difficulties were aggravated still more by the fact that Berlin and Vienna disagreed as to the service which the respective Balkan states would be able to render to the Triple Alliance. Berlin held that Bulgaria should be sacrificed to Rumania, while Vienna feared that in case Rumania should refuse to consider such a proposal, it would be confronted at some future time by a solid Balkan bloc under the leadership of Russia. Count Berchtold succeeded finally in convincing Berlin of the soundness of the Vienna viewpoint, and from March, 1914, the fundamental aim of the Balkan policy of the Central Powers was to bring Bulgaria entirely into their camp. At the same time the relations between the Dual Monarchy and Italy grew steadily colder, and although in the Conference of Abbazia, San Giuliano and Berchtold came to an agreement in April, 1914, it became clearer every day that soon the growing sympathy of the Italians for the Entente would seriously endanger the Triple Alliance. Vienna's apprehensions in regard to Italy and the ever-increasing influence of the Entente in that country were allayed, however, by the knowledge that negotiations were going on between the English and the

Germans for the establishment of more amicable relations. These efforts were heartily seconded by Count Mensdorf, the Austro-Hungarian Ambassador in London. Meanwhile Vienna believed that France and Russia had succeeded in creating a Balkan League and under that impression Konrad von Hötendorf, chief of the general staff, drew up on June 22, 1914, a memorandum in which he painted the Balkan situation as very dark for Austria-Hungary and requested that Rumania be compelled to commit herself for or against the Central Powers and that in the latter case an alliance be formed with Bulgaria. A similar memorandum was prepared by Foreign Minister Berchtold for Berlin; in this the imperative need for the formation of a Balkan League, not including Serbia, and under the leadership of the Central Powers, was stressed. Before this memorandum could be presented, events occurred which immediately changed the entire situation. On June 23, 1914, Francis Ferdinand, the Austro-Hungarian heir to the throne, and his consort were assassinated at Sarajevo in Bosnia. The resulting Austro-Hungarian ultimatum to Serbia, and the outbreak of the War are described elsewhere (See WAR IN EUROPE). The above-described policy was of prime importance in bringing the War to pass. In taking a gambler's chance of crushing Serbia without Russian intervention, the reckless Berchtold was opposed by saner statesmen, notably Count Tisza, chief spokesman of the Hungarian ruling class.

Italy (q.v.) refused active aid to Austria-Hungary in her struggle with Serbia on the ground that her treaty did not oblige her to, but she raised the question of future compensation, a request which was granted by Vienna under pressure from Berlin, with the proviso that Italy would fulfill her treaty obligations. Italy denied again that a *casus fœderis* existed and remained neutral. Likewise Rumania failed to join the Central Powers, although she was promised Bessarabia. Rumania maintained that her construction of her treaty obligations did not warrant the abandonment of her neutrality. The Central Powers were more successful in regard to Turkey. The Austro-Hungarian Foreign Office supported all promises and concessions made by Germany to Turkey in the early weeks of the War for the purpose of inducing the latter to enter the camp of the Central Powers. All efforts on the part of Austria-Hungary, to have Bulgaria take an active part in the War against Serbia, so that her own armies might be released to meet the ever-growing pressure from the Russians on the eastern front, remained fruitless, because Ferdinand of Bulgaria was too clever to commit himself, until the military superiority of the Central Powers should be definitely established. Moreover, the Austro-Hungarian reverses had a bad effect in Sofia and especially in Bucharest, where Entente influences were growing steadily. Advice from Berlin in favor of territorial concessions to Rumania and later counsel not to oppose a march of Rumanian troops into Transylvania were strongly opposed by the Hungarians and hence not heeded by Berchtold. After the death of King Charles of Rumania on Oct. 10, 1914, the Rumanian situation became even more unsatisfactory, for Ferdinand, the new king, was less friendly to the Central Powers than his uncle had been.

and although he remained neutral, he would not bind himself to an agreement not to march against the Central Powers, in spite of all efforts made in this direction by Count Czernin, the able Austro-Hungarian Minister in Bucharest. Meanwhile the negotiations with Sofia advanced or lagged in accordance with the military victories or reverses of the Central Powers. Although in the beginning of 1915, Vienna, in conjunction with Berlin, was ready to grant the far-reaching territorial demands of Bulgaria, provided the latter country entered the War on the side of the Central Powers, Ferdinand of Bulgaria decided to remain neutral for the time being in view of the unfavorable military situation. During the remainder of 1914, Italy maintained her neutrality as well as cordial relations with the Entente. At the same time, the Italian government pressed its demands for territorial concessions and hinted at the Trentino. To this neither Berchtold nor Tisza, the Hungarian Premier, would listen, even though Berlin and the military leaders of the Dual Monarchy urged the purchase of Italian neutrality through such sacrifices. A few months after the death of San Giuliano, on Oct. 16, 1914, the situation became more critical. Regardless of Berchtold's previous refusals, Baron Sonnino, the new Italian Foreign Minister, let Vienna know plainly in December, 1914, all previous approaches in this direction having been made through Berlin as intermediary, that territorial concessions on the part of Austria-Hungary were desired by Italy as compensation for her future neutrality. New negotiations began thereupon between Rome and Vienna in the middle of December, but Berchtold still refused to consider the Italian demands. On Jan. 13, 1915, Count Berchtold was replaced by Baron Burian. In view of seemingly unfavorable military and diplomatic circumstances and under strong pressure from Germany, Burian opened in March, 1915, new negotiations with Italy, in the course of which the latter demanded extensive territorial concessions and the immediate transfer of the ceded districts. The latter demand was flatly rejected by Burian, but Italy was offered the major part of German South Tirol. This Sonnino refused to accept, and he presented on Apr. 10, 1915, a memorandum in which Italy demanded the whole of South Tirol, Gorizia, and Gradisca, and made a number of other requests, the fulfillment of which would have amounted in substance to the establishment of Italian supremacy in the Adriatic. Italy would promise neutrality for the duration of the War in return for these concessions. Due to the grave military situation at the time, Burian did not directly refuse these exorbitant demands but strove to keep the negotiations open and gradually increased his offers. His efforts were frustrated, however, by the conclusion of the Treaty of London on Apr. 26, 1915, under which Italy bound herself to join the Entente within a month. On May 3, 1915, Italy decided to declare its alliance with Austria-Hungary dissolved. Vienna was now willing to grant the full demands of the Italians, but without avail, for Italy declared war on the Dual Monarchy on May 23, 1915. For the subsequent developments of this territorial problem see TIROL, GERMAN SOUTH.

Vienna's tardy willingness to make great sacrifices for the sake of an understanding with

Italy had to a large extent been determined by the knowledge that Italy's declaration of war would ultimately be followed by that of Rumania, since on Feb. 6, 1915, the agreement of September, 1914, between Italy and Rumania had been renewed and had received an additional stipulation whereby the two countries pledged themselves to mutual assistance in case of an unprovoked attack on the part of Austria-Hungary on either one. As a result of the negotiations between Rome and Vienna, Bucharest had immediately increased its demands, which included now Transylvania in addition to the Bukovina. Vienna's refusal of these demands strengthened the influence of the Entente in Bucharest still further. The situation seemed critical for the Dual Monarchy, when suddenly the news of the great victory at Gorlice, May 2, 1915, arrived. This tremendous military success, and the subsequent events in Galicia and Poland during the summer of 1915, were powerful factors in helping the Rumanians to decide on neutrality for the time being. The Rumanian horizon cleared up, the Central Powers turned their chief attention to Bulgaria, for Turkey's lack of arms and ammunition made the establishment of direct land communication with that country necessary. During the first half of 1915 the Bulgarians had been continually negotiating with both the Central Powers and the Entente. Under the influence of the victories the prospects of the Central Powers in Sofia became much brighter, and on Sept. 6, 1915, treaties were signed between Austria-Hungary and Bulgaria, whereby Bulgaria pledged herself to enter the war against Serbia and was promised in return the whole of what is to-day Serbian Macedonia. It was further provided that, in case Rumania and Greece should enter the War on the Allies' side, Bulgaria should receive the territories ceded by her to these states under the Treaty of Bucharest (1913). With the conquest of Russian Poland in the summer of 1915, the Central Powers were confronted with the serious problem of the final disposition of that country. Various solutions advanced, such as the return of Poland to Russia, division of Poland between Germany and Austria-Hungary, annexation of the whole country by either one, or the creation of an independent Polish state under the tutelage of the Central Powers, were acceptable to neither. No agreement could be reached, till the defeat of the troops of the Dual Monarchy in the Brusiloff offensive of August, 1916, gave the German proposal for the creation of an independent state the preponderance. Still no definite steps were taken. A proclamation on Nov. 5, 1916, promised to the Poles the restoration of an independent Poland under a hereditary monarchy. Meanwhile the divided administration of the country by the Germans in Warsaw and the Austro-Hungarians in Lublin continued.

During 1916 the Central Powers carried on continuous negotiations with Rumania. Their offers, which were conditional on Rumania's entrance into the War on their side, were refused by the Rumanian statesmen, who were at the most prepared to concede only neutrality. Germany and the Austro-Hungarian High Command urged far-reaching concessions in the Bukovina and Transylvania, but Burian and the Hungarians were not willing to consider such proposals. At the same time the in-

fluence of the Entente in Bucharest grew stronger all the time and the Austro-Hungarian defeats in Russia in August, 1916, served to strengthen the conviction of the Rumanians that the ultimate superiority in the War lay with the Allies. Burian continued his steadfast refusal to grant the Rumanian demands and at the end of August, 1916, an agreement was concluded between the Allies and Rumania whereupon the latter, on August 27, entered the War against the Central Powers. In order to allay Turkish fears growing out of Rumania's entrance into the War, Germany concluded two agreements with Turkey on Jan. 11 and on Nov. 27, 1917, which provided for the abolition of the capitulations. The Dual Monarchy hesitated for a long time to come to similar agreements with Turkey, and only on Mar. 30, 1918, was a treaty signed between Turkey and Austria-Hungary under which the latter bound herself not to sign any peace re-establishing the capitulations. The weariness of the Austro-Hungarian people, who had suffered more from the War and were in a much weaker condition than their German allies, induced the Vienna government to address itself to Berlin in the fall of 1916 with the proposal to inquire through neutral channels whether the Allies were prepared for a discussion of peace. Germany objected, and for a time there was a lively exchange of opinion between the two governments. Finally an agreement was reached. Emperor Francis Joseph had died meanwhile, and Charles had ascended the throne. The latter was determined on the conclusion of a peace satisfactory to both sides. On Dec. 12, 1916, the Quadruple Alliance made its peace offer, proposing a conference of the Powers. Austria-Hungary at this time was ready to conclude a peace which left her territory intact and gave her minor frontier rectifications. The offer was met on Jan. 12, 1917, by the answer of the Allies to President Wilson's peace proposal. Thereupon Germany started her campaign of submarine warfare. Neither Count Czernin, who in the meantime had become Austro-Hungarian Foreign Minister, nor Emperor Charles entertained the sanguine hopes which the Germans placed on this policy, and they gave their consent to it only under pressure from the German statesmen and generals, and the Emperor. Czernin, in fact, pointed out the danger of war with the United States. While war broke out between Germany and the United States on Apr. 5, 1917, the United States did not declare war on Austria-Hungary until Dec. 7, 1917. As the results of unlimited submarine warfare fell short of expectation, Emperor Charles on Mar. 24, 1917, through his brother-in-law, Prince Sixtus of Bourbon-Parma, proposed peace pourparlers and assured France of Austrian support for her "just claims" on Alsace-Lorraine. On Mar. 27, 1917, Count Czernin, who knew the substance of the offer, but not the text, signed an agreement with the German Chancellor which contained a minimum and maximum programme for peace neither one of which provided for ceding Alsace-Lorraine to France. On Apr. 3, 1917, and repeatedly afterwards, Count Czernin approached the German Emperor and his statesmen with a peace proposal which suggested possible cession of Alsace-Lorraine to France, and, as compensation for this sacrifice, the annexation of Poland to Germany. Such a proposal the Germans re-

fused to consider. Shortly thereafter the Prince Sixtus move came to naught, because the Italians insisted on territorial concessions as promised by the London Treaty, which Austria-Hungary was not prepared to grant at this time. Under these circumstances Emperor Charles and Czernin concluded, on May 17-18, 1917, an agreement with Germany which provided for large Austro-Hungarian annexations in the Balkans, and, on the fulfillment of these conditions, for the surrender of Austro-Hungarian interests in Poland to Germany. Czernin, however, during the remainder of 1917, continued his efforts in various directions toward a peace by agreement, but without result.

A ray of light appeared with the Bolshevik ascent to power in the East. The new Russian government issued a summons for a general peace, and on the refusal of the Entente to consider it, began peace negotiations with the Quadruple Alliance on Jan. 9, 1918. Various difficulties arose, some of which led to the conclusion of Feb. 9, 1918, of a separate peace between the Ukrainians and the Quadruple Alliance. Under this peace the Austro-Hungarian frontiers remained unchanged, but the Dual Monarchy promised to surrender the district of Cholm, in Russian Poland, for incorporation into the Ukrainian Republic, and to make Galicia an autonomous Austrian Crownland. After further difficulties with the Soviet delegates, in which Czernin was often at variance with the German spokesmen and which brought about a temporary renewal of the war with Russia, a peace treaty was signed on Mar. 3, 1918, at Brest-Litovsk. From this peace the Dual Monarchy received no territorial enlargement. Poland having become an independent state under the Brest-Litovsk Treaty, the Polish question came up once more. The decision of the previous year, to leave Poland to Germany, was abandoned, and Charles and Czernin advocated in its stead the Austro-Polish solution, which provided for the incorporation of Poland in Austria-Hungary. This scheme was opposed by the German government, which would merely consent to a personal union between Poland and the Dual Monarchy. This latter proposal Vienna refused to accept. The Poles made skillful use of this disagreement between the two Powers and obtained the signature of the latter to a protocol providing for a future rectification of the frontier between Poland and the Ukraine. Count Hertling, the German Chancellor, advised Vienna in July, 1918, that Germany would not accept the Austro-Polish solution and would leave it to the Poles to choose their form of government, provided that they came beforehand to an agreement with the Central Powers. Vienna accepted in principle, but succeeding negotiations failed to bring a solution. The peace with Russia led also to the signing of the Peace Treaty of Bucharest on May 7, 1918, which gave Austria-Hungary a strategic frontier with Rumania and valuable economic advantages.

The favorable settlements gained in the East could not, however, hide the grave condition of the Dual Monarchy, which was in urgent need of peace. Czernin, fully aware of this, attempted unsuccessfully in various ways in the early months of 1918 to bring about a cessation of hostilities. He even approached President Wilson through the King of Spain. The only possible road which could lead to peace for

Austria-Hungary, namely, the conclusion of a separate peace with the Allies, which would have been equivalent to leaving Germany in the lurch, Czernin refused to take. This he had stated on previous occasions, and did so again in his address to the Vienna Town Council in April, 1918. This latter statement led to the publication by Clemenceau of Emperor Charles's letter to Prince Sixtus in the previous year, in which reference had been made to the "just claims" of France on Alsace-Lorraine. Czernin, who had not been apprised of this reference, resigned thereupon and was succeeded by Burian. Charles had to make a penitent trip to German headquarters at Spa in order to appease Emperor William and was induced on May 12 to sign an agreement binding the Dual Monarchy closer than ever to Germany. The agreement, however, did not become effective, due to the breakdown of the negotiations on the Polish question, on which it had been made to depend. The ultimate failure of the great German effort in the West made the Germans more amenable to the Austro-Hungarian insistence on peace by diplomacy, although before August they had rejected all of Charles's and Burian's efforts in this direction. Since Vienna and Berlin could not agree on a proper course of action, Burian made finally, without Germany's participation, an appeal to the Allies which was turned down flatly and resulted in revealing to the Entente in a more glaring light than ever the desperate straits of the Dual Monarchy. The catastrophic military events of the early fall and the defection of Bulgaria and Turkey ushered in the last act of the drama. The Austrian collapse followed rapidly. Austria-Hungary and Germany appealed to President Wilson for an armistice. When Wilson failed to reply, Emperor Charles in a manifesto on October 16 proclaimed Austria a federal state. Wilson rejected the peace offer, finally declaring that the United States recognized Czecho-Slovakia as an independent state and acknowledged the national aspirations of the Southern Slavs. The dissolution becoming manifest now, Charles was ready to make a separate peace at great sacrifice, provided the territories remained under the dynasty, no matter in how loose a federation. On October 24 Count Andrássy became Foreign Minister and three days later the pacifist Professor Lammasch was appointed Austrian Premier. New efforts for an armistice failed. The débâcle in Italy brought about the final disintegration. On November 3 the Dual Monarchy was forced to sign an armistice which turned her over, defenseless, into the hands of the victors and compelled her to give passive aid against her ally. Emperor Charles agreed to this under protest. But the catastrophe went still further. Charles gave up his share in the Austrian government on November 11, without, however, renouncing his crown. The Lammasch government finished its task of liquidation and resigned. The proclamation of the Austrian Republic on November 12 and of the Hungarian Republic on November 16 completed the disintegration of the Dual Monarchy. (For the Treaty of St. Germain and the Treaty of the Trianon, see PEACE CONFERENCE AND TREATIES.)

Internal Political History of the Austrian Empire, 1914-1918. All predictions to the contrary notwithstanding, the outbreak of the War evoked from the various nationalities com-

prising the Austrian Empire loud protestations of their loyalty to the dynasty and the state. Even the Czechs gave evidence of their enthusiastic support of Austria's cause in the War, and the Austrian Poles called for a union of Russian Poland and Galicia under the Habsburg crown. Likewise most of the Italians in the Tirol remained faithful after Italy's entrance into the War. In spite of these favorable demonstrations, the Austrian government did not deem it advisable to convoke Parliament. The ministry was in a position of almost complete political impotence and practically all control over internal affairs was in the hands of the military, which used rigid and shortsighted police measures. This system led finally to the assassination of the premier, Count Sturgkh, on Oct. 21, 1916, by the Socialist, Friedrich Adler. Under his successor, Dr. Körber, little change was wrought in the internal affairs of Austria. The only outstanding event of his administration was the creation of an Office for Food Control on Nov. 14, 1916, which was later enlarged into the Food Ministry. On the death of the aged Francis Joseph, Nov. 21, 1916, young Charles Francis Joseph, as the nearest heir, inherited his great-uncle's crown. Emperor Charles, ambitious and intelligent, was resolved not only to maintain the greatness of his dynasty, but also to effect a constitutional readjustment more satisfactory to the non-German peoples of the empire and to restore peace at the earliest opportunity. Himself assuming supreme command of the army, he proceeded to replace many of the highest officials with his own trusted friends. Hötzendorf was superseded by Aiz von Straussenburg as chief of staff; Foreign Minister Burian gave place to Count Ottokar Czernin; and Premier Körber, with whom the headstrong monarch disagreed on several issues, was dismissed on December 20, to be followed by a Czech nobleman, Count Clam-Martinitz, in whom Charles expected to find a more obedient agent for the execution of his policies. That the highhanded measures of the military rule and the economic hardships produced by the War had not yet at this time seriously affected the allegiance of the various nationalities to the Crown was evinced by the numerous declarations of loyalty which followed on President Wilson's note of Dec. 11, 1916, and the answer of the Entente of Jan. 12, 1917, in which reference had been made to the oppressed nationalities of Austria. At the same time, however, actual attempts at ironing out the conflicts and difficulties between the nationalities proved futile. On the final convocation of Parliament, on May 31, 1917, the Southern Slavs and the Czechs demanded the creation of a federal state, and the German Austrians offered strong opposition to any such proposal. Under these circumstances Clam-Martinitz, who had hoped for a national coalition, resigned on June 19, 1917, and was succeeded by Ritter von Seidler. On account of the amnesty granted the Czech political offenders on July 2, 1917, the German National Council at Prague passed on July 15 a vote of censure. With a reorganized cabinet, Seidler embarked in August, 1917, on a vast plan of social, economic, and political reform, which, however, proved a complete failure. In fact, his attempts at reconstructing the state on the basis of national autonomy served to reveal to

what extent dissolution had progressed. The nationalities advanced demands now which could hardly be reconciled with the unity of the Empire. The calling of a fresh Parliament on June 16, 1918, proved no remedy. The previous day, the Czechs had set up at Prague a national committee demanding a sovereign and independent Czecho-Slovak state. Seidler resigned on July 22, 1918. Baron Hussarek, his successor, attempted in vain to reconcile the nationalities. Disintegration had gone too far. The Czechs won Allied recognition in August and were acting as an independent nation. The Poles, too, had become intractable, although Hussarek advocated Polish independence. As a last means to avoid dissolution, the Emperor issued on Oct. 16, 1918, his manifesto proposing a federal state for Austria. Its effects on the nationalities was null, because at the same time they were beginning to set up national councils. Disintegration was an established fact. The last imperial cabinet, the ministry of liquidation of the pacifist Lammasch, Oct. 27-31, 1918, could do no more than help the peaceful settlement between the rising Republic of Austria and the succession states, Czecho-Slovakia, Jugo-Slavia, and Poland.

Economic History of the Austrian Empire, 1914-1918. The outbreak of the War produced a serious economic crisis in Austria. Industrial production ceased almost entirely and the country was cut off from foreign markets. In agriculture great want of labor was encountered in bringing in the harvest. The government tried to meet the serious situation, but all that it could do was to close the Bourse and declare a moratorium. More than any governmental measures, the development of a war industry helped to improve the situation. The needs of the army stimulated production for military purposes, especially since only a very limited market could be found for non-military products. This transformation of Austrian industry took place within six months after the outbreak of the War. Soon, however, and in an increasing degree as the War progressed, Austria was faced with a shortage of raw materials, resulting from the blockade and the disruption of all communication between the Central Powers and the outside world. This was further aggravated by the fact that parts of the Austrian Empire which had been productive of raw materials were in the hands of the enemy. Moreover, economic union, so necessary in time of war, did not exist in the Dual Monarchy, and in the negotiations on economic matters Hungary, as the producer of foodstuffs, was often able to strike bargains which were greatly to the disadvantage of Austria. Shortage of raw materials and lack of foodstuffs forced the government soon to take measures for the regulation of supplies and to set up a rigid system of central control. A further step of the government in war economy was an agreement with the German government regarding the distribution of raw materials between the two powers. Austria followed Germany's example in creating central offices for the purchase of raw materials abroad. When this purchase was more and more curtailed and ceased in 1915, the central offices were transformed into a machinery to ensure the utmost economy in the use of raw materials within the country. The central offices, which were

composed of experts, supervised distribution and performed other duties in order to conserve or increase the stock of materials. Strict measures were used to regulate the supply of foodstuffs. For this purpose food cards were finally introduced. The entire traffic in grain was regulated by a Central Grain Traffic Office exercising absolute control over grain, flour, mills, and bakeries. It fixed the price of bread, determined its quality and rationed the supplies. For industries which employed grain as raw material, as for instance the brewing industry, offices similar to these central offices for raw materials were established. The functions of these offices were to regulate the distribution of supplies and to stimulate new methods of production in the industries. In short, the state set up a rigid system of centralized control over economic activities, which, if it did not function well, served at least the necessary purpose for which it was created. But rationing methods could not make up for lack of raw materials and foodstuffs. Not only did imports from abroad cease almost entirely, but production at home fell off for a number of reasons. Between 1914 and 1918 the crops decreased by more than 50 per cent through lack of labor, draft animals, implements, and manure. The substitutes which the people were taught to use were entirely inadequate. The population grew restive under the interminable hardships and deprivations, and labor became fruitful soil for revolutionary ideas. The War and the following collapse of the Empire left Austria economically destitute, but the subsequent settlement succeeded in making conditions even worse than they had been before.

AUSTRIAN REPUBLIC. The Austrian Empire had an area of 115,831.9 square miles and a population of 28,571,934 in 1910. As a result of the Treaty of St. Germain (Sept. 10, 1919), the plebiscite decision in the Klagenfurt (q.v.) district, and the ruling of the Council of Ambassadors with respect to the Burgenland (q.v.), the Austrian Republic had, in 1922, an area of 32,352 square miles and a population of 6,428,336 according to the census of 1920. The density per square mile was 199; females in the population were in the ratio of 1089 to 1000 males. The Republic consists of the following provinces: Vienna, Lower Austria, Upper Austria, Salzburg, Styria, Carinthia, Tirol, Vorarlberg, Burgenland. The leading towns gave these population figures for 1920 (1910 figure in parentheses): Vienna, 1,841,749 (2,031,498); Graz, 157,644 (151,886); Linz, 94,072 (67,817); Innsbruck, 55,650 (53,194); Salzburg, 36,749 (36,210). From 1916 to 1919 deaths continued to exceed births, the excess being 31,815 in 1916, 66,877 in 1918, and 14,555 in 1919. Births in 1920 numbered 137,324, and deaths, 116,284. Distribution by religions was thus given in the 1910 census for all this area except Burgenland: Catholics, 5,979,667; Protestants, 165,007; Jews, 189,758. As for education, there were, in 1920, 4772 elementary schools attended by 888,640 pupils, 143 secondary schools with 40,257 pupils, 4438 of them girls; and three universities, viz., Vienna (11,442 students), Graz (1937 students), Innsbruck (1968 students). Besides, there were 2 technical high schools and 18 theological schools.

Industry. Agriculture formed the main oc-

cupation of the country. In 1921, 4,152,237 acres were under crops, largely in Lower Austria and Upper Austria. The main classes were: fields and gardens, 24 per cent; woods, 38 per cent; meadows, 11 per cent; pastures, 16 per cent; vineyards, 0.6 per cent. The leading crops were wheat, of which 177,715 metric tons were counted in 1922; rye, 334,311 tons; barley, 119,340 tons; oats, 275,788 tons; potatoes, 832,985 tons; turnips, 530,514 tons. In every case but the last, the yield surpassed that of the previous year. Deprived of the agricultural products of the rich provinces of Moravia, the Alpine forelands, Bohemia, Galicia, Istria, and Goritz, the Austrians were compelled, after the War, to import their food stocks from Hungary, Bohemia, Russia, and Rumania. In 1920, imports of grain and flour totaled \$58,200,000; in 1921, \$49,100,000. That the agricultural situation was gradually improving was indicated by a smaller importation for 1922, viz., \$36,900,000. Livestock numbered, in 1919: horses, 243,000; cows, 911,000; oxen, 214,000; bulls, 55,000; calves, 539,000; swine, 1,269,875; sheep, 300,000; goats, 300,000. Mineral supplies were scarcely adequate for local wants. In 1921, 2,469,701 metric tons of lignite coal were mined, and 137,666 tons of anthracite, while 5,842,978 tons had to be imported. Iron ore mined in 1920 totaled 435,062 tons, largely from Styria. Other minerals were copper, zinc, lead, and salt. The leading industrial centres were in Lower Austria, Vorarlberg, and Upper Styria, where iron foundries and machine, automobile, textile, and clothing factories were gathered. Chemical and paper goods works were grouped chiefly around Vienna, which was also the centre of the artistic trades.

Trade and Communications. The first years of the Republic showed heavy adverse balances, which, however, continued to decrease. In 1921, imports of 8,228,249 metric tons were valued at \$349,960,000; exports of 1,546,532 tons were valued at \$186,259,000. For 1922, imports weighed 7,448,737 tons and were worth \$327,721,000; exports were 2,115,760 tons, at a value of \$209,944,000. During 1922, the greatest amount of imports, by weight, came from Germany, 37.3 per cent; from Czecho-Slovakia, 37.1 per cent; from Hungary, 6.3 per cent. Exports to Germany amounted to 31 per cent of the total; to Italy, 19 per cent, and to Hungary, 11.9 per cent. Up to 1923 trade was hard hit by Germany's disastrous competition in foreign and domestic commerce. The situation improved after 1923, particularly with respect to the Balkan trade, because of the disorganization of German industry and transportation, consequent on the Ruhr occupation, and because of the German tendency to quote prices only in foreign currencies. In 1923, however, the unfavorable trade balance had mounted up to \$163,000,000. Replacements of depreciated stocks were heavy in this first year of Austria's reconstruction; imports were many to avoid future turnover taxes, and many purchases were made in Germany with the stabilized Austrian crown, all of which helped bring this about. The factors of invisible exchange were also effective. Vienna was the banking centre of the Succession States as well as the wholesale centre; Austria had large interests in the industries in the Succession States; the tourist trade was consider-

able. Discounting these conditions, the adverse balance was still high, and it was an important reason for Austria's economic plight.

The country had 4274 miles of railway, of which 2964 were state-owned. The principal lines were the Western, the Northern, North-western, Eastern, and Franz Josef Railways, the last connecting Vienna with Czecho-Slovakia. Not until July, 1923, was the government able to see its way out of the hopeless railway tangle. From the end of the War, the railways had been regularly operated at a loss, because the portion of the railway system left in Austria contained a high percentage of mountainous track, which, before the War, had been counterbalanced by the level stretches in the territories now belonging to Czecho-Slovakia, Hungary, and Poland; it was necessary to import fuel; a surplus of personnel prevailed; the government operation was unprofitable. To meet the situation, by the law of July 19, 1923, a corporation was created to conduct operation under a centralized control. The government financed the venture with a capital of 200,000,000 crowns and placed control in the hands of a directorate of 14, 11 of whom were to be business men or transportation experts, and 3, representatives of railway employees. To the government were reserved the rights to regulate tariffs, approve loans, supervise social and safety measures, and regulate construction. River traffic was equally hard hit by the loss of ships and barges during the War.

Finance. Nothing revealed so completely the helplessness of the country as the unsatisfactory condition of government finances. Revenues for 1921-22 were 93,325,000,000 paper crowns, or \$42,276,000; for 1922, they were 209,763,000,000 crowns, or \$169,698,000; for 1923, they were estimated at 11,488,267,000,000 crowns, or \$160,836,000. Expenditures for 1921-22 were 258,229,000,000 (\$116,978,000); for 1922, 347,533,000,000 (\$281,154,000); for 1923, 13,862,760,000,000 (\$194,079,000). Thus the deficits were \$74,701,000, \$111,456,000, and \$33,243,000. From 1919 to 1921 conditions steadily grew worse, so that on Jan. 11, 1921, the Austrian government confessed itself at the end of its resources and offered to turn over the country's administration to the Reparations Commission which the Treaty of St. Germain had established in the country. While the Supreme Council talked, the country's obligations continued to pile up. In 1921 it was estimated that Austria's share of the Dual Monarchy's debt was 53,200,000,000 crowns out of its total debt of 116,693,000,000 crowns, with an annual interest charge of 1,918,000,000 crowns. Finally, on Sept. 27, 1922, the League of Nations accepted responsibility for the economic rehabilitation of Austria, and in so doing, practically established a dictatorship over the Republic. The plan accepted included the placing of a loan of \$135,000,000 for 20 years among Italy, Great Britain, France, and Czecho-Slovakia; the appointment of a commissioner general by the League of Nations to direct expenditures; a committee of control to represent each of the guarantor governments; the setting aside of gross receipts from customs and the tobacco revenue as security; the promise on the part of Austria to eliminate the deficit by 1925. The Austrian government agreed to push retrenchments, cut down personnel, etc. On Feb. 1, 1923, the League of Nations author-

ized the issuance of the loan. Of this, American bankers took \$25,000,000, at 7 per cent for 20 years. On February 21, the Reparations Commission renounced all rights to Austrian property and revenues for 20 years. As an indication of good faith, the Austrian government between September, 1922, and October, 1923, dismissed 50,000 functionaries; on Nov. 22, 1922, heavy increases were announced in the income tax, the tax on shares, and the turnover tax. Under Dr. Zimmermann, the League Commissioner General, appointed in December, 1922, the financial reforms were pushed and the success with which they met was indicated by the fact that the draft budget of 1924 carried a deficit of 836,900,000 paper crowns as against the 1923 deficit of 2,664,200,000,000. Whether it would be possible to reach a balance by 1925 was problematical, for with the growing soundness of economic conditions it was inevitable that expenditures should increase, especially in the replacement and repair of depreciated equipments. It was plain in 1924 that the Austrian people were taking heart at the activities of their government and that such a return of confidence could not but augur well for the future. On Jan. 1, 1923, a new National Bank for Austria was opened with a capital of 30,000,000 gold crowns.

Economic Conditions. Its state condition made it inevitable that the Austrian Republic should turn to the printing press to meet current expenses. In June, 1919, 7,000,000,000 paper crowns were in circulation; at the end of 1920, 30,600,000,000 paper crowns, with a metallic reserve of 8,807,000 gold crowns; 1921, 181,000,000,000 paper crowns, with 10,022,000 gold crowns in reserve; 1922, 4,080,400,000,000 paper crowns, with 356,000 gold crowns in reserve. That the currency should depreciate with this unprecedented inflation was inevitable. The gold crown at par is worth \$2026. On Jan. 1, 1922, the paper crown was worth \$.000387; on Jan. 1, 1923, \$.00014. The cost of living mounted. Compared with the figures for 1914, it rose to 13 in December, 1918; 69 in January, 1921; 662 in January, 1922; and 11,271 in December, 1922. Wages rose almost equally; on the same scale, the wage index for September, 1922, was 10,744. The establishment of the rehabilitation scheme at once changed tendencies for the better. In the first quarter of 1923, note circulation increased only 9 per cent; the metallic reserve increased; savings deposits became greater, and the cost of living index dropped 14 per cent. It is plain that these conditions had been merely the reflections of a general debilitation. Austria had been a manufacturing centre. After the War, the lack of raw materials, fuel, and grains brought on a complete breakdown. The government found it necessary to centralize trade in food, and in many instances, food stocks were sold to the public below their actual costs. To June, 1921, it was estimated that £32,500,000 was spent in foodstuffs by the government. Unemployment naturally mounted with the general breakdown. In May, 1919, 186,000 persons were out of work, 132,000 of them in the Vienna district alone. In April, 1920, the number had fallen to 46,000, with 38,000 in the Vienna district; by October, 1921, to 24,000 in the Vienna district. Thence forward it mounted again. December, 1922, saw 86,000 men out of work in Vienna, and January, 1923,

125,000; but in October, this figure had dropped to 77,900. The government applied itself to the problem of relief doles; in April, 1919, 46,000 were receiving aid; and not until May, 1920, was it able to put the situation on a scientific basis by the enactment of unemployment insurance legislation. It should be pointed out that the mounting unemployment of 1922-23 was a sign for the better. The exchange was now stabilized and industry was merely going through a transitional period. During these troublesome times measures were taken to render the lot of labor more comfortable. Many of these acts were of an advanced character. An eight-hour day was enforced, and laws were enacted for compulsory holidays, the legalizing of collective bargaining, the establishment of workers' councils in industry, and the building of houses by governmental agencies. For example, the city of Vienna, in 1923, made plans for the erection of 25,000 houses, workshops, and business places. These, then, were evidences of an economic and moral rehabilitation. At the close of 1923, observers saw Vienna regaining her position as a commercial and exchange centre of Southeast Europe. In 1923 alone, new capital investments in the country totaled 200,000,000. Three things were still needed, an intensification of agricultural methods, development of water power to eliminate heavy coal imports; and the breakdown of the customs barriers which the Succession States had erected.

History. The proclamation of the Republic of Austria on Nov. 12, 1918, left the country in a precarious political and economic situation. Its territory had been materially reduced and comprised not even all of the German language districts of the old Austrian Empire. The government was carried on by the provisional National Assembly which had convened on Oct. 21, 1918. On Feb. 16, 1919, a National Constituent Assembly was elected, in which the Socialists and the Christian Socialists held a majority. The Assembly elected the Socialist, Seitz, President of the new republic and appointed on Mar. 15, 1919, a ministry with Dr. Karl Renner as Chancellor. The new government launched a programme of extensive social and economic reform, including abolition of the feudal nobility and nationalization of the means of production; but confronted with serious internal difficulties, it was not able to proceed very far along these lines. As a result of the spread of revolutionary ideas and of the very bad economic conditions, notably the lack of foodstuffs, Communist agitation developed which had to be put down by force. The terms of the Treaty of St. Germain to which Chancellor Renner affixed his signature on Sept. 10, 1919, served to aggravate the internal situation still further. The only way out of what seemed an impossible state of affairs, by union with Germany, which, for political and economic reasons appealed strongly to the Austrian people, was blocked by the opposition of the victors. By Article II of the Fundamental Law of Nov. 12, 1918, German Austria had proclaimed itself a constituent portion of the German Republic, but despite the vigorous popular agitation, the actual union had not been consummated. This project was vetoed by Article 88 of the Treaty of St. Germain, inserted on French initiative and declaring the

independence of Austria inalienable without the consent of the Council of the League of Nations. The establishment of a Soviet Republic in Hungary strained relations with that country, for the Austrian government was in constant fear of a rising among its own ultra-radical elements with active support from the Hungarians, which, indeed, might have proved serious, since the feeble Austrian army was in part strongly Bolshevik in sympathy. Meanwhile the internal situation grew steadily worse. Except for the German language and nationality there was no bond of cohesion in this country, which, against its will, was forced by the dictum of the victors to exist as an independent state. The old antagonism between the city of Vienna, comprising one-fourth of the population of Austria, and the agricultural sections, which were unwilling to supply the food without which Vienna was doomed to starvation, assumed at times serious proportions and threatened the very existence of the metropolitan population. Under the grave circumstances a steadily growing and almost desperate desire for union with Germany manifested itself, both on the part of the country as a whole and of individual districts, especially Salzburg and the Tirol. On June 22, 1921, the Austrian Assembly voted to submit the project to a plebiscite. The Allies, however, particularly France, let it be known in various unofficial ways that, while they would not interfere with the plebiscite, they would regard any attempt at union with Germany as an infraction of the peace treaties and would take the proper steps to prevent it.

The withdrawal of socialist support from the coalition forced the ministry to resign on June 11, 1920. Pending a new general election, which was held on Oct. 17, 1920, the Christian Socialist Dr. Michael Mayr presided over a Proportional Cabinet representing all parties. The elections proved a victory for the moderate policy of the Christian Socialists, who obtained 82 seats as compared with 66 for the Social Democrats and 19 for the Pan-Germans. Dr. Mayr now formed a Christian Socialist cabinet, braving the open opposition of the Socialists. Dr. Michael Hainisch, well-known as a sociological writer and formerly a Socialist, but now rather non-partisan, was elected President of the Republic by the new Assembly on Dec. 9, 1920. A ray of light illumined the abysmal scene when the decision of the Klagenfurt plebiscite (q.v.), on Oct. 10, 1920, saved the territory for Austria. This was a valuable territorial acquisition in view of the agricultural productivity of the region. Another favorable turn was the admission of Austria into the League of Nations in December, 1920. But the economic plight of the country had grown worse meanwhile. With the approaching winter of 1920 Austria was in dire need of food and fuel. Her production of these necessities of life was small in comparison with her needs. Purchase of these commodities in foreign countries was precluded by lack of funds; a deficit in the budget, and an ever-mounting inflation of the currency. If anything, this situation became worse during the course of 1921, and it was evident that the unfortunate country was headed for disaster. By October of that year the crown had become practically worthless. While the people were facing famine, the government made desperate attempts to obtain financial aid abroad. In the spring of 1921 it

requested the Finance Committee of the League of Nations to procure the necessary funds for the purchase of foodstuffs. The League sent representatives to study the Austrian problem. Meanwhile the economic distress and the apparent uninterest of the outside world had made the Austrians even more weary of an independence which was forced on them and had stimulated the agitation for union with Germany. Alarmed by the extent of the movement, the Allies declared on Apr. 14, 1921, that all agitation toward this end must cease forthwith, lest the Allies withdraw their proposals for financial relief. The government was forced to curb the movement, whereupon a section of the Chancellor's party refused him support, compelling the Mayr Ministry to resign. Schober, the Police President of Vienna, formed a new cabinet in June, 1921. The threat of the Allies did not, however, prevent the people of Tirol on Apr. 24, 1921, nor those of Salzburg on May 29, from voting by overwhelming majorities in favor of union with Germany. Self-sufficient for food, these provinces could well afford to disregard the Allies' declaration. It is also true that the movement was only partially dictated by economic necessity and that political desires and nationalist aspirations were important in it. These plebiscites were, of course, ineffective except as indications of popular sentiment. The three-cornered controversy between Austria, Hungary, and the Allies regarding Burgenland (q.v.), a strip of western Hungary inhabited chiefly by Germans and ceded to Austria by the Treaties of St. Germain and the Trianon, was settled after long altercations and some violence by the assignment of most of the area to Austria and the return of a small portion, the Oedenburg or Sopron district, to Hungary, after a plebiscite held in that locality on Dec. 17, 1921, had shown its predominantly Hungarian sentiment.

The Schober cabinet was forced out of office in May, 1922, over a budget question. It was succeeded by a coalition cabinet under Dr. Ignaz Seipel, the leader of the Christian Socialists. The desperate situation of the country at this time made some sort of action imperative. Austria had either to procure international financial assistance or unite with one of three neighboring countries, Italy, Germany, or Czecho-Slovakia. Italy addressed a note to the countries concerned announcing that she would consider union with Germany or the Little Entente a *casus belli*. Thus the only course open was to seek financial aid abroad. Toward this end Chancellor Seipel appealed on Sept. 6, 1922, to the League of Nations. The latter adopted a plan for the restoration of Austrian finances, providing for an international loan of 650,000,000 gold crowns redeemable in 20 years, secured by Austrian productive assets and guaranteed by England, France, Italy, Belgium, Czecho-Slovakia, Spain, and Holland, and the creation of a commissioner general, appointed by the League to supervise Austrian expenditures. Moreover, a committee of control, consisting of one representative of each of the governments guaranteeing the loan, was to be set up. The guarantor states pledged themselves to respect Austrian sovereignty and independence, in return for which Austria agreed not to alienate her independence. This last clause was inserted in the agreement to prevent union with Germany. The plan also provided for certain

governmental reforms to insure economy. On Nov. 26, 1922, the plan of the League was approved by the Austrian Parliament, the Christian Socialists and the Pan-Germans voting for it and the Socialists against it. The plan was put into operation immediately with Dr. Alfred Zimmermann of Rotterdam as commissioner general. The methods of drastic financial surgery which were applied brought about as early as the spring of 1923 the stabilization of the paper crown and a reduction of the deficit in the budget, although unemployment increased. This increase was counteracted by an accompanying decrease in the cost of living and a revival of industry and trade which during the course of the year absorbed a great number of the government employees dismissed for reasons of economy. Slowly Austria progressed toward financial stability and economic reconstruction. This process of recovery lasted all through the year. By the end of 1923 Vienna was regaining her position as the commercial and exchange centre for the Danube Basin and Southern Europe. The activities of the League not only had a wholesome effect on the economic life of the country, but served also to dampen agitation for union with Germany, which in its extreme form had been largely an outgrowth of economic difficulties. That fact was demonstrated sufficiently by the elections for the Assembly on Oct. 20, 1923, in which the Pan-Germans and the Socialists suffered defeat at the hands of the Christian Socialists, who for the past year had looked with disfavor on the movement. The report of the Commissioner General at the end of the year showed clearly the great forward stride, which had been made during 1923 toward the complete economic recovery of Austria. The budget deficit had been cut in half, savings had multiplied, the currency had been stabilized, industry had been revised, and foreign capital was beginning to come into the country. The balancing of the budget was in sight. This recovery was accompanied by the establishment of more amicable relations with the succession states early in 1924. In the spring and summer of the latter year there began to appear evidences of a desire on the part of the Austrians to escape from the supervision of the League of Nations, although the budget had not yet been balanced. At this time there were also disagreements between the Austrian government and the commissioner over the methods of achieving a balanced budget. The Austrians preferred to do this by means of increased revenue, while the commissioner advocated reduction in expenditures. During the first half of 1924 came a marked increase in the cost of living. See **BURGENLAND**; **TIROL**, **GERMAN SOUTH**; **NAVIES OF THE WORLD**.

The Austrian Constitution. On Oct. 1, 1920, a new constitution was promulgated which was a formidable document indeed and which went into much more detail than customary. It declared Austria a democratic republic, composed of seven states and the city of Vienna. Austria became thereby a federal state in place of the old Austrian centralized state. All privileges were abolished and equal rights were given to all citizens. Universal suffrage for women as well as for men was established, and the voting age was set at 21. Executive power was vested in a president chosen for four years and a cabinet appointed by the As-

sembly. Legislative power belonged to a Parliament of two chambers, an Assembly elected for four years by popular vote and in accordance with the principle of proportional representation, and an upper chamber elected by the provincial diets in proportion to the population of the states. Since the upper chamber was given only advisory powers, the Parliament consisted in fact of only one chamber. The President was to be elected in a joint session of both chambers.

AUTHORS' LEAGUE OF AMERICA, INC.

An organization founded in 1912 to provide mutual assistance in the technicalities and difficulties of publishing and copyrighting. Membership was limited to persons of recognized standing in the literary or artistic professions. It was divided in 1922 into five departments: The American Dramatists; the Authors' Guild; The Authors' League Fellowship; The Artists' Guild; and the Screen Writers' Guild. Throughout the decade the League supplied confidential information to its members regarding managers, producers, etc. In 1919 it launched a world wide propaganda on behalf of American literature to raise the standard of literary criticism and to secure for American books the attention due them. The constitution of the league was revised in 1920 in regard to membership, dues, and the formation of guilds. Presidents during the 10 years were: Winston Churchill, Rex Beach, Owen Davis, Jesse Lynch Williams, and Ellis Parker Butler.

AUTOINTOXICATION. See **DIET**.

AUTOMATIC RIFLES. See **SMALL ARMS**.

AUTOMOBILES. See **MOTOR VEHICLES**.

AUTOMOBILE TIRES. See **MOTOR VEHICLES**; **RUBBER**.

AYLMER, SIR FENTON JOHN (1862-).

A British general. He joined the army in 1880. He gained distinction as an officer in Burma, India, and China, and in 1912 was made adjutant-general at Simla. In 1915 he was promoted to the rank of lieutenant-general and led the forces in Mesopotamia for the relief of Kut-el-Amara. The attack on the Turks failed; he was taken prisoner in April, 1916, and was exchanged in September. See **WAR IN EUROPE**, *Turkish Front*.

AYRES, LOUIS (1874-). An American architect, born at Bergen Point, N. J. He graduated from Rutgers College in 1896, entered the offices of McKim, Mead and White, and in 1910 went to the firm of York and Sawyer, prominent as the firm architects of the Guarantee Trust Company Building, Postal Life Building, Broadway Savings Bank, and Rockefeller Hospital (New York), as well as the Riggs Bank and the American Security and Trust Company (Washington, D. C.). He was appointed architect for the Federal Reserve Bank, Bowery Savings Bank Building, Greenwich Savings Bank (New York), First National Bank (Boston), etc. He was a member of the Federal Fine Arts Commission for 1921-25.

AZERBAIJAN, SOVIET REPUBLIC OF.

One of the three Transcaucasian republics, affiliated with the union of Socialist Soviet Republics that emerged in October, 1917; made up of the former Russian governments of Baku and Elisavetpol, and situated on the land-bridge which links Asia with Europe. The republic derives its name from the Persian Azerbaijan to which it belonged up to 1813, when Russia acquired it. Geographically it lies in

the basin of two great Caucasian rivers, the Kuru and the Aras, and is enclosed by the Caspian Sea, the Caucasus, and the highlands of Armenia and Persian Azerbaijan. Around its chief city, Baku, is to be found oil, and in this single fact lies the prominence of an otherwise unimportant state. Within its boundaries is an area of 33,616 square miles, and a population, according to Russian statistics, of 2,096,973. Seventy-five per cent of the people are Moslems of Tartar and Turk stock, and almost the whole of the remainder are Armenians. The few Russians and Europeans in the state are to be found in the Baku district.

Industry. The natives are a pastoral people. Cattle- and sheep-herding is their leading activity. Lack of communications and absence of a real community life made for ignorance and superstition, and backwardness was further fostered by unfamiliarity with the western world. The city of Baku, with an estimated population of 250,000, was the centre of great oil wells and before the War was the most prolific single district in the world and almost the only source of Russia's petroleum output. Lines of communication and trade centred here, making Baku the focal point of the whole Transcaucasian isthmus. The city was in direct communication by rail and water with Europe and Asia, particularly because it was the eastern terminus of that Transcaucasian railway which ended in the West at Batum, Georgia. Another tie that knitted the two cities together into a single economic unit was the pipe line that tapped the Baku oil fields. The separation of these two cities from 1917 to 1923 as a result of political upheavals was really the nucleus of the Transcaucasian problem. Besides the petroleum some developments were made in Azerbaijan in cotton culture, stock-raising, silk, cereals, and fisheries.

History. The story of Azerbaijan is intimately connected with that of the Russian Republic. In March, 1917, the Russian Republic was established; in September, in concert with Georgia and Armenia, Azerbaijan set up an autonomous government for Transcaucasia. The seat of this federal republic was established at Tiflis and a parliament or *seim* of 132 members organized. The republic had a brief and stormy career, for profound divergences of faith and sympathy impeded attempts at a mutual understanding. The Georgians and Armenians were Christians and looked to Europe for aid; the Tatars of Azerbaijan were Muslims and regarded Turkey as their natural ally. The invasion of Transcaucasia by Turkey in the spring of 1918 to secure the territories allotted it under the Brest-Litovsk treaty of Mar. 3, 1918, caused serious dissension in the Republic, for the Azerbaijani refused to take arms against their kinsmen. Other forces of disintegration were also at work. A Bolshevik government had established itself at Baku, and aided by the Armenian traders in the city, succeeded in seriously hampering the activities of the Azerbaijan government set up provisionally at Elisavetpol. In March, 1918, the Tatar Moslems were compelled to flee from Baku as a result of serious disorders in which thousands were slain. On Mar. 17, 1918, an Azerbaijan attack on Baku was repulsed, compelling the Tatars to turn to their co-religionists, the Turks, for aid. This definite alliance with the Turks on the part of Azerbaijan brought about

the fall of the federal republic, which was dissolved on May 26, 1918. Great Britain had watched all these movements with alarm. The victories of the Turks, together with the threat to the East that their advances implied, compelled the despatch of a British force to the aid of the Russians and Armenians beleaguered in Baku. But the counter-attack of the Turks could not be withstood; the British were compelled to take to their ships; and Baku fell on Sept. 14, 1918. The armistice of October 30 between Turkey and the Allies cleared Transcaucasia of Turkish troops, and a British division soon took possession. It seems to have been the intention of the British to maintain a permanent sphere of control in Transcaucasia. But this policy depended on French successes in the Ukraine, and when the French met with hostility in Odessa and were compelled to withdraw, the British position in Transcaucasia was correspondingly weakened. During July and August, 1919, the British withdrew.

When the Peace Conference assembled early in 1919, Azerbaijan attempted to have its boundary question considered. This matter was compelled to wait on the completion of the Turkish treaty, and nothing was settled. In January, 1920, recognition was accorded by Great Britain to Azerbaijan and its sister-republics, Armenia and Georgia. A little later the three states exchanged treaties in which they promised to safeguard one another's independence and to permit unimpeded intercourse between Batum and Baku. This show of external independence was brief. The defeat of Denikin and the understanding that was reached between the Russians and the Turkish Nationalists on Mar. 16, 1920, once more left unhindered the Russian advance into Transcaucasia. On Apr. 28, 1920, a Russian army entered Baku without opposition. A rising of local Bolsheviks turned out the Equality Party then in power and a Soviet government was established, patterned after and in complete sympathy with the Moscow government. Local disorders as a result of the concentration of Russian activities exclusively in Poland during the fall of 1920 caused much bloodshed. Bolshevik sympathizers were attacked by Tatars at Elisavetpol, and Bolsheviks and Armenians retaliated with the massacre of some 15,000 Tatars of all ages. In September, 1920, Azerbaijan signed a series of treaties with Soviet Russia consenting to unification of the military organization, financial and economic control, and foreign relations of the two countries; Azerbaijan became a dependent state with a very restricted local autonomy. In the fall of 1920 the Russian Bolsheviks brought about the downfall of the national governments of Armenia and Georgia, and in the spring of 1921 soviet governments were set up in these countries. Once more Azerbaijan, Armenia, and Georgia were bound together in a federal republic of Transcaucasia, but the federation was now in vassalage to Soviet Russia. Thus, in effect, Russia was once more in control of her old Transcaucasian provinces and dominated their economic and political life as before the events of 1917. This influence was given the stamp of legality by the completion of the important treaty of Dec. 30, 1922 (see RUSSIA) at Moscow; all the Russian soviet republics were signatories to this. By it the governments of Russia, the Ukraine, White Russia, Georgia, Ar-

menia, Azerbaijan, Bokhara, and Khiva, substituted for their bi-lateral treaties a federal state, called the Union of Socialist and Soviet Republics. Under the treaty a centralized control for the army, navy, foreign affairs, trade, finances, economic resources and relations, etc., was established, and a Central Executive Committee for the Allies was at once created. This body comprised 270 representatives from Russia, 68 from the Ukraine, 7 from White Rus

sia, and 26 from the Transcaucasian states. As far as Azerbaijan was concerned the Union meant, economically, the establishment of relations once more with the port of Batum, and politically, the definite passing of Azerbaijan, as an independent state after a turbulent history of less than six years' duration. See RUSSIA.

AZORIN (1876-). See MARTINEZ RUIZ, José.

B

BABBITT, IRVING (1865-). An American scholar and critic (see VOL. II). His *Rousseau and Romanticism* (1919), one of the outstanding critical productions of the time, synthesized the attitude toward life and letters which he had expressed in previous works. His brilliant attack on the fetish of naturalism in science, philosophy, and literature, and his insistence on the classical formula of moderation and form, came with particular timeliness, when the romantic cult seemed to reach its apogee. His work had something prophetic in it: for the swing toward classicism in France and England became more and more marked. In the United States he was more persistently romanticist because of the absence of a humanistic tradition and because of the firm entrenchment of pragmatism. Mr. Babbitt also published occasional papers in reviews and periodicals.

BABCOCK, BERNIE (SMADE) (1868-). An American author, born at Unionville, Ohio. She was a member of the staff of the *Arkansas Democrat* and later owned and edited *The Arkansas Sketch Book*, the first venture of its kind in her native State. She wrote *Mammy*, a drama read at Chautauqua and on lyceum circuits. She is also the author of *Yesterday and To-day in Arkansas* (1917), *The Coming of the King* (1921), *The Soul of Ann Rutledge*, *Abraham Lincoln's Romance* (1919), and *The Soul of Abraham Lincoln* (1923).

BABCOCK, SAMUEL GAVITT (1851-). American bishop in the Protestant Episcopal Church. He graduated from the Episcopal Theological School at Cambridge, Mass., in 1891. After holding pastorates in Rhode Island and Massachusetts he was archdeacon of Massachusetts from 1903 to 1913, when he was elected bishop.

BABINSKI, JULES (1855-). A distinguished French neurologist, pupil and successor of Charcot. Born in Paris, he graduated in medicine from the University in 1885. He discovered several valuable diagnostic signs in connection with neurological practice; two of these are in daily use among neurologists. The so-called "great toe" or "first Babinski" reflex was described in 1896-97 and the "second toe sign" in 1903. He was Charcot's chief of clinic in the Salpêtrière and Pitié Hospitals, and during the War, he had charge of many traumatic neurological cases at the latter institution. He was professor of neurology in the University of Paris. Babinski has written over 200 papers on nervous affections. With Froment he published *Hyperopthiisme en Neurologie de Guerre*, 1917. This work was translated into English by Sir H. Rolleston in 1918.

BACHELIN, HENRI (1879-). A French

novelist, born at Lormes (Nièvre), France. He is especially noted for his novels describing Morvan, the section of France with which he was best acquainted. In 1918 he was awarded the *Vie Heureuse* prize. His works include *Pas comme les Autres* (1906), *Les Manigants* (1907), *Horizons et Coins du Morvan* (1909), *Jules Renard et Son Oeuvre* (1909), *Robes Noires* (1910), *Juliette la Jolie* (1912), *Sous d'Humbles Toits*, short stories (1913), *L'Héritage* (1914), *La Renaissance du Livre* (1917), *L'Éclaircie* (1918), *Le Serviteur* (1918), *Les Rustres* (1922), and *Le Chant du Coq* (1922-23).

BACHELLER, IRVING (1859-). An American author (see VOL. II). He published *Marryers* (1914); *The Light in the Clearing* (1917); *Keeping Up with Williams* (1918); *A Man for the Ages* (1919); and *The Prodigal Village* (1920).

BACON, FRANK (1864-1922). An American actor, born at Marysville, Cal. He was educated in the public schools of San José, and after experimenting in journalism and photography he made his first appearance on the stage at the Garden Theatre, San José, Cal., in 1890 in the melodrama *Ten Nights in a Bar-Room*. His first appearance on the New York stage was at the Gaiety Theatre, New York, beginning in *Alabama*, *Pudd'n' Head Wilson*, *Me and Grant*, *The Cinderella Man*, *The Fortune Hunter*, etc. His most popular character play was *Lightnin'*, written by himself and produced with extraordinary success for three consecutive years at the Gaiety Theatre, New York, beginning in 1918.

BACON, RAYMOND FOSS (1880-). An American chemist, born at Muncie, Ind. He was graduated in 1899 at DePauw University. He then received a fellowship at Chicago. He taught chemistry at Vincennes University, but subsequent to obtaining his doctor's degree he took up the commercial practice of chemistry in Chicago. In 1905 he went to the Philippines as chemist to the Bureau of Science and five years later accepted a similar appointment in the Bureau of Chemistry in Washington. He was director of the Mellon Institute in Pittsburgh, 1914-21; in 1921 he entered commercial practice in New York City. During the War he served in the Chemical Warfare Service with the rank of colonel and was also connected with the Naval Construction Board.

BADEN, FREE STATE OF. Formerly a grand duchy, now a republic, in Southwestern Germany. Its area is 5819 square miles; its population in 1910, 2,208,503 (the 1910 census gave Baden 2,142,833). The capital, Karlsruhe, had, according to the census of 1919, 135,952. The largest cities include: Mannheim (220,576), Freiburg (87,946), Heidelberg (60,831), and

Baden (25,444). No important changes have appeared in the activities of the population. Wheat, barley, rye, tobacco, hemp, and various root crops are cultivated. The vine culture yielded about 6,000,000 gallons of wine in 1921. The manufactures have included tiles, cigars, jewelry, machinery, musical instruments, chemicals, hats, paper, leather, and brushes.

Up to the revolution of 1918, Baden was ruled by a hereditary monarch, the Grand Duke, with the aid of an election diet. The country, because of an alliance of the Liberal parties and the Social Democrats, and also because of its long liberal tradition, was regarded as one of the most happily administered in all Europe. But the downfall of the Hohenzollern family dragged with it the reigning house of Baden and the Grand Duke abdicated on Nov. 22, 1918. On Jan. 15, 1919, a national assembly, which had been elected on a basis of universal suffrage, met for the preparation of a new constitution. On May 21, 1919, the new constitution was promulgated, the first such document to emerge in revolutionary Germany. It abolished all privilege of birth, religion, and caste; bestowed full legal rights on women; recognized the right of workers, including civil servants, to combine; and granted the suffrage to all men and women over 20. The sovereign power has been vested in a single-chamber diet (*Landtag*), which chooses the ministry of eight, and, from their number, one to act as minister-president and president of the state. Through the exercise of the initiative, the diet may be dissolved at any time. Baden is a member of the German Federated Republic or Reich and has three members in the Reichsrat or Imperial Council.

BAEKELAND, LEO HENDRIK (1863-). A Belgian-American chemist (see VOL. II). In 1914 he was awarded the Chandler Medal by Columbia University, in 1915 the Grand Prize at the Panama-Pacific Exposition, and in 1916 the Perkin Medal.

BAEUMER, GERTRUD (1873-). A philologist, teacher, lecturer and active worker in the woman's movement of Germany. She was born in Berlin, where she studied at the university. She is the author of some philological works, *Die Soziale Idee und die Weltanschauungen des neunzehnten Jahrhunderts* and *Handbuch der Frauenfrage* (in collaboration with Helene Lange). She edited *Die Hilfe* and *Die Frau*, was elected member of the Diet (1918) and became counselor in the Cabinet of the Interior.

BAFFIN LAND. For three centuries this was a land of mystery. Its boundary and extent were unknown, and authorities differed as to whether it was an island or a peninsula. Macmillan added to our knowledge, but it remained for the governmental expedition of Canada in 1923 to solve the geographic problem. It is by far the largest island in the Parry archipelago, extending northward 1200 miles from latitude 62°N. to 74°N. Its estimated area is 211,000 square miles, five times the size of Cuba. Canada perfected its claim to the island by the establishment of a station of mounted police in Ponds Inlet, where the Hudson Bay Company had a factor trading with the inhabitants of a permanent village of about a hundred natives at that point. There were several different tribes of Eskimos living by hunting and fishing in the interior. In the

southern district are two large lakes, comparable in size to Lake Ontario. Outcroppings of iron and coal were noted, and the latter was mined to some extent. Explorations were being made for gold and other valuable minerals.

BAGDAD. See MESOPOTAMIA; WAR IN EUROPE, *Turkish Front*.

BAGDAD RAILWAY. The Asiatic link, a line 2500 miles long, of the Great "Berlin to Bagdad" Railway, which was intended to further German penetration into the Near East. It was one of the most important "stakes of diplomacy" and as such may be regarded as one of the factors that contributed to bring about the War of 1914; indeed, the frustration of the German "Berlin-Byzantium-Bagdad" plan was publicly declared by Allied and American leaders during the War to be a vital issue of the world conflict. Before the inception of the Bagdad Railway scheme, Central Europe had been connected with Constantinople by the Oriental Railway; and in the very year (1888) in which the first through train ran across the Balkans to the Ottoman Capital, a German syndicate headed by the *Deutsche Bank* obtained a concession to extend the Haidar Pasha-Ismid Railway as far as Angora, in the interior of Anatolia. As soon as this line was opened (in 1893), the same syndicate, operating through the Anatolian Railway Company, obtained permission to build a branch to Konia (completed 1896). Now a wider vista of economic-political penetration was unfolded to the ambitious German engineers and financiers; they now proposed to push the railway from Konia across the frowning Taurus mountains, through Cilicia and northern Syria, across the desert to Mosul on the Tigris, thence to Bagdad, and on to the Persian Gulf. Negotiations for this project, begun in the nineties, culminated in 1903 in the formal grant of the Bagdad Railway Concession by the Ottoman government to an Ottoman corporation, the Bagdad Railway Company controlled by German banks. Russia immediately objected; England and France, declining an offer of shares in the enterprise, raised obstacles in the way of the German advance. Nevertheless, the work of construction was begun, and section after section was completed; yet, because of diplomatic as well as engineering difficulties, the line was unfinished when the War began. Great gaps were still unbridged in northern Mesopotamia and in the Amanus mountains. Turkey's entry into the War was largely due to the politico-economic grip which the railway project had given Germany on the Ottoman Empire. During the conflict, Turks and Germans labored in frantic haste to complete the line, for military purposes. The celebrated Bagtché tunnel was pierced in 1915, a narrow-gauge track was laid to Aleppo, and by the Armistice all but about 325 miles between Nisibin and Bagdad, and the sector below Bagdad, remained unfinished. But not for Germany were the fruits of the enterprise reserved. The Treaty of Versailles (1919) cancelled all former German rights in the Bagdad Railway; the Treaty of Sévres and the accompanying secret Anglo-French-Italian agreement (1920) provided that Turkey should appropriate the Anatolian and Bagdad Railways, and transfer them to a Franco-British-Italian corporation. France, stealing a march on Britain by the Franco-Turkish Treaty of Angora (1921), obtained for a French syndicate (the Cilician-

Syrian Railway Company) the concession for the middle section between Bozanti and Nisibin (i.e. between Cilicia and the Tigris) in 1922. The southeastern sections, from Samarra to Bagdad and thence to Basra, having been completed by the British army of occupation, were, of course, under British control. The north-western or Anatolian section, from Haidar Pasha to the Cilician Gates, remained provisionally in Turkish hands, pending fulfillment of the Sèvres treaty or some other arrangement. It was a delicate problem, because the stockholders of the Bagdad Railway Company, which was to be expropriated, were by no means all Germans; about 30 per cent of the stock was owned by French investors, and a large block was held by the Swiss *Bank für orientalischen Eisenbahnen*, to which the *Deutsche Bank* had transferred its holdings. By purchasing a controlling interest in this Swiss bank, in May, 1923, British financiers hoped to obtain indirectly a dominating interest in the railway. A little later, a British financial group represented by Mr. Huguenin was reported to be negotiating with the Turkish government for a lease of the Anatolian Railway. Such negotiations, of course, were pursued largely behind the scenes of public diplomacy, and could not be traced with certainty, nor had the ownership of the Anatolian-Bagdad system been definitely determined by 1924; but of one point there could be no doubt, that the magnificently ambitious German scheme, which had so profoundly stimulated the hopes of German imperialists and no less deeply stirred the enmity of Entente statesmen before the War, was no longer to be a German enterprise.

BAGLEY, WILLIAM CHANDLER (1874-). American university professor born at Detroit, Mich. He was educated at the Michigan Agricultural College, the University of Wisconsin, and Cornell University. He taught in the public schools and was professor of education in the University of Illinois and Teachers' College, Columbia University. He was president of the National Society for Study of Education and the Society of College Teachers of Education. During the War he edited *The National School Service*. Among his published works are *Educational Values* (New York, 1911); *The History of the American People*, with Charles A. Beard (New York, 1919); *A First Book in American History*, with Charles A. Beard (New York, 1920); *The Nation and the Schools*, with John A. Keith (New York, 1920); and *Our Old World Background*, with Charles A. Beard (New York, 1922).

BAHAMAS. A British colony north of the West Indies consisting of 29 islands, 661 islets, and over 3000 reefs. Only 20 islands of this whole group are inhabited. The principal islands are: New Providence, which contains the capital, Nassau (13,564); Abaco (4463); Grand Bahama (1824); San Salvador (5072); Long Island (4150); Eleuthra (6533); Exuma (3465); and Andros Island (7545). The planting of sugar, the growing of vegetables, and the sponge fisheries continued to be the leading industries, while fruit culture increased rapidly because of the establishment of canning factories. The imports for 1922 were valued at £1,063,152 (a gain of 386 per cent over 1913), and the exports at £1,827,735 (a gain of 599 per cent over 1913). In 1922, 721,846 tons of shipping entered and 718,110 tons cleared the

ports of the islands. In 1922, the share of the United States in Bahamas imports was 60 per cent, and of their exports, 8 per cent, carried for the most part in American bottoms. A large proportion of the illicit alcoholic traffic carried on with the United States originated in the Bahamas, the city of Nassau devoting itself to a large extent to this activity.

BAHREIN. See ARABIA.

BAIKO, ONOYE (?-). A Japanese actor of the Imperial Theatre in Tokyo whose delicacy and charm as an interpreter of female rôles have won him great favor. He is a member of the company which presents classical *Kabuki* drama. Baiko and his associates perform on a stage whose basic fictions are different from those of the American theatre. The orthodox Japanese stage makes little effort to conceal its operation.

BAILEY, BENJAMIN FRANKLIN (1875-). American electrical engineer, born at Sheridan, Mich. He studied electrical engineering at the University of Michigan and later held the positions of chief engineer of the Fairbanks-Morse Electrical Manufacturing Company and Howell Electrical Motor Company, director of Bailey Electrical Company, and vice-president and director of the Fremont Motor Corporation. He is the author of several books on electrical engineering, including *Principles of Dynamo-electric Machinery* (1915). He became professor of electrical engineering at the University of Michigan in 1913.

BAILEY, CAROLYN SHERWIN (1877-). An American author of children's stories, born at Hoosick Falls, N. Y. She graduated from Teachers' College, Columbia University, in 1896. She has contributed to the *Ladies' Home Journal* and other magazines, and published volumes of stories for children, methods of story telling, methods of teaching children, etc., which include *Boys and Girls of Colonial Days* (1917); *Broad Stripes and Bright Stars* (1919); *Flint; The Story of a Trail* (1922); and *Friendly Tales* (1923). She wrote *For the Children's Hour* (1906) in collaboration.

BAILEY, CHARLES JUSTIN (1859-). An American soldier, born in Tamaqua, Pa. He graduated from the United States Military Academy in 1880 and in the same year was appointed second lieutenant. He was promoted through the various grades and became colonel in 1911 and brigadier-general in 1913. On Aug. 5, 1917, he was appointed major general of the National Army. He commanded the Philippine Department in 1918 and in the same year was made commander of the 81st Division of the National Army, which he commanded in France in 1918-19. In the latter year he was appointed commander of the Middle Atlantic Coast Artillery District, and in 1921, commander of the Third Corps Area. He was awarded the D. S. M., the Order of Leopold (Belgium), the Croix de Guerre with palm, and was an officer of the Legion of Honor.

BAILEY, PEARCE (1865-1922). An American neurologist and psychiatrist, educated at Princeton and Columbia Universities. He became a consultant in several New York hospitals and with Collins and Fraenkel founded the Neurological Institute. He was also appointed an associate professor of neurology in Columbia. On the entry of the United States into the War, he was appointed chief of the division of neurology and psychiatry in the

United States army with the rank of colonel. He perfected a system for weeding out defectives which is said to have been used as a model by the Allies. His major literary efforts comprise a translation of Golobievski's *Atlas and Epitome of Diseases Caused by Accident* (1900) and a monograph *Accident and Injury; Relation to the Nervous System* (1906), which he later expanded into *Diseases of the Nervous System Resulting from Accident and Injury*, a valuable work for the medical world. At the time of his death, Dr. Bailey was chairman of the New York State Committee for Mental Defectives.

BAILEY, VERNON HOWE (1874-). An American artist, born at Camden, N. J., who studied at the Pennsylvania Museum School of Art and the Pennsylvania Academy of Fine Arts. Mr. Bailey's special subject is city streets in Europe and America. The best known of his drawings are his sketches in pencil of London. Bailey was the first artist privileged by the United States government on the declaration of war to make drawings of navy yards, munition factories, and other centres of war work. These drawings appeared in exhibitions and were published in the leading magazines throughout the country. The Hispanic Society has a collection of 150 drawings which Mr. Bailey made of Spain, and the Musée de la Guerre of France contains a collection of lithographs of American war subjects. Besides his work as a newspaper artist in London and America Mr. Bailey illustrated many books.

BAIN, HARRY FOSTER (1871-). An American geologist, born at Seymour, Ind. He was educated at Moores Hill College, Johns Hopkins, and the University of Chicago. Meanwhile he became connected with the Iowa Geological Survey in 1893 and remained in this position until 1901, when he entered the United States Geological Survey, with which he served for two years. From 1905 to 1911 he was State geologist of Illinois. In 1918 he returned to the government service as assistant director of The Bureau of Mines and in 1920 succeeded to the directorship. He was editor of the *Mining and Scientific Press*, 1909-15, and in 1915-16 he edited the *London Mining Magazine*. Dr. Bain gave courses of lectures on economic geology at the University of Iowa in 1897 and at the University of Chicago in 1899 and 1902-3.

BAINBRIDGE, WILLIAM SEAMAN (1870-). An American surgeon and gynecologist born at Providence, R. I. He studied at the College of Physicians and Surgeons of Columbia University and at various hospitals in New York City and abroad. He has been a prolific writer on surgical subjects in many fields, notably intestinal stasis and cancer. He became a professor at the New York Polyclinic Medical School and Hospital in 1906. Before the entry of the United States into the War he was United States medical observer with the Allied armies and later was attached to the Surgeon General's office to report his findings. After the entry of the United States into the War he functioned as naval surgeon on vessels and at naval base hospitals and was subsequently commissioned commander of the United States Medical Corps. He is the author of *The Cancer Problem* (1914), re-issued in French in 1922; *Life's Day* (1909), a work on personal

hygiene; and *Report of Medical and Surgical Developments of the War* (Government Printing Office, 1919).

BAINSIZZA, PLATEAU. See **WAR IN EUROPE, Italian Front.**

BAIRNSFATHER, BRUCE (1887-). An English humorist born at Murree, India, and educated at the United Services College, Westward Ho. He studied to be an engineer but in 1914 rejoined the Royal Warwickshire Regiment and served in France until 1916, when he received a War Office appointment. His humorous black and white sketches of life in the trenches which appeared in *Bystander* made Bairnsfather's reputation, and his play *The Better 'Ole*, which scored a great success in 1917, was based on the adventures of the "Old Bill" of these sketches. *Fragments of France* contains many of his drawings. He also produced *Bullets and Billets* (1916) and *From Mud to Mufti* (1919). In 1919 he started *Fragments*, a weekly comic paper.

BAKER, GEORGE BARR (1870-). An American editor, born at Wyandotte, Mich. He began as reporter on the *Detroit Tribune* (1895-96) and was subsequently art critic, foreign correspondent, etc., for leading newspapers and magazines. He was American correspondent of the *London Daily Express*, 1904-05. Later he was associate editor of *Everybody's Magazine* (1907-10) and literary editor of the *Delineator* (1911-14). Through the Spanish-American War he was ship's writer for the U.S.S. *Yosemite*, and during the European War he held the important positions of secretary of the Commission for Relief in Belgium, director of the American Relief Administration, Commander of the United States Naval Reserve Force, etc. He wrote of *Mother's Geese: a New Brood*, in collaboration (New York, 1906).

BAKER, HORACE (? -). An American railway official, born in Missouri, where he was educated in the public schools. He worked up from subordinate positions in various railway companies and became in 1917 general manager of the Cincinnati, New Orleans and Texas Pacific Railway and the Alabama Great Southern Railroad System (lines west). In 1920 he was a member of the Railroad Board of Adjustment and of the United States Railroad Labor Board.

BAKER, HUGH POTTER (1878-). An American forester, born at St. Croix Falls, Wis. He graduated from the Michigan Agricultural College in 1901 and took post-graduate courses in forestry at Yale. He also studied at the University of Munich. For 10 years he was in the United States Forest Service in Idaho, Wyoming, New Mexico, and other western States. He became professor of forestry in the Iowa State College in 1904 and filled the same chair at Pennsylvania State College, 1907-12. He was dean and professor of silviculture at the New York State College of Forestry, 1912-20, and in 1920 he became executive secretary of the American Paper and Pulp Association. During the War he served with the 46th Infantry and was a member of the General Staff.

BAKER, (MRS.) KARLE WILSON (1878-). An American poet and author, born at Little Rock, Ark., and educated at the University of Chicago. In spite of the frequent mordant bits, her poems have visions of real beauty. Under the pseudonym of "Charlotte Wilson,"

she was co-author of *Women and Prisons* (1912), published in London by the Fabian Society. She has contributed fiction and poetry to *Harper's*, *Atlantic Monthly*, *Yale Review*, *The Century*, etc., and is the author of *Blue Smoke*, poems (1919), *The Garden of the Plyneck* (1920), *The Burning Bush* (1922), etc.

BAKER, NEWTON DIEHL (1871-). An American lawyer and public official, born in Martinsburg, W. Va. He graduated from Johns Hopkins University in 1892 and from the law department of Washington and Lee University in 1894. He served as private secretary to Postmaster General Wilson, 1896-97, and in the latter year began the practice of law at Martinsburg, W. Va. He removed to Cleveland, Ohio, and from 1902 to 1912 was solicitor for that city. He was elected mayor in 1912 and was reelected in 1914. His work as an efficient administrative officer attracted wide attention, and in 1916 he was appointed Secretary of War by President Wilson. He was in charge of this most important branch of the government during the War, and although his administration was severely criticized, it was generally conceded that on the whole his conduct of the office was marked by zeal and by absolute devotion to its duties. He served until Mar. 4, 1921. In that year he was commissioned colonel of the O. R. C. On the conclusion of his official service, he resumed the practice of law in Cleveland. He was a zealous advocate of the League of Nations, and at the Democratic national convention of 1924, he made an impassioned appeal for the inclusion of the plank favoring the League in the Democratic platform. This move was defeated.

BAKER, P. BRYANT (1881-). An English sculptor, born at London. He studied at the London Royal Academy of Arts. Baker came to the United States in 1915 and served in the army, 1918-19. His work includes a statue of King Edward VII at Huddersfield, Yorkshire; a memorial to Archdeacon Henry Robeson in Tewkesbury Abbey, the Rt. Hon. Percy Illingworth Memorial in London, a marble bust of King Edward VII, executed for Queen Alexandra, and a portrait of Prince Olav, for the Queen of Norway. An idealistic imagination is evident in his "Eros" (Manchester) and "Mnemosyne" (Hull City Art Galleries). As a student he attracted much attention with the four figure group, "The Entombment," which won a first prize at the Academy. He has made portrait busts of President Wilson, Gen. J. J. Pershing, Chief Justice William H. Taft, and Theodore Roosevelt. His work has been exhibited at the Royal Academy London, the Paris Salon, the Corcoran Art Gallery in Washington and at various important galleries in the United States.

BAKER, RAY STANNARD (1870-). American author and publicist (see VOL. II). After the War, Mr. Baker was prominent as director of the press bureau of the American Peace Delegation in Paris. In this capacity he passed on all the news concerning the peace proceedings which emanated from official sources for home consumption. Continuing his prolific writing, he published books in many genres. Under the pen-name of "David Grayson" he wrote a series of rural studies which in their idyllic charm struck a rather unusual note in American literature. Their tranquillity and

kindliness had the flavor of Vergil's *Georgics*. These sketches included *Adventures in Contentment* (1907), *Adventures in Friendship* (1910), *The Friendly Road* (1913), *Great Possessions* (1917), and the novel *Hempfield* (1915). As a result of his peace activities, he wrote *What Wilson Did at Paris* (1919), and *Woodrow Wilson and World Settlement* (1922). The latter was a full account accompanied by official documents and had as its purpose the vindication of President Wilson's attitude.

BAKU. See AZERBAIJAN.

BALCH, EDWIN SWIFT (? -). An American writer on the Antarctic, glaciers, etc. He was born at Philadelphia and graduated from Harvard University. After studying in the law office of William Henry Rawle, he was admitted to the Philadelphia bar in 1882. Besides contributing to periodicals, he has written *Antarctica* (1902), *Comparative Art* (1906) *The North Pole and Bradley Land* (1913), *Mt. McKinley and Mountain Climbers' Proofs* (1914), and *Arts of the World* (1920), etc.

BALDWIN, JAMES MARK (1861+). An American philosopher and psychologist (see VOL. II). During the War he was active in behalf of the Allies' cause and published addresses pleading for American participation. *American Neutrality, Its Cause and Cure* (1916) and *France and the War* (1916) are two such collections. *The Superstate and the Eternal Values* was the Spencer memorial lecture for 1916. A *Genetic Theory of Reality*, presented as the culmination of his previous studies in genetic logic, is the only comprehensive philosophic work he published after 1914. Professor Baldwin's works have been translated into French and have been well received by the philosophic public of France.

BALDWIN, LEWIS WARRINGTON (1875-). An American railway official, born at Waterbury, Md., and educated at St. John's College (Annapolis, Md.) and at Lehigh University. He began his career in the engineering department of the Illinois Central Railroad in 1896. From 1906 to 1915 he held various positions with the Illinois Central and Yazoo and Missouri Valley Railways, finally becoming their general superintendent. He was successively general manager and vice-president of the Central of Georgia Railway, 1915-18, and in 1918 he became assistant regional director of the United States Railroad Administration for the southern region. He held a similar position in the Allegheny region, 1918-19, and became director in 1919-20. In the latter year he was also made vice-president in charge of the operating department of the Illinois Central Railroad.

BALDWIN, STANLEY (1867-). A prime minister of Great Britain, born Aug. 3, 1867, and educated at Harrow and Cambridge. He entered Parliament in 1908. Business absorbed most of his attention for some years, and it was not until the break-up of the Lloyd George coalition in October, 1922, when he was made financial secretary to the treasury, and later president of the Board of Trade, that he caused any particular stir in politics. His training in trade and finance stood him in good stead, and his great ability in these fields became widely recognized. In the Bonar Law government he was made Chancellor of the Exchequer, and did much to increase Great Bri-

tain's prestige abroad. In January, 1923, he came to the United States to arrange for the payment of the British war debt. After a month of successful accomplishment he returned home to England. On April 16 he introduced his first budget, which showed a surplus of \$500,000,000, most of it due to drastic economy. Soon after Easter, Bonar Law lost the use of his voice, and Baldwin acted as his deputy and spoke for him on many occasions. When Bonar Law resigned in May, 1923, Baldwin became prime minister. Baldwin and his supporters believed that the protection of home industries was the sovereign cure for unemployment, but he was bound by his late chief's pledge to let tariff reform alone. He appealed to the country, and an election was held on December 6. The vote was against protection, and by the time Parliament met on Jan. 8, 1924, it was expected that the Baldwin government would be given a vote of censure. The anticipated vote occurred on January 21, and on Mr. Baldwin's resignation the next day, Ramsay MacDonald was summoned to Buckingham Palace and asked to form a new cabinet.

BALDWIN, THOMAS SCOTT (1854-). An aviator born in Merriem County, Mo. His flying experience extended over a 46-year period, from 1875 to 1921. He is best known as the originator of parachutes and as the first to descend from a balloon in a parachute in the United States (at San Francisco in 1885). He delivered the first airship to the signal corps of the United States army. During the War he was chief of the army balloon inspection and production.

BALFOUR, ARTHUR JAMES, FIRST EARL OF (1848-). A British statesman and former prime minister (see VOL. II). With other Unionist leaders he discarded all party differences on the outbreak of the War and joined Mr. Asquith's first Coalition cabinet of 1915 with the portfolio of First Lord of the Admiralty. In this office his work met the uncompromising criticism of Winston Churchill, whom he had displaced, but his dignified deportment and excellent reports earned public confidence. In his administration the battle of Jutland was fought; he was responsible for the appointment of Sir John Jellicoe as First Sea Lord and Sir David Beatty as commander of the sea forces. With the accession of Lloyd George in December, 1916, Mr. Balfour was transferred to the Foreign Office, where it was felt that his pleasing address could be of greatest aid in gaining the sympathies of the United States. In 1917 he came to the United States as the head of the British Mission and served as an important element in fusing the purposes of the two nations. In the same year his statement to the effect that Great Britain would support the creation of Palestine as a homeland for the Jews attracted the support of Jewry the world over and was regarded as proof of English sincerity in championing the cause of small nations. In the years that followed, Mr. Balfour accepted comparatively unimportant posts cheerfully. He attended the Peace Conference as a British representative and watched the Big Four write the peace. In 1919 he resigned his Foreign Secretaryship to accept the less significant post of First President of the Council. In 1920 he represented his country at the first Assembly of the League of Nations, and

in 1921 he once more came to America as his government's spokesman at the Washington Disarmament Conference. His disinterested services were fittingly recognized; the Order of Merit was conferred on him in 1916, and in 1919 the chancellorship of Cambridge University. Finally in 1922 he was created first Earl of Balfour and Viscount Traprain of Wittingehame, and thus took his seat in the House of Lords after serving in the Commons for almost 50 years. He published, after 1914, *Theism and Humanism* (1915) and *Essays, Speculative and Political* (1920).

BALFOUR, SIR ISAAC BAYLEY (1853-1922). A Scottish botanist, born at Edinburgh (see VOL. II). From 1888 to the year of his death he was King's Botanist in Scotland, Regius Keeper of the Royal Botanic Garden at Edinburgh, and professor of botany at the University of Edinburgh.

BALFOUR DECLARATION. See PALESTINE.

BALIEV, NIKITA FYODOROVITCH (?-). A Russian actor and theatrical producer whose reputation in America was due to the success of his Théâtre de la Chauve-Souris. This "bat theatre" was in origin nothing else than a "cabaret carried out with finesse, fantasy and fancy." In Baliev's establishment the authors and artists of the Moscow Art Theatre gathered for amusement and relaxation. The Revolution came and with it poverty: Baliev went to Paris with his troupe. First Paris, in 1920, then London, and later New York saw in his productions the "enigmatic smiling Russia that is of no time and no age." Baliev is a master showman who knows how to make the most of his limitations. Even his broken English is capitalized in his stage presence.

BALL, ELMER DARWIN (1870-). An American entomologist (see VOL. II). He was State entomologist of Wisconsin (1916-18) and professor of zoology and entomology at the Iowa State College and State entomologist of Iowa (1918-21). In 1921, Professor Ball became director of scientific work in the United States Department of Agriculture.

BALLANCE, SIR CHARLES ALFRED (?-). A distinguished British surgeon who has specialized in cranial and vascular surgery. He received his medical degree from the University of London in 1881. Among his appointments are those of surgeon to the West End Hospital for Nervous Diseases, chief surgeon to the Metropolitan Police, and, during the War consulting surgeon to the British army. He was knighted in 1918. Among his published works are *Surgery of the Brain and Its Membranes* (1907); *Cerebral Decompression* (1912); *Surgery of the Temporal Bone*, 2 vols. (1919); *Surgery of the Heart* (1920) and *History of Surgery of the Brain* (1922). Earlier in his career he wrote two other works in collaboration, *The Healing of Nerves* with Stewart (1901), and *Treatise on Ligature of the Great Arteries in Continuity*, with Edmunds (1891).

BALLANTINE, HENRY WINTHROP (1880-). An American professor of law, born at Oberlin, Ohio, and educated at Oberlin, Amherst, and Harvard Colleges and the Harvard Law School. He was admitted to the California bar in 1904 and was lecturer on law at the University of California, 1905-09, and assistant professor of law at Hastings College of Law in San Francisco. He was dean of the

Law School of the University of Montana, 1911-13, professor at the Law School of the University of Wisconsin, 1913-16, and dean of the College of Law of the University of Illinois, 1916-20. In 1920 he became professor of law in the University of Minnesota. Besides contributions to periodicals, he has written *Problems in the Law of Contracts and Preparation of Contracts and Conveyances* (1921).

BALLET. The year 1910 marks the beginning of a new era in the history of the ballet. In May of that year Sergei Diaghilev appeared in Paris with his new and individual creation, the Ballet Russe, which immediately created a sensation. He had been working for several years toward the realization of his new ideas and had found sympathetic allies in Leon Bakst, the painter, and Michael Fokin, the director of the Imperial Ballet in Moscow. Fokin, before meeting Diaghilev, had seen Isadora Duncan interpreting choreographically masterpieces of absolute music (Beethoven's Seventh Symphony, Chopin, Schumann, etc.). Her art suggested to him the idea of using the mere technical skill of the dancer as a means for the expression of definite emotions through pantomime. Thus the collaboration of Diaghilev, Fokin and Bakst resulted in the development of the ballet by coordinating dancing, stage-decorations, costumes, lighting-effects and music, and fusing these concomitant elements into a homogeneous whole. Moscow thus became the cradle of the new art. The beginning was made with the ballets in the regular repertory, which were interpreted in the new style. Then, following the example of Isadora Duncan, Fokin adapted choreographic actions to famous instrumental works, such as Rimsky-Korsakov's *Scheherazade*, Debussy's *L'Après-midi d'un Faune*, Strauss' *Till Eulenspiegel*. About that time Diaghilev met Stravinsky, then entirely unknown, whose style of music seemed to fit admirably into the general scheme of things. The young musician was commissioned to write the music to *L'Oiseau de Feu*. In 1909, Diaghilev visited Paris with an operatic company, ostensibly for the purpose of introducing Russian operas, in which ballets figure extensively. Incidentally, separate performances of standard ballets were also given, and these aroused the greatest enthusiasm. The following year Diaghilev returned, but only with the Ballet Russe. It was then that Stravinsky's ballet, *L'Oiseau de Feu*, was produced with sensational success. The next year (1911) furnished another sensation, the same composer's *Petrushka*. Two years later these phenomenal successes were even eclipsed by *Le Sacre du Printemps*. The opinion of musicians regarding the value of Stravinsky's scores as absolute music does not enter into consideration here; what counts is the fact that this music fits into the general ensemble as no other music does. This was proved before long, when Diaghilev commissioned ballets from other composers of considerable reputation: Debussy (*Jeux*), Ravel (*Daphnis et Chloé*), Hahn (*Le Dieu bleu*), Dukas (*La Péri*), Tchaikovsky (*Narcisse*, *Le Pavillon d'Armide*), R. Strauss (*Légende de Joseph*). Paris had gone wild over the new art, London fully endorsed the verdict of Paris, and even conservative New York gasped when the new organization made its first appearance there (1916). Such was the success of the

original season of two weeks that the regular season at the Metropolitan Opera House was shortened by three weeks in order to present the new sensation to the subscribers. Although Diaghilev has not revisited the United States, interest in the new art has been kept alive by the tours of Anna Pavlova, who, though never connected with Diaghilev, has developed her own company along similar lines.

BALLET, GILBERT (1853-1916). A distinguished French neurologist and alienist, born at Ambazac (Haute-Vienne), who received his medical education at Limoges and Paris. In 1882 he became chief of the clinic at the Salpêtrière. In 1914 he drew up a scheme for reforming the French lunacy law and was one of the most active opponents of alcohol abuse in France. He held two chairs in the University of Paris, he was appointed professor of the history of medicine (1907) and clinical professor of mental diseases two years later. In 1897 he published his *Psychoses et Affections Nerveuses* and in 1902 collaborated with Proust in the publication of the *Traité de la Neurasthénie*. His greatest work was the *Traité de Pathologie Mentale* (1903). His *Life of Swedenborg* appeared in 1899. Two translations of his *Neurasthenia* were published in English, in 1902 and 1911, and did much to make him known outside of France.

BALLIN, ALBERT (1857-1918). A German merchant, director-general of the Hamburg-American line. He was born in Hamburg and had a commercial education, both at home and in England. After organizing the emigrant traffic of the Carr Line, he took charge of the passenger traffic of the Hamburg-American Line; in 1886 he became a director and subsequently director-general. The expansion of the company was due to his efforts. He increased the share capital tenfold and by acquiring other lines extended the business of the company to all parts of the world. He was the author of the German-American shipping agreement of 1902. As a special confidant of William II, he advised him on all commercial questions. During the War he published some newspaper articles justifying Germany.

BALLIN, HUGO (1879-). An American figure and decorative painter (see Vol. II), president of Hugo Ballin Inc. who produced and mounted more than eighty feature motion pictures including: *East Lynne*, *Pagan Love*, *Baby Mine*, *The Journey's End*, *Jane Eyre*, *Vanity Fair* and *Married People*.

BALLOON. See AERONAUTICS.

BALLOONS, IN WARFARE. See STRATEGY AND TACTICS.

BALMONT, KONSTANTIN D. (1867-). A Russian poet, the founder of the Modernist school of Russian poetry with Bryusov, one of the leading symbolists. He at first made a great sensation but later lost some of his popularity on account of frequent repetitions. He translated extensively from other languages, especially English and wrote many critical essays. Some of the best known of his several volumes of poems are *Under Northern Skies* (1894), *Silence* (1898), *Burning Buildings* (1900), *Let Us Be Like the Sun* (1903), *Love Only* (1904), and *The Flame-Bird* (1907). He also wrote *Phlox Clusters* after a journey to Mexico, besides many short stories and a book of poems for children. His translations include Shelley's complete works, Whitman (most of

the *Leaves of Grass*), Poe, Ibsen's dramas, Calderon's poems, and works from the German, Polish and Sanskrit.

BALTIC PROVINCES. A term applied to three former provinces of the Russian Empire, Courland, Livonia, and Esthonia, in the region of the Baltic Sea. At the conclusion of the War a German army occupied the provinces, and article 12 of the Armistice Convention called for its withdrawal "as soon as the Allies shall consider this desirable." To embarrass the Powers, however, the Germans decided to withdraw at once, and beginning with November, 1918, detachments quit the country as Bolshevik forces spread westward. The situation was further complicated when German troops under General von der Goltz were induced to stay in Latvia to play the rôle of liberators. February, 1919, saw 20,000 Germans concentrated in the Libau-Windau area and actively meddling in Latvian affairs. The tone of the Allied notes became caustic with this turn of events. On Apr. 23, 1919, the Allies called for the end of German interference in local matters and the recall of von der Goltz; on June 18 a demand was made for German evacuation in accordance with the terms of the Armistice. But an ultimatum from General Foch in the summer succeeded neither in hastening withdrawal nor in preventing the German march north into Esthonia. It was not until the Supreme Council threatened economic pressure that Germany showed a willingness to heed Allied protests. A mixed commission was appointed to superintend the withdrawal; evacuation was begun in November, not without material damage to the population; and by the middle of December it was complete. The subsequent history of the Baltic Provinces is given under the names of the two Republics, Esthonia and Latvia (q.v.) which were created out of this territory.

BALTIMORE. Metropolis of Maryland. The area of the city increased from 31.8 square miles in 1914 to 91.93 square miles in 1924 of which 78.72 square miles was land; the population rose from 558,485 in 1910 to 733,826 in 1920 and to 773,580 by estimate of the Bureau of the Census for 1923. An extensive municipal improvement programme was developed in 1920. Loans for \$51,750,000 were authorized by popular vote in that year, and in 1922 another loan of \$15,000,000, in addition to the \$7,000,000 allotted for the purpose from the earlier loan, was voted for school improvement. With these sums 16 new schools and a city college were built or under construction by 1924, and other school houses already built were being repaired and improved. The water supply for the city for many years to come also was assured by the raising of the Loch Raven dam from 188 to 240 feet elevation, the purchase of 4000 acres of land and the razing of two villages. A large water main was extended into each section of the new annex to the city, and the private water companies operating there were purchased. A filtration plant was built, and plans were made for increasing its capacity. The sewage plant was enlarged and 162 miles of sewers laid in the old city and the annex. The municipal hospital for communicable diseases was under construction in 1923; the police department was reorganized with a commissioner at its head, and a \$1,000,000 loan for the erection of police buildings was

approved in 1923 and plans were prepared for the erection of a building adjoining the Cure Centre; and twelve new engine houses for the fire department were under construction. Progress was made in smooth street paving and several bridges were built.

For the development of the harbor, the most extensive of these projected improvements, \$10,000,000 was available in 1924 of the \$50,000,000 the State legislature authorized the city to vote as a loan for the purpose as well as an additional loan of \$2,500,000. In 1923 work had already begun on the McComas Street bulkhead, the first in the plan of the port development commission for this group of projected piers, and negotiations were being carried on for the contract for a \$4,000,000 pier. The complete development ultimately was to have the most efficient handling devices, warehouses, etc., and complete railroad communications with the terminus. The following additional loans were to be submitted to the voters in November, 1924: \$10,000,000 for sewers; \$7,000,000 for paving, bridges and grade crossings; \$1,500,000 for underground conduits for wires; and \$2,000,000 for a municipal building to provide space for city departments occupying buildings in different sections of the city.

The following comparative summary shows the increase in manufacturing in Baltimore from 1914 to 1919, as prepared by the Bureau of the Census.

	1914	1919	Per cent of in- crease
Number of establishments	2,502	2,797	11.8
Persons engaged in manufacture ...	87,453	117,140	33.9
Capital	\$177,301,000	\$434,244,000	144.9
Services	48,978,000	137,144,000	180.0
Materials	120,533,000	427,756,000	254.9
Value of products	215,172,000	677,878,000	215.0

Between 1919 and 1923, according to statistics furnished by the Baltimore board of trade, 284 additional industries were established and 402 expansions of existing industries were made, representing a plant investment of \$130,252,200.

In 1922 Baltimore's bank clearings totaled \$4,141,820,192, a gain of 16.5 per cent over 1918 and the large gain of 125.8 over 1916. The total bank resources increased from \$334,369,000 in 1916 to \$532,679,691 in 1923.

In May 1923, after much investigation, a zoning ordinance was adopted regulating the height and bulk of new buildings, the size of courts and yards, the number of families permitted to be housed per acre, and the location of industries and trades. It divided the city into four use districts, five height, and six area districts. A model elevator code was enacted.

BANAT OF TEMESVÂR. Formerly a territory of the Hungarian Kingdom but since 1919 a Rumanian province of the same name. Its area is approximately 10,000 square miles, and its estimated population, 1,580,000. In 1916, in order to gain Rumanian support, the Allies, by a secret treaty of whose terms the Serbs were not apprised, promised Rumania the entire Banat. This was done in spite of the fact that the district is ethnographically by no means a homogeneous unit, there being Slavs in the west, Rumanians in the east, and strong Hungarian and German minorities throughout. In 1919, an act of union of the

Banat with Rumania was promulgated by the Rumanian Crown and the Peace Conference was confronted by a *fait accompli*. The Supreme Council, however, refused to recognize the annexation and by the statement of June 12, 1919, divided the Banat between Jugo-Slavia and Rumania. Meanwhile the Serbs occupied the district, and, partly in protest against an action that seemed to have the tacit consent of the Supreme Council, the Rumanians marched into Hungary and invested Budapest. It was not until the signing of the Treaty of the Trianon (June, 1920) that Rumania finally signified her consent to the partition of the district. By this arrangement, the counties of Krassó-Szörény and Temes in the east were granted to Rumania, and the county of Torontál, bordering on the Danube, to Jugo-Slavia. The economic considerations underlying the diplomatic controversy were perhaps of greater importance than the purely racial. To the Serbs, whose lands are deficient in cereals, the rich farming country of the Banat made an especial appeal. The peasants of Temesvár wished to join the Serbs; the landowners, because of Rumania's traditional friendliness toward their class, sought annexation to her. Again, any north and south boundary line through the country must disorganize its economic life because the westward-flowing streams, the railways, and canals, all would be cut. That both countries desired the whole Banat was natural; and the partition of the territory in 1920 left a group of problems difficult of solution and containing elements of inevitable discord.

BANCROFT, WILDER DWIGHT (1867-). An American chemist (see VOL. II). During 1917 and 1918 he was chairman of the subcommittee on electro-chemistry of the National Research Council and chairman of the division of chemistry (1919-20). He was also a member of the advisory committee of the Chemical Warfare Service and lieutenant-colonel in 1918 and 1919. In 1921 he wrote *Applied Colloid Chemistry*.

BANDHOLTZ, HARRY HILL (1864-). An American soldier (see VOL. II). He served on the Mexican border in 1916 and went to France as provost marshal-general (1918-19). He was American representative on the Inter-allied Military Mission to Hungary in 1919. On Sept. 1, 1921, he was appointed to command of the District of Washington. In September, 1921, he was sent to West Virginia and successfully suppressed a miners' insurrection there. He received many foreign decorations.

BANDLER, SAMUEL WYLLIS (1870-). An American obstetrician and gynecologist, educated at Columbia University. He became professor of obstetrics and gynecology in the New York Post-graduate Medical School. In addition to his unusual activity in the publication of medical papers on obstetrics, gynecology, and endocrinology, he wrote many books, including *Dermoid and Other Cysts of the Ovary* (1901), also issued separately in German; *Uterine and Tubal Gestation* (1903), *Medical Gynecology* (1908), *Vaginal Celiotomy* (1911), *The Expectant Mother* (1916) and *The Endocrines*, 1920. In 1901 he published a translation into English of Abel's *Gynecological Pathology*.

BANERJEE, SIR SURENDRANATH (1848-). An Indian political reformer and journalist educated at Doveton College, Calcutta, and Uni-

versity College, London. Early in his career he opened a school in Calcutta which later became Ripon College. In 1876 he became editor of the Bengalee newspaper, a political instrument in his hands. In 1905 he supported the boycott of foreign goods and the "national education" movement. He went to London in 1919 as representative of an "Indian Liberal" organization which he had formed and gave evidence before the Joint Parliamentary Committee of both Houses on Indian Reforms. Subsequently he accepted office as Minister for Local Government and Sanitation in Bengal and was knighted in 1921.

BANG, IVAR (1869-1918). An eminent Swedish chemist. He began his career as a practicing physician but took up chemistry under Professor Hammarsten of Upsala, 1897-99. His research attracted wide attention and led to his appointment in 1904 as professor of medical chemistry in the University of Lund. Of several branches of biochemistry to which he devoted especial attention the most significant was the so-called micromethod of quantitative analysis of the blood. As a result of this it is possible to determine the percentage of constituents by testing very small amounts of blood. His writings include *Chemie und Biochemie der Lipide* (1911), *Der Blutzucker* (1913), *Methoden zur Mikrobestimmung einiger Blutbestandtheile* (1916), and *Lehrbuch der Harnanalyse* (1918).

BANKING. See FINANCE AND BANKING.

BANKS, COÖPERATIVE. See LABOR BANKS.

BANNING, KENDALL (1879-). American editor and author, born in New York and educated at Dartmouth. During the War he served as major in the Signal Corps (1917), major on the General Staff of the United States army (1918-19), and officer in charge of compiling a history of the War. He was a member of the Committee on Public Information. Formerly he was manager and associate editor of *System* (1903-17) and managing editor of *Hearst's Magazine* and *Cosmopolitan* (1919-21). He has contributed to the magazines and is the author of several plays.

BANTA, ARTHUR MANGUN (1877-). An American zoölogist, born at Greenwood, Ind. He was educated at Indiana and Harvard Universities. He was a teacher in public schools (1895-1901); assistant in zoölogy, Indiana University (1903-05); professor of biology, Marietta College (1907-09); and resident investigator at the Station for Experimental Evolution, Cold Spring Harbor (1909-). His researches have been on the development of pigment in animals, on the effects of changed environment on cave-dwelling and non-cave-dwelling animals, and on sex determination.

BANTING, FREDERICK GRANT (1892-). A Canadian physician who in 1922 received the larger share of credit for the discovery of insulin (see INSULIN and DIABETES), apparently one of the greatest practical triumphs of laboratory medicine. He took his medical degree at the University of Toronto in 1916. Two years later he became a Member of the Royal College of Surgeons and Licentiate of the Royal College of Physicians. During the War he was a captain in the Army Medical Corps. The first announcement of his great discovery was made in the *Journal of Laboratory and Clinical Medicine*, vol. vii (1921-22). Banting and Best also published jointly an article on the treatment

of diabetes mellitus in the *Canadian Medical Association Journal*, vol. xii (1922). In 1923 the Canadian Government awarded Banting an annuity of \$7500, to enable him with freedom from pecuniary worry to devote his time to the further study of this and similarly important matters. At the time when his discovery was announced he held the office of resident surgeon of the Hospital for Sick Children, Toronto.

BANTU. See ETHNOGRAPHY.

BAPTISTS. The second largest Protestant denomination in the United States, first established in America about 1638-39. Three principal bodies represent the Baptist churches in America, the Northern, Southern and National (Negro) Conventions. Fourteen separate Baptist organizations were listed in the American Baptist Year Book, but the minor divisions, known as Primitive, United, Free, General, etc., are separated from the main body of the denomination by no serious differences and the trend for many years has been in the direction of Baptist unity. The Free Baptists, for example, have merged with the Northern Convention. During the decade 1914-1924 Baptist membership in America increased from 5,799,233 to approximately 8,500,000. In the same period the Southern Convention advanced in membership from 2,522,623 to 3,352,938; the Northern Convention from 1,291,688 to 1,344,346 and the National Convention from 1,934,952 to upwards of 3,250,000. The denomination made enormous gains in membership among the Negroes, both North and South, and a Negro Church, Olivet of Chicago, had the largest Baptist congregation in the world. The aggregate Baptist membership of all countries from whose churches reports were obtained, approached 10,000,000 in 1924. There was a very rapid increase in Russia and Eastern Europe generally, after 1917, as the Slav population found the Baptist doctrine and polity congenial and turned to them as a substitute for the disrupted churches of the prerevolutionary period. No accurate statistics were obtainable, but there were in 1924 far more than 1,000,000 Russians who called themselves Baptists.

While the attitude of opposition to infant baptism, with its corollary acceptance of "believer's baptism," is one of the distinguishing marks of all Baptist bodies, there is no Baptist creed. It is characteristic of the denominational spirit that no authority exists with power to bind the individual churches in respect to matters of faith. The Northern Baptist Convention in 1924 accepted as an expression of the Baptist position the Stockholm declaration of the Baptist World's Alliance, a statement covering those points upon which practically all Baptists are agreed. This action was taken with the definite provision that the statement was in no sense to be regarded as a creed.

Baptist churches always held to the congregational or independent system. Indeed the Baptist temper and tradition would hardly tolerate any other, though there was a growing disposition to moderate an individualism which left each church absolutely sovereign in matters touching its own worship and discipline, but lacked certain advantages in achieving purposes held by all the churches in common. This tendency to coördinate Baptist activities found expression in the New World Movement of the Northern Convention, a five-year programme that terminated in April, 1924, and in the

\$75,000,000 campaign of southern Baptists. In the case of the northern Baptists the movement resulted in the establishment of a permanent organization to unify and coördinate the work of the various participating organizations, known as the Board of Missionary Coöperation. This board became the agent of seven national societies and boards, 36 State conventions, 14 standard city mission societies, and 52 schools and colleges, for the purpose of disseminating information regarding the various organizations and raising funds for them. The nearly 10,000 Baptist churches which united through the Northern Convention in support of all these agencies remained as independent as ever, but they were applying such a measure of coöperation as their experience after 1919 showed to be possible and desirable.

The period which saw the rise of the coöperative spirit in the denomination also saw the Baptist organizations take advanced ground for a ministry of service. A strong Baptist interest always supported schools maintained under Christian influences. Such institutions as Chicago, Brown, Colgate and Rochester universities and Vassar College testify to a zeal for education that has not been limited to America. In Burma, Judson College, bearing the name of the most famous of Baptist missionaries, was constituted an integral part of the University of Rangoon, taking equal rank with the Government college. Great progress was made in the development of opportunities for the education of women in the Orient, especially in India and China. Baptists maintained missions in 11 different national fields and had churches in every part of the globe.

BAPTISTS, FREE. The organizations of the Free Baptists were undergoing union with the Northern Baptist Convention throughout the whole decade 1914-24. The movement began in 1911, and complete financial arrangements were made in 1919, but the denomination retained its separate legal existence for the administration of funds and interests which awaited final settlement and transfer. See BAPTISTS.

BÁRÁNY, ROBERT (1876-). An Austrian otologist, born in Vienna. Originally he was an assistant of Pollitzer and as a student in the University of Vienna, he began in 1902 a series of investigations on the internal ear which culminated in his monograph, *Physiologie und Pathologie des Bogengangapparates beim Menschen*, for which he was awarded the Nobel Prize in medicine in 1915. During the War he officiated as military surgeon and was taken prisoner. In 1919 he published *Primäre Exsion und Primäre Naht Accidentellen Wunden*. In 1916 he received the appointment of professor of otology in the University of Upsala. His most recent work is *Die Radikaloperation des Ohres*, 1923.

BAR ASSOCIATION, AMERICAN. An organization founded in 1878 to advance the science of jurisprudence, promote the administration of justice and uniformity of legislation and of judicial decision throughout the nation, uphold the honor of the profession of the law, and encourage cordial intercourse among the members of the American Bar. Membership increased from 10,500 in 1916 to 21,000 in 1923. Many important resolutions were adopted at the annual meetings held during the decade 1914-1924. In 1918 resolutions were passed protesting against House Bill Number 9354 as an

attempt to deprive the judges of the United States courts of the right to express their opinion on questions of fact in jury cases, and supporting every grant of power desired by the President to help in winning the War, but expressing the opinion that constitutional changes were unnecessary; in 1919 approving an act to make uniform in all States the law of conditional sales and the law of fraudulent conveyances and to continue organized opposition to judicial recall; in 1921 censuring Kenesaw M. Landis in accepting private employ while a member of the Federal Bench; in 1923 favoring adherence to the Permanent Court of International Justice, calling a new conference of nations at The Hague to restate the established rules of international law, to agree on certain amendments, and to consider certain subjects which were not adequately regulated by international law.

BARBADOS. The most easterly of the West Indian Islands, belonging to Great Britain, with an area of 166 square miles, and a population (census of 1921) of 156,312. The cultivation of sugar and cotton continued the leading activities. The immediate years after the War were marked by great prosperity in the island, the culmination being reached in 1920 when exports showed a value of £4,865,700, and imports £5,145,537. (Compare with the 1913-14 figures of exports of £760,699; imports £1,353,059.) In 1921, there was a visible drop, though even then the trade was nearly twice that of 1913. The year 1922 marked a further decrease, the exports being £1,259,794 and imports £2,480,320. Favorable weather conditions, however, in the first quarter much improved the crops, which gave far better results than had been anticipated, and by the end of the year the colony had largely recovered from its depression.

BARBER, DONN (1871-). An American architect, born in Washington and educated at Yale and Columbia Universities and in Paris. In 1900 he began the practice of his profession in New York, where he designed many business and other buildings, including the Lotus Club and the Institute of Musical Art. Other buildings planned by him are the Connecticut State Library and the Department of Justice Building in Washington. He was one of the originators of the atelier idea in the United States. For many years he was editor of the *New York Architect*. He belongs to many architectural societies.

BARBOUR, RALPH HENRY (1870-). An American author, born at Cambridge, Mass. He contributed verse and short stories to magazines under the pen name of "Richard Stillman Powell" but became best known under his own name as one of the most popular writers of stories for young people. He is also the author of numerous entertaining romances and of the excellent Indian story, *Metipom's Hostage*. His more recent writings include *Under the Yankee Ensign* (New York, 1919), *Mystery of the Sea Lark* (New York, 1920), *Quarter Back Bates* (New York, 1920), *Metipom's Hostage* (Boston, 1921), *Over Two Seas* (New York, 1922), and *Right End Emerson* (Football Eleven Books, New York, 1922).

BARBUSSE, HENRI (1874-). A French writer and novelist. He acquired international fame almost over night as the result of the publication in 1916 of his war novel, *Le Feu*. It is the story of a squad in the trenches, told

in the poilus' own unvarnished language. The gruesome, crude details of butchery and animality of life at the front are realistically narrated. Against this background the author makes his heroes philosophize on the future of humanity. The book is in the best sense of the word propaganda against war. Despite its pacifistic tendencies, *Le Feu* was awarded the Prix Goncourt. It was followed by *Clarté* and *La Lueur dans l'Abîme*, both of which continue the author's purpose of using art as a vehicle for social regeneration. At the close of the War, M. Barbusse organized the Clarté movement, which sought to group together the writers of the world and interest them in the social and political progress of humanity. He also organized a union of war veterans of France to fight for the ideal of internationalism. Both these organizations drifted into politics and became more or less affiliated with the regular syndicalist and socialist groups. Besides the works mentioned above, M. Barbusse wrote *Les Supplantes* (1903); *L'Enfer* (1908); *Nous Autres* (1914); *Quelques Coins du Cœur* (1921), and *Le Couteau entre les Dents* (1921).

BARCELONA. See RAPID TRANSIT.

BARD, HARRY ERWIN (1867-). An American educator in Peru. He was born at Crawfordsville, Ind., and educated at Wabash College and Columbia University. After holding positions as instructor, 1894-98, he was appointed division superintendent of schools in the Philippine Islands (1907-09) and subsequently became official advisor of the Ministry of Instruction at Lima, Peru (1909-12; reappointed, 1919); organizing director of the Pan-American Division of the American Association for International Conciliation in New York (1913-15) and secretary of the Pan-American Society of the United States (1915-19). He assisted in preparing the organic school law of Peru (1910-12) and in putting it into execution (1920). Besides contributing to the *Cyclopædia of Education*, he is author of *The City School District* (1909), *Intellectual and Cultural Relations between the United States and the Other Republics of America* (1914), and *South America* (1916).

BARDET, GEOFROY (1852-1923). A French physician and pharmaceutical chemist, distinguished especially as a therapist. Born at Dreux, the son of a physician whom he expected to succeed in practice, he became interested in chemistry and spent some years in the laboratory of Wurtz. He received his degree in medicine from the University of Paris in 1877; his thesis on the soporific alkaloids of opium was crowned by the faculty. After graduation he became laboratory chief for Dujardin-Beaumetz. With Trillat he performed an early feat in synthetic chemistry by obtaining the drug later known as urotropin. His major literary activity was the publication at irregular intervals of *Nouveaux Remèdes*, of which 20 volumes were issued between 1886 and 1911. He edited the *Bulletin Général de Thérapeutique* from 1895 to 1917. In his alma mater he filled the chair of hydrology; besides his knowledge of medicinal waters, he was known as an expert mineralogist. At the International Medical Congress at Paris in 1889 he functioned as general secretary and chief organizer.

BARGONE, CHARLES ("CLAUDE FARRÈRE") (1876-). A French novelist, born at Lyons, and educated at Marseilles and Toulon. Like

Pierre Loti, with whom he has many points in common, Farrère entered the French navy, and it was as a naval officer that he produced his exotic novel, *Fumées d'Opium*, which won the Prix Goncourt for 1905. His succeeding works also dealt with Oriental scenes,—Indo-China, Japan, and Turkey, countries where civilization had not yet abolished mystery. He made two attempts to get away from his exoticism, in *Mademoiselle Dax*, *Jeune Fille*, and its sequel *Les Petites Alliées*, but in the rest of his work he returned to the theme of adventure. In these he sought the manner of Edgar Allan Poe. Besides those mentioned above, he wrote: *Les Civilisés*; *L'Homme Qui Assassina*; *La Bataille*; *La Maison des Hommes Vivants*; *Thomas l'Agnélet*; *La Dernière Déserte*, and *Les Hommes Nouveaux*.

BARING-GOULD, SABINE (1835-1923). An English author (see VOL. II). His last works include *The Vicar of Morwenstow* (1919), *The Evangelical Revival* (1920), *In the Roar of the Sea* (1920), and *Mehalah* (1920).

BARKER, ELSA (?). An American author, born at Leicester, Vt., and educated privately. She was associate editor of the *Consolidated Encyclopædic Library* (1901), lecturer for the New York Board of Education (1904-05), and a member of the editorial staff of *Hampton's Magazine* (1909-10). Besides contributing poems and articles to magazines, she is the author of some novels and several volumes of poetry. Her poems, especially *The Book of Love*, have received high praise from critics both for their lyric feeling and style. Her prose works, dealing for the most part with spiritualism (*War Letters from a Living Dead Man*, 1915) and psycho-analysis (*Fielding Sargeant*), received less universal approbation. Her recent works include *Songs of a Vagrom Angel* (New York, 1919) and *Fielding Sargeant* (New York, 1922). She also wrote a play, *The Scab* (produced in New York and Boston, 1904-05).

BARKER, ERNEST (1874-). English philosopher and educationist. He was educated at Balliol College, Oxford, and this University remained the scene of his activities until 1920. At one time or another he was fellow of the University, Merton, St. John's, and Lew. In 1920 he went to London University, where he became principal of King's College. In 1906 he published his *Political Thought of Plato and Aristotle*, revised in 1918 as *Greek Political Theory*, a work of the first importance, which exerted much influence on the political thought of England. His intimate knowledge of the whole range of political philosophy was displayed in his masterly summary, *Political Thought in England from Herbert Spencer to To-day* (1915). Other works from his pen were *The Dominican Order and Convocation* (1913) articles in the *Cambridge Mediæval History* and *Greek Politics* (1923).

BARKEE, (HARLEY) GRANVILLE (1877-). An English playwright, born in London (see VOL. II). His American season as a producer at Wallack's Theatre in New York in 1916 stimulated the American stage. He produced *A Midsummer Night's Dream*, Shaw's *Androcles and the Lion*, *The Doctor's Dilemma*, France's *The Man Who Married a Dumb Wife* and other plays. The Neighborhood Playhouse achieved success with his *Madras House* (New York, 1921), and Winthrop Ames with *Anatol*

(a paraphrase, from the German of Schnitzler). He has also written *Souls on Fifth* (1916), *Three Short Plays* (1917), *The Secret Life* (1923), and English versions of G. Martinez Sierra's *The Romantic Young Lady*, *Wife to a Famous Man*, *The Kingdom of God*, *The Two Shepherds*, and *A Lily Among Thorns*, all in collaboration with Helen Granville Barker.

BARKER, SIR HERBERT ATKINSON (1869-). A British manipulative or "bloodless" surgeon, born in Southport. He was a pupil of Atkinson, a manipulative surgeon. In 1904 Barker succeeded to Atkinson's practice on the latter's death. His career after 1904 was most successful. Medical opposition was not directed against him personally, and members of the medical profession often referred cases of a certain type to him. His work was largely with orthopædic patients, especially those having affections of the knee, flat foot, etc. During the War the medical profession opposed the demand to turn wounded soldiers over to Barker's supervision. He was knighted by the King in 1922.

BARKER, J. ELLIS (1870-). An English journalist (see VOL. II). His effort to arouse England to the German peril in the period antecedent to the War gave his writings of the years 1914-18 a wide audience both in England and the United States. Articles published in the periodical press were collected under the titles *British Statesmanship* (1917) and *Economic Statesmanship* (1918). Other works included *Modern Germany* (enlarged edition, 1915) and *The Foundations of Germany* (1916).

BARKER, LEWELLYS FRANKLIN (1867-). An anatomist born at Norwich, Ont. (see VOL. II). As the successor to the late Dr. Osler in the Johns Hopkins Hospital Medical Clinic, Dr. Barker has shown an extensive literary activity like that of his predecessor. In addition to many minor contributions to periodical literature in various departments of internal medicine and neurology, he has published *Clinical Medicine, from the Tuesday Clinics of Johns Hopkins* (1916) and *Clinical Diagnosis of Internal Diseases* (1916), comprising three large volumes of more than 3000 pages of the medical library known as *Monographic Medicine*. He was also senior editor, with Hopkins and Nosenenthal, of the five-volume system of medicine entitled *Endocrinology and Metabolism* (1922).

BARNARD, EDWARD EMERSON (1857-1923). An American astronomer (see VOL. II). He received the Bruce gold medal from the Astronomical Society of the Pacific in 1917.

BARNARD, GEORGE GRAY (1863-). An American sculptor (see VOL. I). His famous bronze statue of Abraham Lincoln in Cincinnati (1917), with a replica in Manchester, England, has caused more discussion than any other American sculpture. Its rugged strength and powerful characterization of the great tribune of the common people place it in the foremost rank of American sculpture. Other important recent works are: "Maidenhood," "Adam and Eve" (Tarrytown, N. Y.; Boston Museum); "Rising Woman" (Metropolitan Museum, New York City); and a heroic head of Lincoln (Bourne Collection, Portland, Ore.).

BARNARD COLLEGE. The undergraduate college for women in the educational system of Columbia University, New York City, organized in 1889. The student body grew from 733 members in 1914 to 923 in 1924 and the faculty from 99 to 112. The Ella Weed Library in-

creased from 8600 to 18,000 volumes, the equipment increased in value from \$2,027,246 to \$2,500,000, and the annual net income from \$61,125 to \$178,000. A new dormitory was in process of construction in 1924. President, Nicholas Murray Butler, LL.D. (Cantab), D.Litt. (Oxon), Hon. D. (Paris). Dean, Virginia Crocheron Gildersleeve, Ph.D., LL.D. See COLUMBIA UNIVERSITY.

BARNES, GEORGE NICOLL (1859-). A British labor representative plenipotentiary at the Paris Peace Conference (1919). He was born at Lochie, Scotland, and for many years worked as an engineer. In 1906 he defeated Bonar Law in the election of a representative from Blackfriars (now Gorbals). During Lloyd George's ministry he was Pensions Minister (1916-18) and minister without portfolio in the Coalition Government, from which he resigned in 1920. He was sworn of the Privy Council, from which he resigned, to succeed Arthur Henderson as labor representative in the War Cabinet. After the Peace Conference he attended the International Labor Conference at Washington. He has interested himself in old age pensions, the welfare of discharged soldiers, the Irish problem, and the League of Nations.

BARNES, JAMES (1866-). An American author (see VOL. II). He did important war work as head of the Princeton Aviation School for several months, and major of the Aviation Section of the Signal Corps of the United States Reserve. He was head of the photographic division of the army and was sent to France, as commander of the United States School of Aerial Photography, to organize that work at the front.

BARNOUW, ADRIAAN JACOB (1877-). An educator born in Holland, and educated at the Municipal Gymnasium, Amsterdam, and the Universities of Leyden and Berlin. During 1902-19, he was professor of Dutch language and literature at the Municipal Gymnasium at The Hague, lecturer in English at the University of Leyden, and correspondent at The Hague of the *Nation* (New York). After 1921 he was professor of the Dutch language and literature at Columbia University. He was associate editor of *The Weekly Review* (1919-21). Among his works are *Anglo-Saxon Christian Poetry*, translated by Louise Dudley (1914); *Beatzije, a Middle Dutch Legend* (1914); and *Holland under Queen Wilhelmina* (1923).

BAROJA, Pio (1872-). A Spanish novelist born at San Sebastian and educated in the Institute of Pamplona and at San Carlos. After practicing medicine and running a bakery for six years in partnership with his brother, he drifted into journalism and the writing of novels, which, though sometimes treating of forbidden subjects, are pithy and contain many quaint and accurate descriptions of Spanish life. Baroja is a cynically candid but cultured and liberal writer. Among his recent works are *The City of the Discreet* (1917); *Cesar or Nothing* (1919); *Youth and Egotism* (1920); *The Quest* (1922); and *Needs* (1923).

BARE, AMELIA E. (1831-1919). An Anglo-American novelist (see VOL. II). Some of her latest works were *Three Score and Ten* (1915), *The Winning of Lucia* (1915), *Profit and Loss* (1916), *Joan* (1916), *Christine* (1916), and *An Orkney Maid* (1917).

BARRÈRE, CAMILLE (1851-). A French diplomat. As a youth he prepared for a jour-

nalistic career and attended the Congress of Berlin as correspondent for a Parisian paper. His articles attracted the attention of Waddington, then French minister of foreign affairs, who offered him a post in the diplomatic corps. He rose rapidly through the ranks, and after serving as minister to Bavaria, he became French ambassador to Italy in 1897. He negotiated the commercial treaty of 1898 and throughout his long residence in Italy worked to bring about a good Italian-French understanding. In 1915 he won the diplomatic duel with Prince von Bülow and helped to bring in Italy to the side of the Allies. At the close of the War he retired from diplomatic service.

BARRÈS, MAURICE (1862-1923). A French novelist and politician (see VOL. II). During the War he devoted his talent to patriotic journalism and published many addresses, lectures, and volumes of propaganda. Hostilities ended, he went back to literature. His novel, *Un Jardin sur l'Oronte* (1922), was hailed as a masterpiece of romantic fiction. Written only for the most cultivated readers, it transports the imagination to the Holy Land, and develops its theme by describing the love of a Christian knight for a Mohammedan princess. The story of this passion is handled both sympathetically and ironically. Of his other published works since 1914, the more important are *La Grande Pitié des Eglises Françaises* (1914); *L'Ame Française et la Guerre* (1915); *Les Traits Éternels de la France* (1916); *La Colonne Inspirée* (1916); *Colette Bardoche* (1918); *La Lorraine Dévastée* (1919); *Le Génie du Rhin* (1921); *Un Homme Libre* (1922); and a six-volume *Chronique de la Grande Guerre* (1920-22). In politics M. Barrès made himself known as the advocate of the annexation of the Rhineland to France.

BARRETT, CHARLES SIMON (1866-). An American farm expert, born in Pike county, Ga., and educated in the public and normal schools of Ohio and Indiana. For many years he engaged in general farming and teaching and then began the organization of farmers' societies; in 1905 he was elected president of the Georgia Farmers' Union. In the following year he became president of the National Farmers' Union and was reelected. He served on the Country Life Commission founded by Theodore Roosevelt and was a delegate to many meetings on agricultural subjects in foreign countries. President Wilson appointed him a member of the National Agricultural Advisory Commission; he was also a member of the Price Fixing Commission for the wheat crop in 1917. He was a member of the advisory council of the American delegates to the Disarmament Conference (1921-22).

BARRETT, JOHN (1866-). An American journalist and diplomat (see VOL. II). In 1916 he was delegate of the United States and secretary general of the Pan-American Scientific Congress. He was presiding officer of the second Pan-American Commercial Conference (1919), president of the Pan-American Advertising Association (1919-20), and a member of the governing board of the General Committee on the Limitation of Armament. He published *Pan-American Commerce: Past, Present, Future* (1919) and *Pan-America and Pan-Americanism* (1922).

BARRIE, SIR JAMES MATTHEW, Bart. (1860-). (See VOL. II). His recent work

includes *A Kiss for Cinderella* (1916); *The Old Lady Shows Her Medals* (1917); *Dear Brutus* (1917); *Echoes of the War* (1918); *The Truth about the Russian Dancers* (1920); and *Mary Rose* (1920). Whereas *Dear Brutus* was received by critics and the public as a typical contribution, whimsical, kind, and fanciful, *Mary Rose* failed to duplicate its London success in America and provoked a storm of protest as bearing an alien taint of pessimism and sentimentalized spiritualism. Some of Barrie's novels and plays have been produced in moving-pictures very successfully.

BARRIENTOS, MARIA (1885-). A Spanish coloratura soprano, born at Barcelona, Mar. 10, 1885. A remarkably precocious child, she graduated from the Barcelona Conservatory at the age of twelve, having completed the courses in violin, piano and composition. Two years later, after only six months' study under Ben-net, she made her operatic debut in Barcelona as Selika with such success that she was engaged the following year for La Scala in Milan. Until 1913 she sang in various theatres in Italy and made tours of South America, France, England, Russia, Germany, and Austria. After three years' retirement she made her New York debut at the Metropolitan Opera House as Lucia (Jan. 31, 1916) and sang there till 1920. After that time she appeared chiefly in Italy and South America. In spite of a rather weak voice she won success through perfect vocal technic, musical intelligence, and fascinating personality.

BARROWS, DAVID PRESCOTT (1873-). An American ethnologist (see VOL. II). He became president of the University of California in 1919. During the War he did important relief work as a member of the Committee for the Relief of Belgium in charge of the food supply of Brussels in 1916, and as major and lieutenant-colonel of cavalry in the army (1917-18). He was on active duty in the Philippine Islands and Siberia, 1917-19, and in 1921 became colonel of the 159th Infantry of the California National Guard. Besides engaging in war work, he was actively interested in educational and philanthropic institutions in California and was a member of the California State commission on rural credit and colonization, 1915-17. He is the author of *A Decade of American Government in the Philippines* (1915).

BARRYMORE, ETHEL (1879-). A leading American actress (see VOL. II). Some of her recent performances have been in *The Lady of the Camelias* (1917), *The Off-chance* (1918), *Belinda* (1918); *Declassée* (1919), in which she scored a great success; *Clair de Lune* (1921), *Rose Bernd* (1922), *Romeo and Juliet* (1922), *The Laughing Lady* (1923), and *A Royal Fandango* (1923). She also toured in several of Barrie's comedies.

BARRYMORE, JOHN (BLYTHE) (1882-). American actor and member of a noted theatrical family. He made his debut in *Magda* in Chicago in 1903, and in the following December he appeared on the New York stage in *Glad of It*. He next played in London (1905), and later in Australia, in the company of William Collier. Since his debut, Barrymore has not missed appearing on either the American or the English stage each year. He first attracted serious attention in *Justice* and scored a great success as co-star with his brother Lionel in

The Jest (1919), but it was in *Richard III* (1920) and *Hamlet* (1922) that his art ripened and his reputation became assured. Among other productions in which he has appeared are *A Stubborn Cinderella*, *The Fortune Hunter*, and *Peter Ibbetson* (1917). He has also appeared as leading man in moving-pictures.

BARRYMORE, LIONEL (1878-). An American actor who made his debut in *The Rivals* with his grandmother, Mrs. John Drew, in 1893. He appeared in *Squire Kate* (1896), *Cumberland '61* (1897), and several plays with Nance O'Neil's company. He was two seasons with John Drew. Among other plays in which he has acted are *J. M. Barrie's Pantaloon* (1905), *Peter Ibbetson* (1917), *The Copperhead* (1918), *The Jest* (1919), which were noteworthy successes, in the title rôle of *Macbeth* (1921) *The Claw* (1922), and *Laugh, Clown, Laugh* (1923). He has appeared as leading man in many screen successes.

BARTHOLOMÉ, PAUL ALBERT (?-). A French painter and sculptor (see VOL. II). He became a member of the Royal Academy in 1921. His recent sculptures have been those in commemoration of the authors and dramatists who died in the War: in honor of Raymond the aviator at Montbrison; "Le Monument à Paris 1914-18," place du Carrousel; and "Le monument aux avocats," palais de Justice.

BARTHOUS, LOUIS (1862-). A French statesman and man of letters (see VOL. II). During the War he was minister of foreign affairs in the Painlevé Cabinet (1917). After the Armistice he was instrumental in practically all the governmental overturns of France. He was minister of war in the Briand cabinet (1921-22), and when this was succeeded by the Poincaré government he became minister of justice. In 1918, M. Barthou was elected to the French Academy, doubtless on the strength of his *Life of Mirabeau*, originally published in 1913. Other works include *Lamartine Orateur*, which M. Barthou considers his masterpiece, and *La Bataille du Marne* (1919).

BARTLETT, FREDERIC CLAY (1873-). An American painter, born in Chicago, who studied at Munich with Gysis, at Paris with Collin, and with Aman-Jean and Whistler. His work includes murals and paintings at the Chicago University Club, murals at the University of Chicago; a landscape, "Roman Afternoon," at Carnegie Institute, Pittsburgh; "Blue Blinds," "Evening White," "Canton Street," murals at the Burnham Library of the Art Institute in Chicago. Mr. Bartlett is a member of the National Institute of Arts and Letters and of the Mural Painters' Royal Academy of Munich. He received a silver medal from the St. Louis Exposition in 1904 and a silver medal from the Panama-Pacific International Exposition, 1915.

BARTLETT, FREDERICK ORIN (1876-). An American writer of popular fiction, born at Haverhill, Mass., and educated in the public schools, at Proctor Academy (Andover, N. H.), and at Harvard University. He was a reporter on the *Boston Record* (1900-02) and on the *Boston Herald* (1902-06). He is the author of many realistic novels and short stories of varied character; tales of adventure, and stories for young people, in which he shows unusual skill in handling a plot and in character drawing. His most successful novel is

The Wall Street Girl. Other works include *The Forest Castaways* (1911); *The Lady of the Lane* (1912); *The Wall Street Girl* (Boston, 1916; New York, 1918); *Joan and Company* (Boston, 1919; New York, 1921), and many short stories.

BARTLETT, PAUL WAYLAND (1865-). An American sculptor (see VOL. II). His most ambitious work, the pediment group for the House of Representatives (Washington), was completed in 1916. It is composed of 12 colossal figures representing Democracy protecting Genius, conceived as typical examples of American laborers. Other important recent works are: six large marble statues for the façade of the New York Public Library; a bronze statue of Benjamin Franklin (Waterbury, Conn.), and "Patriotism," a colossal stone statue at Duluth, Minn. Bartlett was elected to the National Academy in 1917.

BARTLETT, ROBERT ABRAM (1875-). An American explorer (see VOL. II). He commanded the third Crocker Land Relief Expedition to New Greenland, returning in 1917. In the same year he was made marine superintendent of the Army Transport Service in New York and in 1920 was raised to the rank of lieutenant commander of the United States Naval Reserve Force. He was awarded the Gold Medal of the Harvard Travelers' Club in 1915, and in 1918 the Back Grant of the Royal Geographic Society for his work in the Canadian government Arctic expedition of 1913-15. He is the author of *The Last Voyage of the Karluk* (1916).

BARTLEY, NALBRO (1888-). An American writer, born at Buffalo, N. Y., and educated at the public high school of that city. She first wrote as a reporter on the *Buffalo Morning Express* (1907-09) and later appeared in New York City as a free lance writer. She has a large following of admiring readers in the popular publications to which she is a frequent contributor. Included among her works are *Paradise Auction* (1917), *Bargain True* (1918), *A Woman's Woman* (1918), *Gorgeous Girl* (1919), *Careless Daughters* (1919), *Gray Angels* (1920), and *Fair to Middling* (1921).

BARTOK, BÉLA (1881-). An Hungarian composer, born at Nagy Szent Miklos. After studying with Kersch and Erkel, he finished his musical education at the Landesmusikakademie in Pesth, where he has been professor of piano since 1906. As a composer he exhibits strong futuristic tendencies. He wrote an opera, *Ritter Blauharts Burg* (Pesth, 1918); a ballet, *Der Wunderbare Prinz* (1919); a dance-pantomime, *Der Holzgeschnitzte Prinz* (1922); a symphonic poem, *Kossuth*; a rhapsody for piano and orchestra; *Two Portraits* for orchestra; several suites for orchestra; a piano quintet and a string quartet, and pieces for piano. He has edited piano works of Haydn and Mozart and published a collection of several hundred Hungarian, Slovakian, and Rumanian folk songs.

BARTON, BRUCE (1886-). An American editor, and writer on everyday ethics. He was born at Robbins, Tenn., and educated at Amherst College. He was managing editor of the *Chicago Home Herald* (1907-09) and of *The Housekeeper* (1910-11); later he became assistant sales manager for P. F. Collier and Son (1912-14), editor of *Every Week* (1914-18), and president of Barton, Durstine and Osborn,

an advertising firm of New York. Besides contributing to magazines, he is the author of *More Power to You* (1917); *The Making of George Groton* (1918); *What Shall It Profit a Man?* (1919); *It's a Good Old World* (New York, 1920); *Unknown* (1921); and *A Personal Letter to the Kaiser* (1916).

BARTON, GEORGE (1866-). An American author and newspaperman born in Philadelphia where he began newspaper work with the *Philadelphia Inquirer* (1837) and the *Evening Bulletin*. He returned to the former as an editorial writer. He has contributed over 200 short detective stories to popular magazines and is the author of many stories for boys. Some of his recent books are *Bell Haven Eleven* (1915), *A Young Knight of Columbus* (1916), *The World's Greatest Military Spies and Secret Service Agents* (1917), *The Mystery of the Red Flame* (1918), *The Pembroke Mason Puzzle* (1920), etc.

BARTSCH, PAUL (?-). A zoölogist born at Tuntshendorf, Germany, and educated at the University of Iowa. He was associated with the division of mollusks of the United States National Museum (1896-1905); assistant curator (1905-14); curator of the division of Marine Invertebrates (1905-21); curator of the division of mollusks (1921-); professor of zoölogy at George Washington University (1899-); director of the histological and physiological laboratories of Howard University (1901-), and associate editor of *The Osprey* (1900-). His researches have been mainly with the mollusks, particularly in experimental breeding of terrestrial forms. He was a member of several expeditions sent out by the National Museum and by the Carnegie Institution of Washington.

BARUCH, BERNARD MANNES (1870-). An American financier, educated at the College of the City of New York (1889). For many years he was a member of the New York Stock Exchange and has been nationally prominent since 1916, when President Wilson appointed him to the advisory committee of the Council of National Defense. Since that time he has been chairman of the commission on raw materials, minerals, and metals; commissioner in charge of raw materials for the War Industries Board; member of the commission in charge of all purchases for the Allies; chairman of the War Industries Board (appointed in 1918); member of the drafting commission of the economic section of the American Commission to Negotiate Peace; member of the Supreme Economic Council and chairman of the raw materials division; American delegate on economics and reparation clauses; economic adviser for the American peace commission; member of the President's conference for capital and labor (1919); member of the President's agricultural conference (1922); and trustee of the College of the City of New York. He was regarded as one of the ablest organizers of the war time. He is the author of many pamphlets, addresses, and *The Making of Economic and Reparation Sections of The Peace Treaty* (1920).

BASEBALL. America's national game greatly strengthened its claim to popular favor during the 10 years ending with 1924. The attendance at the contests played by the many professional league clubs of the United States showed steady and at times sensational increases. The climax to a period of unprece-

dented growth in popularity came with the 1923 world series between the New York Americans, or "Yankees," of the American League and the New York Nationals, or "Giants," of the National League. These games were played in New York City before more than 300,000 persons, the total gate receipts amounting to over \$1,000,000.

The prestige that baseball enjoys at present is undoubtedly in large measure due to the rise in recent years of such star players as George Herman Ruth (q.v.), familiarly known to fandom as "Babe"; Tyus Raymond Cobb (q.v.), George H. Sisler, Edward T. Collins, Rogers Hornsby and others.

"Babe" Ruth stands out as the most powerful batter in the history of the game and at the same time as the greatest "gate" attraction the sport has ever known. The record of 59 home runs in a season which he established in 1921 seems destined never to be surpassed. The fame of Cobb, Sisler, Collins and Hornsby rests on their all-around playing, both at bat and in the field. Their names, too, provide the strongest of magnets at the major league turnstiles.

The onward march of professional, or "organized" baseball during the span from 1914 to 1924 encountered one serious check which threatened for a time to bring disaster. Following the world series of 1919 in which the Cincinnati National League team, the "Reds," emerged victorious over the Chicago American League team, the "White Sox," it developed that six of the Chicago players had been bribed by a coterie of big gamblers to "throw" the games. The effect of this disclosure was so wide-spread that the officials of organized baseball were finally compelled to make radical changes in the conduct of the game. The six offending Chicago players were blacklisted and Kenesaw Mountain Landis (q.v.), a Federal judge of Chicago, was chosen Commissioner of Baseball for a term of seven years, beginning with 1921. At the same time powers were conferred upon the Commissioner which constituted him practically a "czar." These drastic measures brought about the desired result. Public confidence was soon restored and baseball resumed its prosperous way.

A list of the pennant winning clubs in the National League during the period 1915-24 follows: 1915, Philadelphia; 1916, Brooklyn; 1917, New York; 1918, Chicago; 1919, Cincinnati; 1920, Brooklyn; 1921, New York; 1922, New York; 1923, New York.

The pennant winners in the American League were: 1915, Boston; 1916, Boston; 1917, Chicago; 1918, Boston; 1919, Chicago; 1920, Cleveland; 1921, New York; 1922, New York; 1923, New York.

The victors in the world series were: 1915, Boston Nationals; 1916, Boston Americans; 1917, Chicago Americans; 1918, Boston Americans; 1919, Cincinnati Nationals; 1920, Cleveland Americans; 1921, New York Nationals; 1922, New York Nationals; 1923, New York Americans.

Aside from the United States, the country evincing the greatest interest in baseball during 1914-24 was Cuba, where several league circuits have been established. Japan, too, has taken up the game on an extended scale but in the nations of Europe the sport has made slow progress.

BASKERVILLE, CHARLES (1870-1922). An

American chemist, born at Deer Brook, Miss., and educated at the Universities of Mississippi and Virginia, Vanderbilt, and North Carolina. Beginning his teaching career in the University of North Carolina, he soon reached the professorial chair in chemistry. In 1904 he became professor of chemistry, and director of the chemical laboratory of the College of the City of New York; this position he held until his death. His studies on the rare earths led to the announcement of his discovery of the chemical elements carolinium and berzelium. He devoted much attention to the chemistry of anesthetics. In the industrial field he was active in the refining and hydrogenation of vegetable oils and established plastic compositions, besides succeeding in reinforcing metals. He also made studies on pulp and the paper industry, particularly with the branch relating to the recovery of used stock. The danger of various manufacturing processes and the best ways to meet and overcome these dangers received his careful consideration. In 1912 he received the Longstreth prize from the Franklin Institute. Baskerville was a fellow of the American Association for the Advancement of Science; he presided over the Chemical Section in 1903 and was chairman of the section of analytical chemistry at the International Congress of Applied Chemistry meeting in London in 1909. Nearly 200 papers, 8 books, and 16 patents testify to his scientific energy in the field of applied chemistry and to his effort to improve humanity.

BASKETBALL. Basketball added considerably to its popularity as a sport during 1914-1924, particularly among the colleges, high schools and Y. M. C. A. organizations. The games of the Intercollegiate League attracted as many as 2000 spectators on several occasions and some of the larger colleges were forced to enlarge greatly the seating capacity of their gymnasiums. Professional basketball also came into vogue and flourishing leagues were established in various sections of the United States.

One important change in the playing rules was adopted in 1917 which provides that the entire background of the court shall be regarded as within bounds, thereby giving the player an additional leeway of two feet under the basket. Another important change regarding personal fouls was made in 1923. The player fouled must "throw." A 17-foot zone was also established within which two free throws for fouls committed within the zone are allowed.

BASS, CHARLES CASSEDY (1875-). An American physician, born at Carley, Miss. He studied medicine at Tulane University (1899) and afterward devoted himself to the study of bacteriology. He has done much original investigation in the intestinal parasites of man, notably hookworm, malaria, pellagra, Riggs' disease, etc. In recognition of his work in malaria he received gold medals from the State of Mississippi, the Southern Medical Association, and the American Medical Association. He is the author of *Hookworm Disease*, with G. Dock (1909); *Alveolodental Pyorrhæa*, with Johns (1915), and *Practical Clinical Laboratory Diagnosis*, also with Johns (1917).

BASRA. See MESOPOTAMIA.

BASSLER, RAY SMITH (1878-). An American palæontologist, born at Philadelphia

and educated at the University of Cincinnati. He served as private assistant to Edward O. Ulrich, from whom he obtained his early training in geology and palaeontology. In 1901 he became connected with the United States National Museum, in which since 1911 he has been senior curator of palaeontology. His advance studies were made in the George Washington University, where after 1904 he held the chair in geology. He served as special geologist on the State Geological Surveys of Virginia, Tennessee, and Maryland and has contributed to their reports volumes on local economic geology, stratigraphy, and palaeontology. His original investigations have been largely devoted to the stratigraphy and palaeontology of the Lower Palaeozoic and on fossil bryozoa, ostracoda, and other micro-organisms. With Ferdinand Canu he has published three quarto volumes on the Cenozoic Bryozoa of North America and made these early forms of life available for stratigraphic and economic purposes. He is a fellow of the Geological Society of America and in 1910 he became secretary of the Palaeontological Society of America.

BASTIN, EDSON SUNDERLAND (1878-). An American geologist, born at Chicago, Ill., and educated at Michigan and Chicago. In 1905 he became connected with the United States Geological Survey, serving in the division of mineral resources, and part of the time as its chief. In 1919 he returned to Chicago, where he later held the chair of economic geology. His original investigations have tended toward the study of economic resources of various parts of the United States and include discussions of questions concerning their origin.

BASUTOLAND. A British native protectorate in Southern Africa under the control of the British Colonial Office, administered by a resident commissioner under the direction of the high commissioner for South Africa. It has an area of 11,716 square miles. The census of 1921 showed a native population of 495,937; 1603 Europeans, 172 Asiatics, 1069 colored. Maseru, the capital, had 1890 natives and 399 Europeans. The increase in the European population over 1911-21 was considerable because of prohibitions on white settlements. Education advanced steadily under missionary administration, in 1922 there being 495 native schools with 34,733 pupils. Exports, sent to South Africa, increased from £193,122 in 1908 to £1,380,119 in 1919. In 1922 exports were £69,330. Imports increased from £239,830 in 1908 to £1,137,037 in 1919. In 1922 imports were £702,125. Leading exports were grain, cattle, wool, mohair. Leading imports were blankets, ploughs, clothing, iron and tinware. The district supported its own administration, deriving its funds mainly from a native poll tax and customs. An income tax in 1922-23 brought in £3,755. Revenues in 1913-14 were £161,417, and expenditures £203,461; in 1922-23 these were £212,538 and £224,547. The native Basutos continued orderly during the period and many saw service in France and Africa in labor contingents. To the question of annexation by the Union of South Africa, however, they were consistently opposed.

BATAILLE, FELIX HENRI (1872-1922). A French playwright, one of the foremost figures of the French stage during the decade 1914-24, born at Nîmes, and educated at the Lycée Henri IV at Paris and the Lycée Janson de Sailly.

His first play, *La Belle au Bois Dormant*, was brought out in 1894, and his first great success came with his publication of *Maman Colibri* in 1904. Though the plot was rather repelling, *Maman Colibri* triumphed by the sheer charm of Bataille's art and the manner in which he idealized his heroine. *La Marche Nuptiale* (1905) was regarded by many as the best of his earlier works. A new side of his talent was displayed in *L'Amazone* (1917), inspired by the War. Its thesis was the struggle between the material and spiritual. There is in Bataille's plays the reflection of a distinct individual temperament. He was extremely sensitive to the sufferings of humanity, he scrutinized the human heart, he took the banalities of life and wrote of them as of his own intimate emotions; all this he did with dramatic results which, though morbid and over-sentimentalized, possess a certain charm and originality of treatment. In addition to the works mentioned, Bataille's publications include *La Lépreuse* (1896), a tragedy; *Ton Sang and L'Enchantement* (1900); *Paliche* (1906); *Les Flambeaux* (1912); *Le Phalène* (1913); *Notre Image*, and *Les Sœurs d'Amour* (1919); *L'Homme à la Rose* (1920); *La Tendre* (1921), and *La Possession* (1922). He also wrote *La Chambre Blanche* (1895); *La Divine Tragedie* (1916), and *La Quadrature de l'Amour* (1920), all verse.

BATES, HENRY MOORE (1869-). An American lawyer, born at Chicago and educated at the University of Michigan and Northwestern University. After practicing law in Chicago, 1892-1903, he became Tappan professor of law at the University of Michigan and was made dean of the Law School there in 1910. In 1917-18 he was professor of law at the Harvard Law School and in 1921 he was appointed Commissioner on Uniform State Laws. He was president of the Association of American Law Schools (1912-13), a member of the Executive Committee of the American Institute of Criminal Law (1911-14), and president of the Order of the Coif (1913-16).

BATES, LINDON WALLACE (1858-1924). An American civil engineer (see VOL. II). Mr. Bates was chairman of the Engineering Committee of the Submarine Defense Association in 1917. He died at Paris on April 22, 1924.

BATES COLLEGE. A nonsectarian, co-educational institution at Lewiston, Me., founded in 1864. During the decade 1914-24 the student body increased from 450 to 626, the faculty from 33 to 40, and the endowment from \$800,000 to \$1,500,000. Bates claimed a unique record in the two fields of education and debating. Forty-six per cent of its more than 2000 living alumni were engaged in 1923-24 in teaching, and it provided more than twice as many high-school principals in New England as any other college. Bates was the first American college to send a debating team to England, and the first to debate an English university on this side of the Atlantic. From these beginnings grew a new institution of international collegiate debating. For 55 years there were but two presidents. The third president, Clifton Daggett Gray, Ph.D., LL.D., assumed office in May, 1920, following the death of George Colby Bates, D.D.

BATESON, WILLIAM (1861-). An English zoologist, born at Whithy and educated at St. John's College, Cambridge. He was Silliman Lecturer at Yale University (1907); pro-

fessor of biology at Cambridge University (1908-09); Fullerton professor of physiology in the Royal Institution (1912-14); president of the British Association for the Advancement of Science (1914); director of the John Innes Horticultural Institution (1910-), and trustee of the British Museum (1922-). As the guest of the American Association for the Advancement of Science, he delivered the principal address at the meeting held in Toronto in December, 1921. His most important earlier researches dealt with various phases of the theory of evolution; the most important of the results appeared as *Materials for the Study of Variation* (1894). Since 1900, he was prominently identified with the Mendelian study of genetics and was regarded as the leading English authority on this subject, maintaining in opposition to the biometricians that only through the Mendelian technique could accurate results in heredity be obtained. Besides numerous shorter papers he published *Mendel's Theory of Heredity* (1902) and *Problems in Genetics* (1915). See BOTANY.

BATTALION. See ARMIES AND ARMY ORGANIZATION.

BATTISTI, CESARE (1875-1916). An Italian author and patriot, born at Trent, and educated at Vienna, Gratz, and Florence. He devoted himself to geographical science and particularly the history of the Trentino. When socialism made its appearance in Italy, he became an enthusiastic supporter. While editor of the Socialist daily, *Il Popolo*, he worked continuously for the autonomy of the Trentino, the cessation of Austrian interference, and subsequently the intervention of Italy against Austria. For his views he was many times imprisoned by Austrian authorities. In 1915 he entered the Italian army and a year later, while commanding a company of the Vicenza Battalion, was severely wounded. Reports followed that Battisti was taken prisoner by Austria and put to death for treason; that finding himself imprisoned within Austrian lines, he committed suicide; and finally, that wounded and half dead, he was hanged by the Austrians. Public indignation in Trent and Italy generally ran very high. Just what did happen has not been ascertained in spite of a photograph published by the *New York Times* showing Battisti walking unaided to his execution. He wrote *Il Trentino, Saggio di Geografia, Fisica e d'Antropogeografia*; *Termini Geografici Racolti nel Trentino*, and other volumes.

BATTLE CRUISER. See VESSEL, NAVAL.

BATTLESHIP. See VESSEL, NAVAL; ELECTRIC SHIP PROPULSION.

BATTLES OF THE FRONTIER. See WAR IN EUROPE, Western Front.

BAUCH, BRUNO (1877-). A German philosopher and Kantian scholar, born in Schleswig and educated at the universities of Freiburg, Strassburg, and Heidelberg. He studied mathematics, natural science, and philosophy and became associated with the neo-Kantian group of Hermann Cohen. His first work, *Glückseligkeit und Persönlichkeit in der Kritischen Ethik* earned him a reputation in philosophical circles. On the occasion of the Kantian anniversary he published *Luther und Kant* in 1904, and shortly afterward wrote a volume on Schiller. Among his other works are a philosophical biography of Kant and *Fichte und Unsere Zeit* (1920). Contrary to the tendency before the War, Professor Bauch presents Fichte as a cham-

pion of republican ideals and opposed to military Pan-Germanism.

BAUER, LOUIS AGRICOLA (1865-). An American magnetician (see VOL. II.) In 1917 he was a member of the National Research Council, and in 1917 and 1918 chairman of the committee on navigation and nautical instruments of the Council of National Defense. From 1920 to 1922 he was vice-chairman of the American Geophysical Union.

BAUER, OTTO (1881-). An Austrian Socialist politician. He was a member of the faculty of jurisprudence at the University of Vienna, where he devoted himself to the study of economics. Even during his student days he was an ardent advocate of the Social Democratic party. After being held a prisoner of war in Russia (1915-17), he returned to Vienna. In November, 1918, after the revolution, he became an influential leader of his party, bent on the union of German Austria with Germany. He retired from office in 1919 but subsequently was recognized, partly because of his thorough knowledge of economics, as a power in the Constituent National Assembly and in the National Parliament (Nationalrat). His works include *Die Nationalitätenfrage und die Sozialdemokratie* (Vienna, 1907); *Die Russische Revolution und das Europäische Proletariat* (1917); and *Bolschewismus oder Sozialdemokratie?* (1920).

BAUMANN, EMILE (1885-). A French novelist and critic. His work shows the influence of Bourget and Claudel. His novel, *Job le Prédestiné*, which shared the Prix Balzac in 1922, is mystical in spirit, like his much discussed *L'Immolé* (1921). His other works include *Le Baptême de Pauline Ardel* (1913); *Trois Vieilles Saintes* (1912); *Les Grandes Formes de la Musique* (1905); *Fosse aux Lions*, and *Le Fer sur L'Enclène* (1920).

BAUXITE. The production of bauxite, which is used largely for the manufacture of aluminium (q.v.), was 522,690 long tons, valued at \$3,156,610, in the United States in 1923, as compared with 219,318 long tons valued at \$1,069,194 in 1914. The 1923 production was an increase of over 72 per cent in quantity and 56 per cent in value as compared with the domestic production of 1922; in amount it equaled the largest annual domestic production before the War, the record output was 605,721 long tons valued at \$3,447,992 in 1918. The largest producer was the American Bauxite Company, whose plant was at Bauxite, Ark., where about 1000 tons a day were handled. Bauxite was also mined at other points in Saline and Pulaski Counties, Arkansas. In this Arkansas field the production increased from 266,790 long tons in 1922 to 493,880 in 1923. The operations in the eastern fields of Georgia, Alabama, and Tennessee became less extensive as the older deposits were worked out. The production which in 1917 had been 62,134 long tons fell from 42,800 long tons in 1922 to 28,810 long tons in 1923. The greatest decrease was in the Alabama districts, for the production of both Georgia and Tennessee was greater in 1923 than in 1922. The deposits in Alabama, Georgia and Tennessee produce 42,810 long tons in 1922. New deposits similar to those worked in Macon, Sumter, and Wilkinson Counties in central Georgia were opened in 1923 in east-central Alabama.

Most of the bauxite imported into the United States comes from South America, but France and Dalmatia also contribute and brought the

total importation for the year 1923 to 119,020 tons, as compared with 23,656 tons in 1922. The Bauxite received in the United States from South America came from British Guiana, where the Demerara Bauxite Company reopened its mines and completed its drying and loading equipment at Mackenzie on the Demerara River, 60 miles above Georgetown. This bauxite was used by manufacturers of aluminium and aluminium salts. In 1923 it was landed and sold at eastern markets more cheaply than domestic bauxite, even after the import duty of \$1 a ton had been paid, and its importation was seriously affecting the business of some domestic bauxite miners. A large drying and loading plant was erected on the Cottica River, 100 miles above Paramaribo, Dutch Guiana, from which bauxite was exported during 1924.

The record world production of bauxite in 1918 amounted to 962,876 metric tons. France headed the roll with some 145,000 tons. Dalmatia and Istria were other notable producers in that year. See ALUMINIUM.

BAUXITE PRODUCED AND CONSUMED IN THE UNITED STATES, IN 1923, IN LONG TONS

Year	Domestic production	Imports	Exports *	Apparent consumption
1923	522,690	119,020	78,560	563,150

* Largely bauxite concentrates.

DOMESTIC BAUXITE CONSUMED BY UNITED STATES INDUSTRIES, 1923, IN LONG TONS

Year	Aluminium	Chemicals	Abrasives and refractories	Total
1923	280,518	68,872	73,300	522,690

BAVARIA. During the War the well-known Bavarian particularistic tendencies were kept in check by a steadfast loyalty to the Empire, in spite of the fact that the enemies of Germany attempted to use these aspirations toward breaking the unity of the Empire. Upon assuming the office of German chancellor in November, 1917, Count Hertling was succeeded as Bavarian prime minister by von Dandl. The latter's offer of electoral reform, advanced in the Diet in October, 1918, came too late in the face of the German crisis. The November revolution of 1918 resulted in the deposition of the dynasty and the proclamation of the Republic. On November 8 the Soldiers' and Workers' Council in Munich elected the radical Socialist, Kurt Eisner, prime minister. Eisner wished to swing Bavaria far to the left and acceded to the urgent request for elections to the Bavarian Constituent Assembly only after he had provided in advance through ordinance for the establishment of a powerful Socialist government. The elections of Jan. 9, 1919, resulted in the following party divisions in the Assembly: Bavarian People's party (successor of the Bavarian Catholic Centre) 66, Socialists 62, Democrats 25, German People's party and German National party 9, Farmers' League 15. On February 21, the date of the convocation of the Assembly, Kurt Eisner was assassinated by a former army officer and in consequence a period of disorder and lawlessness ensued in which the official Socialist party and the provinces were at odds with the

Munich Soviets who attempted to usurp all power. After much conflict a new ministry was formed by the Socialist Hoffmann, and, in view of the threatening situation in the capital, the government and the Assembly were transferred to Bamberg in Northern Bavaria. Meanwhile the Munich revolutionary councils set up a Soviet republic which was ruthlessly suppressed, however, by the Hoffmann government and the provinces with the aid of the Prussian and Württemberg military during the first days of May, 1919, after one month of power in the capital. During the hard fighting between the two factions both sides committed barbarous excesses.

With the overthrow of the Soviets and the return of the Hoffmann government to Munich, the slow but steady process of reaction in Bavaria began. The rural sections of the country were opposed to the republican, Socialist, and anti-Catholic government in Munich, and to prevent future radical uprisings volunteer military organizations sprang up which were powerful instruments of reaction. At the time of the Kapp Putsch (March, 1920) the reactionary movement had progressed to a point where the Socialist government could be replaced by a bourgeois coalition under von Kahr, consisting of the Bavarian People's party, the Democrats, and the Farmers' League. The elections for the Diet on June 6, 1920, showed a further swing to the right, inasmuch as they resulted in the return of only 27 Majority Socialists, 22 Independent Socialists, and 2 Communists against 108 representatives for the bourgeois parties, most of whom re-entertained monarchist sentiments. Thereupon von Kahr reorganized his cabinet so as to include men more fully in sympathy with his own reactionary views. During 1921 the existence in Bavaria of secret military organizations in violation of the Versailles Treaty led to a serious dispute between the Berlin and Munich governments as a result of which von Kahr resigned on Sept. 12, 1921, and was succeeded by Count von Lerchenfeld. The new premier represented a more liberal viewpoint and reached subsequently a satisfactory agreement with the Government of the Reich. This turn toward moderation, however, was the result merely of pressure from without and had little effect on Bavarian reaction, which continued to grow daily in strength. The Lerchenfeld government found too little support in the country to cope with the secret military societies and the solid nationalist organization against treaty-enforcement and democracy. Moreover, Bavaria became a haven for all the extreme monarchist elements in Germany and henceforth all nationalist opposition to the Republic had its headquarters in Munich. In consequence of the activities of the Bavarian reactionaries, in 1922 the Reich came into conflict with the Allies. Count von Lerchenfeld, whose liberal tendencies lacked the support of the majority of the Bavarian people, was forced to resign early in November of the same year and a strongly monarchist government was formed by von Knilling with a programme of opposition to the fulfillment of the Peace Treaty. Under the influence of the reparation policy of the Allies and particularly of the developments in the Ruhr, Bavarian reaction and nationalism blazed forth in 1923 into a violent flame. The National Socialists with a programme of extreme nationalism and anti-Semitism sought refuge in Ba-

varia and under the leadership of Adolf Hitler formed activist organizations without interference from the Bavarian government. On Sept. 26, 1923, the Knilling ministry suspended civil law and appointed von Kahr General State Commissioner with the powers of a dictator. Kahr and his lieutenant, General von Lossow, the commander of the Bavarian Reichswehr, took a stand against the laws and decrees of the Reich, especially against the "Law for the Defense of the Republic." A tense situation between Bavaria and the Reich resulted therefrom, which on the part of Bavaria took the form of direct refusal to recognize the authority of the Berlin government. Only the utmost caution and considerable sacrifice of principle on the part of the central government prevented open hostilities between the Reich and the recalcitrant state. To make matters even more complicated, the National Socialists under Ludendorff and Hitler executed on Nov. 8, 1918, their ludicrous "Beer Hall" Putsch. Kahr and Lossow, who at first had taken part in the affair but later claimed that they had been forced into such action by threats, suppressed the movement on the following day by military force and arrested the ringleaders. This procedure, however, by no means met with the approval of nationalist Bavaria and in consequence of his stand in the affair Kahr's position in the Diet was considerably weakened. Hence Kahr and Lossow resigned in February, 1924, and the full conduct of the government was again taken over by the Knilling ministry. During the following month the farcical trial of the perpetrators of the "Beer Hall" Putsch gave the world a fair view of the strength of nationalism in Bavaria. The elections to the Diet in April, 1924, resulted in a victory for the partisans of Hitler and in an increased representation of the Communists at the expense of the moderate parties and the Socialists.

On Aug. 14, 1919, Bavaria adopted a new constitution, which conformed with the provisions of the constitution of the Reich. According to this document the supreme power lay with the people. The executive power was vested in a ministry taken as a whole and the legislative power in a single-chamber diet, elected for four years by all Bavarian citizens, male or female, of 20 years of age, on the basis of one member for every 40,000 inhabitants. Provision was made for the application of the system of proportional representation and for equal, direct, and secret suffrage. Under the constitution of the Reich, Bavaria was shorn of its special military, financial, railroad, and postal privileges. Parallel with the growth of monarchism in Bavaria, demands were advanced early in 1924 for a revision of the German constitution so as to restore Bavaria's special privileges as well as for a reform of the country's own Fundamental Law with a view to erecting a bi-cameral legislature and limiting the franchise. These demands failed, however, to receive the indorsement of the Bavarian people in the April elections of 1924.

Resentment over the loss of the special privileges, and the wide differences between monarchist and Catholic Bavaria on the one hand, and republican and Socialist Germany on the other, stimulated Bavarian particularism anew in the years after the Armistice. Frequent mention was made of the possible secession of Bavaria from the Reich and the establishment of a Catholic monarchy, consisting of Bavaria and

the conservative sections of Austria, in opposition to radical and Protestant northern Germany. Accusations were made that French intrigues had been actively at work in this direction. Be that as it may, there can be little doubt that the separatist movement in the Rhenish Palatinate, which, parallel with the similar movement in the Rhenish Province of Prussia, came to a head late in 1923, was engineered by the French, as was conclusively proved by the quick disappearance of the "Republic of the Palatinate" early in 1924 as soon as France had withdrawn its active support. In conjunction with the demands for far-reaching constitutional changes in the spring of 1924, a proposal was made for the formation of a Catholic monarchy, to consist of Bavaria and the Tirol, but this, like the former demands, was rejected by the people in the April elections. Bavaria received an addition to her territory when on Nov. 30, 1919, the Thüringian city of Coburg voted by a large majority to join Bavaria. See RHINELAND.

BAWDEN, WILLIAM THOMAS (1875-). An American educator, born at Oberlin, Ohio, and educated at Denison University, the Mechanics Institute of Rochester, N. Y., and Teachers' College of Columbia University. After teaching in various schools, he was director of the Manual Training Department of the Illinois State Normal University (1903-10), assistant dean of the College of Engineering of the University of Illinois (1910-12), specialist in industrial education of the United States Bureau of Education (1914-19), and commissioner in 1919. He was chairman of the subsection on Industrial Education at the second Pan-American Scientific Congress (Washington, D. C., 1915-16). In 1909 he became editor of *Manual Training Magazine*.

BAX, ARNOLD (E. TREVOR) (1883-). A British composer, born in London. From 1900 to 1905 he studied at the Royal Academy of Music with Tobias Matthay (piano) and Frederick Corder (composition). He has written a *Festival Overture*; the symphonic poems *Into the Twilight*, *In the Fairy Hills*, *Christmas Eve on the Mountains*, *The Garden of Fand*, *November Woods*, *In Memoriam*, and *Tintagel*; choral works with orchestra, *Fatherland* and *Enchanted Summer*; a Symphony in E flat minor; chamber music, piano pieces, and songs.

BAYLISS, SIR WILLIAM MADDOCK (1860-). A British physiologist, born at Wednesbury, Staffordshire, and educated at Oxford and the University of London. He was appointed professor of general physiology in the University of London and with Harden edits the *Biochemical Journal*. He delivered the Herter lectures at the New York Academy of Medicine in 1922. He was very active during the War, in committee and research work on the treatment of shock, chemical warfare, and the food supply. His principal writings are *The Principles of General Physiology* (1915); *Nature of Enzyme Action* (1908); *Physiology of Food and Economy of Diet* (1917); *Intravenous Injection and Wound Shock* (1918); *Introduction to General Physiology* (1919); *The Vaso-motor System* (1923), and *Interfacial Forces and Phenomena in Physiology* (1923).

BAYREUTH FESTIVAL. See MUSIC, Festivals.

BAYS, ALFRED WILLIAM (1876-). An American lawyer, born at Vermont, Ill., and

educated at Knox College and the School of Law of Northwestern University. He was appointed lecturer at the university in 1905 and was advanced progressively until he became professor of law in 1912; at the same time he continued his general practice in Chicago. He is author and compiler of the *American Commercial Law Series*, 9 vols. (1911-12), *Cases on Commercial Law* (1914), *Commercial Law* (1919), and a second edition of the *Commercial Law Series*, 4 vols. (1920-22).

BAZIN, RENÉ (1853-). A French novelist and man of letters (see VOL. III). After 1914, he produced a half dozen novels besides miscellaneous writings. *Les Nouveaux Oberlé* (1919) is regarded as a masterpiece. It treats of a subject dear to the French heart, the patriotism of the Alsations, a theme which the author handles in a simple manner. *Charles de Foucauld, Explorateur* (1921) is a magnificent biography of a notable French explorer. His other works include *Mémoires d'une Vieille Fille*; *L'Abandonné* (1914); *La Closerie de Champdolent* (1917); *Récits du Temps de Guerre* (1919); *Le Mariage de Mlle. Gimel*; *La Barrière*; *La Douce France*; *Histoire de Vingt-quatre Sonnettes*; and *Ferdinand Jacques Hervé Bazin* (1921).

BEAL, ALVIN CASEY (1872-). An American floriculturist, born at Mt. Vernon, Ill., and educated at Illinois and Cornell University. From 1900 to 1908 he was instructor of floriculture at the University of Illinois, and in 1909 he became professor of floriculture at Cornell. He was a member of many floricultural societies and wrote numerous research bulletins and articles.

BEAL, GIFFORD REYNOLDS (1879-). An American painter, born in New York, who studied with Chase, DuMond and Ranger. He was elected an Academician in 1914, and he took prizes at the Academy in 1910, 1913 and 1919. In 1913 he took a medal at the Art Institute of Chicago and at the Corcoran Gallery, and in 1915 he was awarded a gold medal at the Panama-Pacific International Exposition at San Francisco. Among his many awards is included the gold medal of the National Arts Club (1918). Beal is a versatile colorist. His subjects are taken from many fields and moods. His circus pictures had a peculiar *réclame*. Of another genre are his garden scenes, peopled with ladies in crinolines and dandies of long ago. Later pictures show gain in organization. His best known work includes "Mayfair" and "The Albany Boat," in the Metropolitan Museum (New York), and "A Puff of Smoke," in the Art Institute (Chicago). He is represented also in the Syracuse, San Francisco, and Detroit Museums.

BEARD, CHARLES AUSTIN (1874-). A prominent American historian and publicist (see VOL. III). After 1914, Mr. Beard's work assumed increasing importance. His insistence on the part played by economics in the development of America's institutions was recognized by American scholars as a major contribution to historical thought. He projected an ambitious study of the interrelations between politics and economics in American life, with *The Economic Interpretation of the Constitution* (1913) and a continuance of its story in *The Economic Origins of Jeffersonian Democracy* (1915). These works not only received the commendation of scholars but also were read widely, for Mr.

Beard's stylistic talents are considerable. These factors enhanced the popularity of his other works; his *Contemporary American History* (1914) and *The History of the United States* (1921), are used as general texts by schools throughout the country. In 1917, he gained great prominence for his fight for academic free speech; his resignation from Columbia University was a protest against the dismissal of two of his colleagues. His interest in contemporary social and educational problems then led him to affiliate himself with the Bureau of Municipal Research (New York) and later with the New School for Social Research. He wrote prolifically on many historical and allied themes, his works including the excellent *Economic Basis of Politics* (1922) and *Cross Currents in Europe To-day* (1922), besides many textbooks for schools. Of these the more important are *National Governments and the World War* with F. A. Ogg (1919), and *History of the American People*, with W. C. Bagley (1918).

BEARD, MARY RITTER (MRS. CHARLES A.) (1876-). An American writer and suffrage leader, born at Indianapolis and educated at DePauw and Columbia Universities. She was editor of *The Woman Voter* until 1912, a member of the executive committee of the Congressional union for Woman Suffrage, and former vice-chairman for Manhattan of the Woman Suffrage party of New York. She is the author of several excellent historical surveys, *American Citizenship*, with her husband (1913), *Women's Work in Municipalities* (1915), *A Short History of the American Labor Movement* (1920), a useful and readable summary; and *History of the United States* (1921).

BEAR ISLAND. A desolate Arctic land about 200 miles north of Norway, which claims it. Extensive deposits of coal led to the belief that it would be economically valuable, and a temporary colony was established for mineral exploitation, but its further development was unpromising owing to the superior mining facilities in Spitzbergen (q.v.).

BEATTY, DAVID BEATTY, first EARL OF (1871-). A British admiral born in County Wexford, Ireland. He began a meteoric career in the navy in 1884. He served with the Nile flotilla in 1896; participated in the advance on Peking in 1900; acted as aide-de-camp to Edward VII in 1908 and as naval secretary to the First lord of the Admiralty in 1912, when he was made commander of the First Battle Cruiser Squadron. The outbreak of the War gave him the opportunity which all naval men traditionally crave. He distinguished himself in the naval battles of Heligoland Bight (Aug. 28, 1914), Dogger Bank (Jan. 24, 1915), and Jutland (May 31, 1916), where his direction of the battle cruisers was characterized by a spirit and enterprise which gained universal commendation. In December, 1916, he was raised to the post of Commander-in-Chief of the Grand Fleet, in succession to Sir John Jellicoe. In 1919 he received a peerage, the Order of Merit, and the position of First Sea Lord. He married, in 1901, Ethel Field, the daughter of the American, Marshall Field.

BEATTY, EDWARD WENTWORTH (1877-). A president of the Canadian Pacific Railway Company, born at Thorold, Ont., and educated at Upper Canada College, the Model School of Toronto, Harbord Collegiate Institution (To-

ronto), Toronto University, and Osgoode Hall Law School. After reading law in a Toronto office, he was called to the Ontario Bar in 1901, and in the same year was appointed assistant in the law department of the Canadian Pacific Railway. He became assistant solicitor in 1905, general solicitor in 1910, general counsel in 1913, vice-president in 1914, King's counsel for Ontario in 1915, King's counsel for the Dominion in the same year, and director of the company in 1916. He was constituted a member of the executive committee in 1916 and was elected president in 1918. Other offices which he holds are those of director of the Bank of Montreal, director of the Royal Trust Company, chancellor of Queen's University and of McGill University, and trustee of Royal Victoria Hospital.

BEAUX, CECILIA (?-). An American painter (see Vol. III). She won the Saltus medal from the National Academy of Design in 1914; medal of honor from the Panama Pacific International Exposition (1915); the Proctor portrait prize from the National Academy of Design (1915); the National Arts Club prize of the N. A. Women Painters Society (1917); and the Logan medal from the Art Institute of Chicago in 1921.

BEAUX-ARTS INSTITUTE OF DESIGN.

This institute was organized in 1916 by members of the Society of Beaux-Arts Architects who had formerly attended the Ecole des Beaux-Arts of Paris. It was formed in order to carry on the educational work which had developed from the original social club of the Society of Beaux-Arts Architects. The main courses were in architecture, but this was supplemented by important courses in sculpture, mural painting and interior decoration. The institute now serves as a clearing house for advanced architectural design in the majority of big architectural schools in the United States, from California to New York, and its number of pupils has increased from about 1100 in 1914 to 1500 in 1924. Building, 126 East 75th Street; Director, Whitney Warren, 16 East 47th Street, New York, N. Y.

BECHUANALAND. A British native protectorate in South Africa under control of the British Colonial Office, administered by a resident commissioner under the direction of the high commissioner for South Africa. It has an area of 275,000 square miles, and a population (census of 1921) of 152,983 of whom 1743 were Europeans. The most important city is Serowe; population, 20,000. The native peoples were a pastoral folk for the most part, and exported cattle and skins to South African markets, notably Kimberley, Johannesburg, and Mafeking. The mines of the Tati District produced 6005 ounces of gold and 1317 ounces of silver in 1922. Administrative costs consistently increased, expenditures in 1913-14 being £66,749, and in 1922-23, £82,436. In the three years 1919-22, expenditures exceeded revenues and imperial grants were necessary to meet the deficit. In 1922-23, revenue exceeded the expenditure by £9559. The protectorate belonged to the South African Customs Union and no figures for local trade were kept. There were 12 schools for Europeans, attended by 178 children; one for colored; and 66 native schools with an attendance of 4183 children.

BECK, JAMES MONTGOMERY (1861-). An American lawyer and author, born at Phila-

delphia, and educated at Moravian College. He was admitted to the bar in 1884. He was United States Attorney for the Eastern District of Pennsylvania (1896-1900), assistant attorney-general of the United States (1900-03), and member of the law firms of Shearman & Sterling, New York (1903-17), and of Beck, Crawford and Harris, New York (1917-21). In addition he has held the positions of trustee and bank director, and in 1921 was solicitor-general of the United States. He is the author of several works on international relations, with searching analyses of the problems of war and peace. *The Evidence in the Case* (1914) discusses the question of responsibility for the War, with a condemnation of Germany. *The War and Humanity*, with a foreword by Theodore Roosevelt (1916), is a brief for world coöperation. *The Reckoning* (1918) is a discussion of the moral aspects of the peace problem, and *The Passing of the New Freedom* (1920) is a satire on President Wilson. He is also author of *The League of Nations* (1919) and *The Constitution of the United States*, with a preface by the Earl of Balfour (1923).

BECKER, ALFRED LE ROY (1878-). An American lawyer, born in Buffalo, N. Y., and educated at Harvard and Buffalo Universities. He practiced law in Buffalo, 1902-14, and later became deputy attorney of the State of New York (1915-19). He attained a nation-wide reputation during the years 1917 to 1919 for his investigation and exposure of German plots and propaganda. He is known as a lecturer on Dutch history in New York, at the Brooklyn Institute of Arts and Sciences.

BECKER, CARL LOTUS (1873-). An American historian, born in Blackhawk County, Iowa, and educated at Wisconsin and Columbia Universities. He taught history successively at Pennsylvania State and Dartmouth Colleges and Kansas, Minnesota, and Cornell Universities. He became professor of history at Cornell in 1917. In 1915 he was made a member of the board of editors of the *American Historical Review*. A student of Frederick J. Turner, he has inherited much of his master's historical philosophy and literary style, writing works characterized by technical skill and, what is rare in historical activity, good style. His most successful works in this respect have been *Kansas in the Turner Essays* (1910), *Beginnings of the American People* (1915), and *The Eve of the Revolution* (1918). The latter is easily one of the best of the *Chronicles of America* series. It not only possesses a proper sense of the underlying values, but also catches, with a sophistication comparable only to the French method, the flavor of the American scene in 1776. His study, *The Declaration of Independence* (1922), displays the same technique in intellectual history. His other works include *The United States, an Experiment in Democracy* (1920), *America's War Aims and Peace Terms* (1918), and many monographs on the French Revolution, which is the theme of his principal seminar.

BECKETT, PERCY GORDON (1882-). An American mining engineer, born in Quebec, Canada, and educated at Fettes College, Edinburgh, and at the School of Mines at Camborne, Cornwall. He served as superintendent and engineer of several important mining corporations. From 1908 to 1912 he was engineer for Phelps, Dodge and Company in Arizona, and was gen-

eral manager of the Old Dominion Company at Globe, Ariz., from 1912-17. He became general manager of the Phelps, Dodge Corporation in Arizona in 1920.

BECKHAM, J. CREPPS WICKLIFFE (1869-). An American senator, born at Bardstown, Ky., and educated at the Central University of Kentucky. He was admitted to the Kentucky bar in 1893. In 1894 and 1896-98, he was a member of the Kentucky House of Representatives, and was Speaker in the latter year. From 1900 to 1907, he was the governor of Kentucky. He was a member of the United States Senate, 1915-21, and a delegate-at-large and member of the Committee on Resolutions of the Democratic National Convention in 1904, 1908, and 1912; he was delegate-at-large in 1916 and 1920.

BEDFORD-JONES, HENRY JAMES O'BRIEN. (1887-). An author, born at Napanee, Ont., and educated at Trinity College (Toronto). He collaborated in *The Boys' Big-Game* series, *The Boy Scouts of the Air* series, and *The Captain Becky* series (1912). Besides contributions to magazines he has written *Gathered Verse* (1916), *L'Arbre Croche Mission* (1917), *The Mesa Trail* (1920), *The Shadow* (1922), and *Canada*, 1695 (1922).

BÉDIER, CHARLES-MARIE-JOSEPH (1864-). An eminent French scholar. He was born in Paris, and after teaching in the faculties of Fribourg and Caen succeeded Gaston Paris at the Collège de France (1903) as professor of mediæval French language and literature. He was twice sent on missions to the United States (1909 and 1913) to organize a system of exchange of professors in French and American universities, but the War interrupted this work. As a scholar he unites minute scientific accuracy with sure literary insight as is shown in the introduction to his edition of the *Lai de l'Ombre* (1892), *Les Fabliaux* (1893), and *Les Légendes Épiques*, 4 vols. (1908-13). In the *Lai de l'Ombre* he opposes the mechanical German method of text constitution. The *Légendes Épiques* is a monumental work in which he refutes the old theory of the origin of epic poems and proves that they are products of the age in which they were first written down, not the oral heritage of an earlier period. His *Tristan et Iseut* (1900) is an adaptation of the ancient story, based on all the extant mediæval versions in every language. The collating of these numerous texts was done with painstaking care. During the War, Bédier abandoned his scholarly work and published several arraignments of Germany. *L'Effort Français* is the best known of these. Finally, as a fitting successor to his list of learned works, comes a definitive edition of the oldest French masterpiece, the *Chanson de Roland*, in preparation (1924). He has also written *Colin Muset*, a Latin thesis (1893); *Études Critiques* (1903); *Roman de Tristan par Thomas*, 2 vols. (1903-05); *Deux Poèmes de la Folie Tristan* (1907); *Chansons des Croisades* (1909), and two pamphlets *Comment l'Allemagne Essai de Justifier Ses Crimes* (1915) and *Les Crimes Allemands d'après des Témoignages Allemands* (1915). In 1917 he was attached to the information service at general headquarters. He was elected to the French Academy in 1920 and is one of the directors of the *Revue de France*. In the summer of 1923 he was one of the French delegation of university

professors at the Summer School of Columbia University and in that year and in 1924 was engaged in editing an elaborate history of French literature.

BEEBE, (CHARLES) WILLIAM (1877-). An American ornithologist, explorer and essayist. (see VOL. III). He is the author of *A Monograph of the Pheasants*, an elaborate work in four volumes, the first of which appeared in 1918 and the second in 1921, and *Galapagos: World's End* (1924). He also wrote essays founded on his observations in the tropics. Most of these appeared in the *Atlantic Monthly*.

BEECHAM, SIR THOMAS (1879-). A British orchestral conductor, born at Liverpool. While pursuing regular academic studies, he was instructed in music by private teachers. In 1899 he formed at Huyton an amateur orchestra which he conducted for three years and which gave him sufficient practical experience to accept, in 1902, a post as conductor with Truman's Opera Company. At the conclusion of the tour he devoted an entire year to further serious study and then appeared, in 1905, as a full-fledged symphonic conductor with the Queen's Hall Orchestra. The following year he founded the New Symphony Orchestra, which he conducted till 1908, when he formed the Beecham Symphony Orchestra. In 1910 he gave at Covent Garden a season of grand opera, conducting personally an extensive repertoire and arousing great enthusiasm by the excellence of the performances, to which his own splendidly drilled orchestra largely contributed. This success induced him to continue his career as impresario until 1920, when he suddenly retired from all musical activity. He emerged from this voluntary retirement just as suddenly in 1923, when he appeared as conductor of the Hallé Orchestra in Manchester. During the season 1915-16 he was also conductor of the London Philharmonic Society. He was knighted in 1916. Among the important novelties which he introduced to England are R. Strauss's *Feuersnot*, *Salome*, *Elektra*, *Rosenkavalier*, and *Ariadne auf Naxos*; d'Albert's *Tiefeland*; Rimsky-Korsakov's *Le Coq d'Or*; Delius's *Romeo and Juliette in the Village*; Leroux's *Le Chemineau*; Holbrook's *Dylan*; Lehmann's *Everyman*; and Stanford's *The Critic*.

BEE DISEASES. See ENTOMOLOGY, ECONOMIC.

BEEF. See LIVE STOCK.

BEEHIVE COKE. See COKE.

BEER, EDWIN (1876-). An American surgeon, born in New York, and educated at Columbia University. Among his hospital appointments have been Bellevue and Mt. Sinai. He has been a prolific writer on surgery of the male urinary organs and in 1910 first described what was originally known as Beer's method of treating tumors of the bladder by the high frequency current applied through the natural passages. His great success with this method led to its general adoption by genito-urinary surgeons. He has also published many papers on abdominal surgery.

BEER, GEORGE LOUIS (1872-1920). An American historian (see VOL. III). He served with distinction on the American Commission to negotiate Peace (1919), in control of Colonial affairs. On the formation of the League of Nations he was made director of the mandatory section of the League's secretariat. His untimely death robbed the League of one of its most enlightened champions. Friends collected

his important papers in 1923 under the title of *African Questions at the Peace Conference*.

BEEER, THOMAS (1889-). An American writer, born at Council Bluffs, Iowa, and educated at Yale and Columbia Universities. He served in the War (1917-18) and has contributed short stories to *The Century*, *Saturday Evening Post*, *Smart Set*, etc. In 1922 he published *The Fair Rewards*; in 1923, *Stephen Crane: A Study in American Letters*, and in 1924, *Sandoval*, a novel.

BEETLE, JAPANESE. See ENTOMOLOGY, ECONOMIC.

BEHAN, RICHARD JOSEPH (1879-). An American surgeon, born at Pittsburgh, Pa., and educated in medicine at the university there. He is known for his extensive monograph *Pain* (1914), the most complete work ever written on the subject. Profusely illustrated, it deals with pain as a symptom of disease, injury, and derangement. In the second Balkan war he served as a surgeon at the Fourth Reserve Hospital in Serbia. He was surgeon of St. Joseph's Hospital, Pittsburgh (1914-19).

BEHAVIORISM. A school of psychological doctrine developed in recent years under the leadership of the American psychologist, Prof. John B. Watson. Its central idea is to regard psychology as a scientific study of behavior and to explain behavior as a system of responses to stimuli. The topic of behaviorism in 1924 occupied the forefront of psychological polemic and had divided Anglo-American psychologists into two camps, the behaviorists and the anti-behaviorists. In the United States, the psychologists styling themselves behaviorists were said to constitute a numerical majority, but as there exist among them infinite variations of doctrine, ranging from Watson's own statement in his *Psychology from the Standpoint of a Behaviorist* (1919) to the mere use of certain behavior concepts, this is not as significant as it may seem.

Behaviorism may be best understood as a somewhat impatient attempt to make psychology a science like other sciences regardless of the peculiar complexity of mental phenomena. It is a reaction against the slow methods of experimental introspection developed by Wundt and Titchener, and against the so-called subjectivistic ideology imported from idealistic philosophy. It is therefore a revolt in the direction of empiricism and objectivity. The method of behaviorism was evolved from animal psychology. In 1906 there was published in Paris a book by Kostylef on the present crisis in psychology. In it the author portrayed what he regarded as the theoretical breakdown of experimental psychology, and showed that individual experimentation had outrun the capacity of the science for synthesis. The number of experimental papers accumulated in the United States alone defied any effort at integration.

As a remedy to this disorganization, Kostylef held up the conditioned reflex theory developed by the Russian physiologists Pavlov and Bechterev—a theory which would transform psychology into an objective science. What was this conditioned reflex? When food is exposed to a dog, his mouth begins to salivate. This is called a reflex action. Now the same dog can be made to salivate when food is exposed and a gong rings at the same time. After the sound of the gong and the exposure of the food has been imposed upon the dog's attention at

repeated intervals, the food can be withdrawn altogether, and the salivation reflex will be induced by the sound of the gong alone. This conditioned reflex will function only a short length of time—about a month, unless its association with the simple reflex is renewed.

In this conditioned reflex and in the formation of new habit responses, Kostylef saw the hope of developing a completely objective psychology which would explain even the most complex human activities. In retrospect we may say that we had here the essentials of the behaviorist programme without the label of behaviorism. The behaviorist movement, however, did not crystallize until the work of Pavlov and Bechterev was translated and made available in English and German, and was combined with the already thriving animal psychology studied by Thorndike, Washburn, Jennings and Watson. The behavior articles of Watson began to be published about 1913 and soon attracted a following to the new point of view, as well as bitter criticism from the camp of the introspectionists.

First and foremost the behaviorist viewpoint is a challenge to the traditional preoccupation of psychology with consciousness. Historically modern psychology developed out of the empirical movement in philosophy—Locke's quest for the origin of ideas. The first fundamental theory of psychology was the association of ideas or sensations. As the technique of physiology was perfected, the associationist psychology was modified into a physiological psychology, with the hypothesis of psycho-physical parallelism as the theoretical bridge. Mental phenomena as introspectively reported were correlated with the physical or physiological stimuli, and thus the progress of the science was made to depend on two factors: the perfection and precision of laboratory apparatus and introspective training on the part of the observer. The latter factor was the weak spot of this school of psychology (generally known as structural psychology). Introspection could never be made precise enough to compare with the mathematical delicacy of physical and physiological technique, and moreover, there was the additional difficulty of passing from conscious states to conscious action.

On the other hand biology approached the study of animals and man precisely through the notion of individual action for the protection of the organism, and it is from biology that the idea of instincts, or inherited modes of action, and reflexes or acts automatically induced by stimuli, were developed and passed on to psychology. The difficulty here was just the reverse, how to pass from acts to consciousness. The concept of the struggle for existence, with its ambiguous connotation of mechanism and conscious reflection, has often been made to serve as a connecting link between activity and thought. Around this concept has grown the school of psychology known as functionalism—implying that psychic activity is a unified function of the individual in his biological struggle. The best representative of this psychology in America was William James, who incidentally derived his pragmatic philosophy largely out of the same motif. Where the structuralists sought microscopic precision through introspective analysis, the functionalists slurred over details for the benefit of a sweeping gesture.

In animal psychology (q.v.) none of the problems of introspective analysis are present

for the simple and sufficient reason that we cannot ask animals to introspect. The method of procedure is necessarily objective, being confined to a study of external behavior in correlation with the stimulus or situation set by the experimenter for the animal. However, if the observation is objective, the interpretation of results, or for that matter the setting of the experiment, betrays a reference to the introspective consciousness of the human individual.

No experimenter can regard the animal as a dumb mechanism in spite of the fact that the response to stimulus is in many cases almost automatic. And the very existence of the conditioned reflex leads to problems almost as puzzling as the association of ideas in man. But just as the early associationists took the association of ideas to be a mechanical affair, regulated by such conditions as contiguity, frequency, etc., so many of the animal psychologists look upon the conditioned reflex as if it were an automatic mechanism.

Under ordinary conditions the adoption of the technique of animal psychology to explore the complexities of the human mind would be regarded as an attempt to explain the obscure by the more obscure. But the ground had already been prepared for throwing out consciousness from human psychology. As one wit put it, after losing its soul, psychology was to lose its mind. In 1904 James led a polemic against the belief in the existence of consciousness as an entity. He was ready to grant a functional existence to it, but would have nothing to do with "the hypothesis of a trans-empirical reality." Those who still cling to consciousness, he said, "are clinging to a mere echo, the faint rumor left behind by the disappearing 'soul' upon the air of philosophy. . . . The healthy thing for philosophy is to leave off grubbing underground for what effects effectuation or makes action act."

Another influence which favored the rise of behaviorism was the pressure of American life in the direction of an empirical applied psychology, or a psychology of individual capacities. Here, too, biological functionalism was the implicit theoretical assumption, but the use of statistical methods prevented any grievous errors. In the case of behaviorism, the appeal presented is not that of the actuary, who predicts future cases by comparison with the tabulated instances of the past: it is rather the appeal of system. Human activity is explained in a quasi-mechanical manner as the play of instincts, reflexes, habits. Sensation and perception are abolished, and thought is reduced to the status of an implicit language habit. Red, yellow, blue are no longer regarded as visual sensations or after images, but are responses to the respective physical stimuli.

This oversimplification has been criticized by many psychologists who wish to remain behaviorists. Thus Prof. John Dewey wants to find room for value and purpose concepts, and the neo-realists who first welcomed the new psychology because it eliminated that "alien influx into nature," consciousness, have found much difficulty in explaining purpose behavioristically. It must be admitted, however, that other systems of psychology, including structuralism, have shared this difficulty of explaining moral ideas.

The legitimacy of the behavioristic scheme has been attacked on strictly scientific grounds by

Boring in a paper on the "Stimulus Error." In introspective psychology, he writes, it has been customary to distinguish between attention to the stimulus and attention to the sensation of subjective reaction produced by the stimulus. The behaviorists, in common with the capacity psychologists, refuse to recognize the stimulus error (judgment about the stimulus instead of the sensation) and correlate all responses in the same column. Now it is possible, he holds, to demonstrate experimentally the existence of an equivocal correlation if the subjective dispositions are neglected. A more popular illustration of the same argument can be cited in the difficulty of explaining hallucination in behavioristic terms.

Outside of psychology, behaviorism has received support from pragmatism because of the similarity of emphasis on action, and from neo-realism for its realistic empiricism. The rationalists and idealists, however, regard behaviorism as a simple variety of materialism. Their opinion is best represented by Lovejoy who raises the "Paradox of the Thinking Behaviorist." See *INSTINCT; ACTION; CONSCIOUSNESS AND THE UNCONSCIOUS; PSYCHOLOGY, GENERAL*.

Consult: J. B. Watson, "Psychology as the Behaviorist Sees It," *Psych. Rev.* vol. xx (1913); *Behavior* (1914); *Psychology from the Standpoint of a Behaviorist* (1919). Roback's *Behaviorism and Psychology* (1922) is a polemic against Behaviorism, and may be used as a guide to the discussions in the psychological periodicals.

BEITH, IAN HAY (1876-). An English writer, under the pen-name of Ian Hay. He was educated at St. John's College, Cambridge. His books, written in a humorous vein, became widely popular. They include *The Right Stuff* (1908); *A Man's Man* (1909); *A Safety Match* (1911); *Happy-Go-Lucky* (1913). He served during the War in the Argyll and Sutherland Highlanders, rising to the rank of major. His book *The First Hundred Thousand* (1915), was one of the most widely read volumes relating to the War. His later books include *The Willing Horse* (1921), *A Baker's Dozen* (1922). He lectured much in the United States and in 1923 became an American citizen.

BEKHTEREFF, V. G. VON. See **BECHTEREV, V. G. VON.**

BEKKER, LEANDER J. DE (1872-). An American editor, born in Kentucky. From 1897 to 1919 he was identified with such various publications as *Carter's Magazine*, the *New York Evening Post*, and the *New York Tribune*. As the editorial correspondent of the *Tribune* (1919), he led the opposition to Mexican intervention. He was confidential assistant of the United States War Trade Board and in 1914 was one of the founders and the first president of La Ligue des Pays Neutres. He became secretary of the Writers' Publishing Company in 1915 and president in 1921. His works include *The Stokes Encyclopedia of Music and Musicians* (1908, 1910, 1912), and *The Plot against Mexico* (1919). He edited *Hoyt's New Practical Cyclopaedia* (22d ed.)

BELASCO, DAVID (1859-). An American playwright and manager (see Vol. III). As firm a believer in old conventions now as ever, Belasco has lengthened his career with such popular successes as *Polly with a Past* (1917), *Tiger Rose* (1917), *Daddies* (1918), *Tiger! Tiger!* (1918), *The Gold Diggers* (1919), *De-*

bureau (1920) and *Kiki* (1922). An extravagantly costly revival of *The Merchant of Venice* (1923) roused a stormy critical discussion. Mrs. Fiske came under his direction in *Mary, Mary, Quite Contrary* (1923).

BELGIAN CONGO. See COPPER.

BELGIUM. A kingdom of western Europe, bordering on the North Sea, between France and the Netherlands. Belgium has an area of 11,752 square miles, with a population of 7,539,568 on Dec. 31, 1922, giving an average density of 642 persons to the square mile; the greatest of any whole nation, though portions of other countries may be more thickly populated. In spite of war losses, the population of Belgium (exclusive of the small territories annexed by the Treaty of Versailles) decreased by only 22,431 between 1910 and 1920, and was after that increasing at the rate of about 60,000 per year. The country was highly industrialized with 1,600,000 engaged in industrial pursuits and an agricultural population of 1,200,000 of whom 800,000 were actually engaged in agricultural work. The principal city and capital, Brussels, on Dec. 31, 1921, had a population of 775,000. The chief port, Antwerp, had 304,000 people, while Liège and Ghent possessed each a population of 165,000. Between 1910 and 1920, the last two years for which complete census figures are available, the number of persons speaking French only increased from 2,833,334 to 2,855,835, the number speaking Flemish only fell from 3,220,662 to 3,187,073, and those speaking German only from 31,415 to 16,877. Before the War, immigrants entering Belgium each year slightly exceeded emigrants from the country, but afterward the situation was reversed, and in 1921 immigrants numbered 24,389, compared with 27,443 emigrants. With the economic recovery of Belgium, the excess of emigrants was gradually diminishing, and the former situation seemed likely to return in a few years. The movement of population was greatest between Belgium and France, followed by the Netherlands and the United States.

Education. The educational system was becoming constantly more highly organized; the number of primary schools increased from 22,915 in 1913 to 29,210 in 1921, and the number of pupils rose from 939,285 in 1913 to 955,365 in 1920. Besides these, there were 3217 primary schools for adults, with 117,833 pupils, and 3422 infant schools with 154,032 pupils in 1920. In schools of intermediate grade there were 56,056 pupils in 1921, compared with 39,081 in 1913. Above these schools are the four universities (Ghent, Liège, Brussels, and Louvain), several technical and commercial institutions, three military schools, a school of veterinary education, a colonial school and an agricultural institute. The number of pupils in the universities rose from 8532 in 1913-14 to 9329 in 1920-21. No illiteracy statistics have been compiled since 1910, when the proportion was 14.1 per cent.

Industry. Despite the predominantly industrial character of the country, Belgian agricultural production was of considerable importance. The acreage of various crops returned practically to normal in the post-war years, but the emphasis was now more on sugar and forage beets, and other forage crops, than before the War. The accompanying table gives a comparison of the principal kinds of agricultural products in 1913 and 1923.

AGRICULTURAL PRODUCTS IN BELGIUM

CROP	1913		1923	
	(Acres)		(Metric Tons)	
Wheat	394,134	345,486	401,950	364,028
Rye	641,173	573,346	570,694	528,017
Barley	84,105	84,700	91,808	91,047
Oats	671,371	653,831	696,094	683,028
Sugar beets ..	129,525	178,976	1,394,917	2,036,518
Forage beets ..	176,464	188,298	4,554,467	4,300,230
Potatoes	383,082	376,589	3,200,932	2,822,212
Forage crops, not including pasture land ...	926,598	957,873	1,894,070	1,854,733

Mineral production was always an important item in Belgium. The country has as natural resources supplies of coal and zinc, and after the economic union with Luxemburg in 1922 gained ready access to supplies of iron ore. Immediately after the War resumption of metallurgical activity was initiated and by 1923 production had practically reached the pre-war level, except zinc production, which advanced more slowly. The accompanying table shows the progress made in 1923, compared with the previous year, and also reveals the approximation of pre-war conditions.

BELGIAN COAL, IRON AND METALLURGICAL PRODUCTION

	(Metric Tons)		
	1913	1922	1923
Coal	22,841,590	21,234,170	22,916,070
Coke	3,523,000	2,707,490	4,156,700
Agglomerates	2,608,640	2,477,160	1,931,050
Pig iron	2,484,690	1,603,620	2,188,130
Raw steel and rough casting	2,465,904	1,463,640	2,285,910
Finished steel	1,859,064	1,409,990	1,943,390
Finished iron	304,344	180,252	207,740
Zinc	204,156	113,136	148,080

Belgian glass production, an extremely important industry in the country, made rapid strides in the post-war years, approaching pre-war volume in window glass and surpassing it in other lines. Production of window glass was 41,708,667 square meters in 1913, 33,708,000 square meters in 1922, and 37,000,000 square meters in 1923. Plate-glass production increased from 2,444,575 square meters in 1913 to 3,200,000 square meters in 1922, and 4,500,000 square meters in 1923. Bottle and glassware making increased greatly in importance since the war, new factories for the former being opened at Lommel, Moll, Selzaete and Jumet. The textile industry of Belgium was of paramount importance and was operating on practically the same scale as before the War. The number of cotton spindles in the country was 1,682,965 on July 31, 1923, compared with 1,518,134 on Mar. 1, 1914. Production, which totaled 48,000 metric tons in 1913, was as low as 43,125 metric tons in 1922, but rose to 51,000 metric tons in 1923. The woolen industry with approximately 625,000 spindles in operation, both before the War and in 1923, was also active; 27,578 metric tons were conditioned in 1913, 35,560 metric tons in 1922, and 30,000 metric tons in 1923, notwithstanding an important strike in the early part of last year. The flax, hemp and jute industries were operating 300,000 spindles in 1923, compared with 280,000 spindles before the War.

The unemployment situation in Belgium practically ceased to be a problem. On Dec. 31, 1921, there were 86,093 unemployed; by Dec. 31,

1922, this number was reduced to 26,055 and later changes were slight and largely seasonal. On Dec. 31, 1923, there were 23,450 unemployed in the country.

Commerce. The figures showing Belgium's trade in 1923 are not exactly comparable with those for previous years. Beginning with May, 1922, the economic union with Luxemburg was in effect and trade statistics make no distinction between the foreign trade of the two countries. The total trade may thus be increased to some extent, but the fact that trade between Belgium and Luxemburg has now become domestic commerce, offsets, in large measure at least, the increase due the inclusion of trade between Luxemburg and other countries. No attempt is made in the following statistics to distinguish between Belgian and Luxemburgian trade in 1922 and 1923. The table for foreign trade appended here shows values in the different classifications. (The depreciation of the Belgian franc should be borne in mind: 1913, par, 19.3 cents; 1922, 7.68 cents; in 1923, 5.22 cents).

BELGIAN FOREIGN TRADE			
Values in	IMPORTS		1923
	Thousands of Francs	1913	1922
Live animals	65,273	126,069	112,856
Foodstuffs and beverages	1,034,822	2,627,810	3,416,871
Raw materials	2,667,035	3,539,372	5,509,831
Manufactured articles	869,478	2,783,861	3,510,829
Totals	4,636,598	9,077,112	12,550,387
Values in	EXPORTS		1923
	Thousands of Francs	1913	1922
Live animals	44,413	90,064	83,997
Foodstuffs and beverages	327,663	506,821	806,712
Raw materials	1,826,078	2,095,738	2,595,238
Manufactured articles	1,436,430	3,366,959	5,370,543
Totals	3,634,584	6,059,582	8,856,490

All of the figures in the foreign trade table are exclusive of the trade in gold and silver. Converted into dollars at the rates of exchange mentioned above, the total values of the commerce of Belgium were: imports in 1913, \$894,863,000; in 1922, \$697,385,000; and in 1923, \$665,004,000; exports in 1913, \$701,475,000; in 1922, \$465,552,000; and in 1923, \$462,220,000. From a dollar standpoint, the trade seemed to be still diminishing in 1923, but it must be remembered in this connection that the rise in prices, when a currency is depreciating rapidly as was the Belgian franc in 1923, is not so rapid as the fall in the value of the currency unit. It is probable that Belgian exports were actually somewhat greater rather than slightly less in 1923 than in 1922.

The distribution of Belgian foreign commerce in the same three years is shown in the next table.

DISTRIBUTION OF BELGIAN FOREIGN COMMERCE			
COUNTRIES	IMPORTS		1923
	Thousands of Francs	1913	1922
France	1,000,297	1,840,850	2,784,554
Great Britain	518,475	1,368,858	1,928,046
United States	420,496	1,030,781	1,481,384
Netherlands	356,998	1,001,838	1,285,379
Argentina	316,797	616,037	960,501
Germany	761,765	1,213,776	912,040
Italy	44,007	129,162	200,886
Switzerland	19,379	123,865	107,945

COUNTRIES	EXPORTS		1923
	Thousands of Francs	1913	1922
France	762,187	1,513,290	1,979,561
Great Britain	511,710	957,405	1,762,232
United States	106,381	218,401	340,365
Netherlands	320,930	644,715	1,182,755
Argentina	91,154	180,891	343,742
Germany	940,378	849,986	453,286
Italy	75,931	120,056	172,632
Switzerland	53,416	198,781	352,284

Leading imports in 1922 were cheese, wool and woolen goods, coal, cotton, machines and mechanical articles, lumber, coke, corn. Changes over 1913 were: an increased importance of coal and metallurgical products and the disappearance of flax, diamonds, hides, and crude rubber from the leading items. Leading exports in 1922 were iron and steel bars, woollens, coal, glass, flax yarn, machines and mechanical articles, refined sugar, flax. Changes over 1913 were: the increased importance of coal and iron and steel products, and the rising importance of Belgium as a manufacturer and exporter of glass, with the falling off of textiles except flax.

Finances. Even prior to 1914, deficits were not uncommon in the financial administration of the Belgian government. For instance, for the year 1913 budget estimates gave receipts as 758,452,349 francs and expenditures as 884,829,630 francs, leaving a deficit of 126,377,281 francs. In general, however, there was in pre-war days a relative equilibrium between expenditures and receipts. But for the period surveyed, this approximate balance was entirely destroyed; expenditures advanced to such an extent as to leave a considerable deficit, even had reparation receipts equalled budget forecasts (as they have consistently failed to do). For 1923, the deficit was officially estimated at 2,244,000,000 francs, but the failure to receive anticipated payments from Germany to cover the so-called "recoverable expenses" caused the actual deficit to be probably in excess of 4,000,000,000 francs. The same sort of situation existed with reference to the 1924 budget estimates, in which a deficit of 1,645,439,651 francs was shown; this budget included "recoverable expenses" of 1,636,000,000 francs, of which 1,500,000,000 represented the balance of Belgian priority under the Spa agreement, the receipt of which was at least problematic. Total receipts in the 1923 budget were set at 5,942,000,000 francs and expenses at 8,186,000,000 francs, while in the 1924 budget estimated receipts were increased to 6,687,000,000 francs and expenses to 8,332,000,000 francs. The extraordinary budget, included in the general budget for 1924, was reduced from the previous year by about 24 per cent by transfer to ordinary account of high cost of living allowances. The operating deficit of the state monopolies (railways, posts, telegraphs, and telephones) was reduced by 40 per cent, and it was hoped that a contemplated increase in rates would eventually wipe it out. Extensions of line and the purchase of new equipment, however, would add about 100,000,000 francs to the extraordinary expenditures beyond the amount required for 1923. The revenue budget showed important increases due to extensive tax reforms.

The Belgian public debt as expressed in paper francs varied considerably according to fluctuations in exchange. As the foreign debt was in gold, a drop in the franc caused an immediate increase in its amount as given in paper francs,

though its actual gold or dollar value did not change. The Belgian Ministry of Finance, calculating the external debt for each year uniformly at the exchange rate of Oct. 1, 1923 (United States dollar = 19.20 francs), issued the accompanying table showing the increases in the public debt from year to year.

BELGIAN PUBLIC DEBT

DATE	CONSOLIDATED (Francs)	FLOATING (Francs)	TOTAL (Francs)
1914, Aug. 4	5,205,000,000	661,000,000	5,866,000,000
1919, Oct. 1	7,046,000,000	18,031,000,000	27,077,000,000
1920, Oct. 1	10,356,000,000	20,091,000,000	30,447,000,000
1921, Oct. 1	11,858,000,000	24,582,000,000	36,440,000,000
1922, Oct. 1	14,763,000,000	24,173,000,000	38,936,000,000
1923, Oct. 1	16,512,000,000	23,395,000,000	39,907,000,000

According to another statement, the total Belgian debt on Jan. 1, 1923 (using the exchange rate of that date, 14.70 francs to the dollar), was 37,446,367,125 francs, of which 15,246,899,970 francs was funded and 22,199,467,153 francs floating debt, of which latter 16,980,381,355 francs was external floating debt. Although some progress was made in the way of increasing revenues, and reforms of taxation were expected to yield considerable returns, the annual deficits of the Belgian government were still large in amount in 1924, and were increased by the failure to receive reparation payments anticipated in the budgets for each year. The extensive increases in the tax rates evinced a growing tendency to place little dependence on reparation and to rely more and more on internal resources. Prospects seemed hopeful for a gradual reduction of deficits, but the time of their elimination was, it was evident in 1924, as yet far distant.

Communications. Belgium is a small, well unified country, and communication facilities are excellent; the country has access to the sea, with a port of paramount importance in Antwerp; and it has also internal water connection by river and canal, as well as water and rail connection with the rest of western Europe. Practically all of the railways in Belgium are operated by the state; in 1913, the length of the state railways was 2712 miles, while in 1922, with the lines constructed during the War and those in the new districts of Eupen and Malmédy, it had increased to 2981 miles. The privately operated lines had in 1913 a length of 191 miles, but in 1922 this had declined to 171 miles. In 1913, the state railways yielded a profit of 119,619,000 francs from a total operating expense of 222,416,000 francs, while in 1919 they gave a deficit of 117,150,000 francs with a total operating cost of 530,352,000 francs. On Dec. 31, 1923, the Belgian merchant marine consisted of 179 steam and three sailing vessels, with a net tonnage of 378,923 and 2573 tons, respectively, compared with 124 vessels with a tonnage of 236,136 tons in 1913. The number of vessels entered at Belgian ports in 1923 was 13,406, with a tonnage of 19,963,596 tons, compared with 11,964 vessels and 17,097,515 tons in 1913. About two-thirds of the tonnage entered at Antwerp before the War, and the proportion increased somewhat after the War. The two other leading ports were Ghent and Ostend, which together receive about 20 per cent of the total tonnage. These statistics bring out particularly the increasing importance of shipping in Belgium, also the preëminence of the

port of Antwerp in Belgian shipping and its continued importance in European trade.

History. Belgium's history was overshadowed by the War. On July 31, 1914, amid the alarms of a threatened world conflict, the Belgian government ordered a general mobilization. Two days later it was in receipt of an ultimatum

from Germany demanding the right of passage across Belgian territories. The refusal to comply brought down on the Belgian people all the horrors of a war-ridden country. During August 3 and 4, German troops entered, and despite the heroic defense of the army, swept on unchecked. The lines yielded in rapid succession. Louvain was taken, August 10; Brussels, August 20; the French frontier was crossed on the 24th. The career of brutality embarked upon by the German invaders in an endeavor to break the spirit of the Belgian people will long remain a symbol of the meaning and purposes of modern warfare. The pillaging and burning of homes and the deportations and indiscriminate killing of civilians were coolly ordered and carried out by a staff and soldiery to whom war meant ruthlessness. Belgian official records reveal more than 1000 deaths in the province of Liège alone during August. The toll was almost as heavy in the Namur, Limburg, and Luxemburg provinces. The destruction of Louvain was indeed an act of cold-blooded ferocity. The city was entered on August 19 and was fired three days later after all effective opposition had ceased. The cathedral, the university and library, and more than 1000 homes were destroyed. In the city and its environs, 300 men were shot, and from it 1000 inhabitants were deported to forced labor in Germany.

In Flanders, the career of the Germans was the same. With the fall of Brussels, the Belgian government fled to Antwerp; from thence, after the fall of that city, it moved to Ostend, and later to Havre. Central administration, therefore, ceased, with the result that only the local authorities were left to attend to the business of government. That such was not to remain the condition of affairs at once became apparent. Under the German military governors, von der Goltz, von Bissing, and von Falkenhausen, Belgium was organized as a conquered province for the purpose of utilizing her economic resources to the full. Authority was vested more and more in the hands of German officials as gradually the provincial councils were deprived of power. With the suppression of the latter in July, 1918, for their consistent refusal to collaborate with the occupation government, the Germans were in entire control of the country. Yet, while ostensibly German domination was complete, the spirit of the people could not be crushed. Opposition was never completely stilled. The world now and then caught echoes of the heroic deeds of a M. Max or a Cardinal Mercier. *La Libre Belgique*,

printed secretly, appeared regularly from 1915 to the end of the War.

In every channel of Belgian life, no matter how insignificant, the German influence was to be encountered. Law and justice received a studied attention. Military and civil tribunals were erected to try offenders under the edicts emanating from the German authorities; punishments might be meted out to substitutes, and confiscation of property was countenanced. Finally, in 1918, the Belgian courts were abolished altogether. Something of the repressive character of the edicts may be gained from the fact that not merely was tale-bearing encouraged, but punishment was imposed on those who were believed cognizant of an illegal act and who did not denounce it. The presence of spies, etc., had to be reported on pain of long-term imprisonment. Even in civil practice profound modifications were introduced. For refusing to accept German interference in the regular court procedure, Belgian magistrates were often forcibly seized and deported to Germany. In 1918, the most flagrant example of this conduct occurred when the justices of the Brussels Court of Appeals were interned in a German civilian camp. Belgium was struck at in other ways, notably in the attempt to separate Flanders from Wallonia. From 1914 to 1917, the occupation government employed all means to encourage the use of Flemish in the northern provinces. In 1917, von Bissing finally effected a complete separation by erecting two different administrations, one for Flanders to be governed from Brussels, where Flemish was to be used exclusively; the other, to be governed from Namur. Attempts were made seriously to further the partition. A Flemish party known as the "Activists" received the encouragement of the Germans in its propaganda. In 1918, an attempt was made to hold elections for members of a Flemish consultative council, but so great was the antagonism aroused that the order was given to desist. A council was nevertheless erected, bolstered up by German arms; attempts on the part of the Belgians to arrest members of the council were met with reprisals, which led to more bitterness. In these schemes the University of Ghent was chosen as the pivotal point. To hasten the process of Flemization, all professors except those Activist in sympathies were dismissed; lectures were ordered to be given in Flemish; to attract students all other universities were closed and liberal scholarships were offered. Nevertheless, the University did not thrive. In fact, all these plans met with failure, and the move to divide the country culturally never met with any real Belgian support.

It is not to be supposed that German domination stopped here. Possibly affecting the life of the people more closely was the Germanization of all branches of the economic order. Belgium, in short, was utilized to further the German military effort. By requisitions, by administrative orders, by forcible seizure, Germany soon gained control over all branches of Belgian industry and trade. Central bureaus, making in effect German monopolies, were put in charge, beginning with 1914, of coal, water, gas, electricity, oils and fats. Raw materials were requisitioned and paid for at prices fixed by German officials, not, however, in coin, but in vouchers. Requisitions even penetrated into the homes where all household articles contain-

ing materials needed in the war, e.g. copper, zinc, lead, iron, leather, wood, wool, cotton, etc., were seized. The work of the "coal central" was typical. Coal produced was utilized first on the railways and then for the army; the needs of Belgian industry came next; finally the surplus was exported to neutral countries and the profits appropriated under the guise of a war loan. As industry languished because of the cessation of trade and the sequestration of raw materials and machinery by the Germans, the status of the civil population became alarming. Unemployment daily increased until by 1917 the body of idle workers numbered 700,000. This state of affairs gave color to the German excuse for expediency for the large-scale policy of deportations which the occupation government inaugurated in 1916. The lack of raw materials and the inadvisability of spending large sums for public works in a country subject to the chances of war prompted the German government, ostensibly, to offer employment to Belgians in German industries or in war areas behind the lines. In spite of Belgian protests that factories were willfully being destroyed and local units hindered in their work of relief and that action of such a character was merely an excuse for a studied plan to crush the Belgian industrial and national life, the Germans proceeded in the years 1916-18 to deport more than 50,000 Belgians to Germany and another 50,000 to the war areas. Undoubtedly some Belgians went willingly, for even the small wages offered were more acceptable than starvation, but that coercion was the rule cannot be denied. The treatment accorded these unfortunate individuals was of a piece. Used brutally, often starved at the first sign of recalcitrancy, Belgians were set to work digging trenches and constructing railroads in the war zones or making munitions in the German factories. The protests of Belgians, Cardinal Mercier chief among them, were unavailing. Not until the American, Dutch, and Spanish diplomats took up the cry did the German Emperor consent to rescind the order and promise to send back all these deportees against whom coercion had been applied. This pledge was never carried out. Some sent back to Belgium were reshipped to France; others were put to work in the seized Belgian factories; many more were returned to Germany. Deportations, in fact, never ceased until the end of the war.

The story of Belgium during the War cannot be complete without the tale of the Commission for Relief in Belgium. This organization, brought into existence late in 1914 by the American and Spanish ambassadors and ministers at London and Brussels, and the American ambassador and minister at Berlin and at the Hague, and managed until America's entry by Mr. Herbert C. Hoover, became the international clearing house and liaison division for the Belgian *Comité National de Secours et d'Alimentation* in the work of feeding Belgium. Importations and payments were handled by the Commission; distributions by the *Comité National*. To facilitate the work, the United States opened a monthly credit of \$15,000,000 for the Commission. An idea of the scope of the project may be gained from the fact that the provisioning department of the Commission undertook to feed from 7,000,000 to 10,000,000 people in the devastated areas of Belgium and northern France. During the year ending Oct. 31, 1916,

THE UNIVERSITY OF LOUVAIN



THE RESTORATION OF THE LIBRARY OF THE UNIVERSITY OF LOUVAIN MADE POSSIBLE BY AMERICAN GIFTS

The Principal Facade from the Drawing of the Architects, Warren & Wetmore

there were imported 1,708,774 metric tons of food into Belgium and 483,346 tons into France. Nearly one-half of these supplies came from the United States and the remainder came about equally from Argentina and the British Empire, though small quantities came from Holland. Food was distributed through 3000 communal communities in Belgium and 2000 in France, staffed by about 35,000 volunteer workers. The benevolent department of the Commission cared for those who were wholly or partially destitute, including more than 1,500,000 children. It maintained special committees for children, farmers, refugees, the tubercular, destitute, and others. Up to the close of 1917 the Commission had expended nearly \$400,000,000, and during the fiscal year ending Oct. 31, 1918, it spent for relief in Belgium over \$83,000,000 received from loans to Belgium by the United States, and \$7,275,000 from loans by Great Britain and France. To complete the account, it should be stated that the Commission also expended in 1918, in northern France, \$56,000,000 received from the United States loan to France, and an additional \$2,376,500 received from French sources. When the Commission wound up its affairs on Apr. 30, 1919, it was stated that something like \$1,000,000,000 had been spent in the relief of war victims during 1914-19. Until the entrance of the United States into the War the entire personnel of the Commission was American; after 1917, direction was taken over by Spanish and Dutch citizens, although Mr. Hoover remained throughout as chairman. The director in America was Mr. W. L. Honnold, its treasurer, Mr. A. J. Hemphill, while Mr. Poland was the European director.

Nothing presented so disheartening an aspect as the condition of Belgium on the resumption of peace; and nothing showed so clearly the enduring qualities of the human spirit as the rapidity with which Belgium was resurrected. Not only had industry been destroyed but the usual channels of communication had been completely dislocated. In fact, the damage to property was put at \$7,600,000,000. Yet by the end of 1922 it could be seen that the manufacturing industries were practically on a normal footing. Iron and steel plants were operating on a 75 per cent basis; linen, cotton, and artificial silk works exceeded their pre-war capacity, as did also the plate-glass and cement factories. The acreage under crops in 1922 was 97 per cent of the 1913 figure. In 1918 shipping was dead, the ports of Zeebrugge and Ostend badly damaged and their terminal facilities wrecked. The approach to Ghent by the sea canal from Holland was choked up because of the severe fighting which had taken place in that area. The losses from destruction of railway bridges, etc., in the four years of war were estimated at \$275,000,000. Rolling stock had been diverted for military purposes and had greatly depreciated; rails had been torn up by the enemy in retreat. Yet so rapidly had reconstruction been pushed that 58,221,686 metric tons of freight were carried on the railroads in 1922 as against 66,541,975 metric tons in 1913, and 238,096,000 passengers in 1922, as against 204,541,093 in 1913. At the time of the Armistice there were 800,000 industrial workers unemployed and being supported by government doles; in September, 1919, the number thus supported had fallen to 200,000; by 1923 it was reported that marked

shortages of labor were apparent in all specialized industries and so acute in the unskilled trades that laborers had to be imported from Poland and Italy.

The political parties met the awesome problems with courage. A coalition government representing the Catholics, Liberals, and Socialists administered affairs. The election of 1919, for the first time, was conducted on the principle of "one man, one vote" (women being given the vote only in municipal elections), and resulted in a great increase of the Socialist delegation. Legislative measures were progressive and showed a desire to conciliate all elements of the populace. In 1919, the repressive laws against freedom of association were, to a great extent, lifted and labor unions accordingly increased mightily; the eight-hour day in industry was installed in the same year; so were the income tax, a progressive inheritance tax, and a law limiting the sale of alcohol. Councils and commissions were erected for the amicable settlement of problems arising between capital and labor and their functions soon penetrated into almost every important industry. Echoes of the controversy over the Flemish question continued to be heard increasingly. In 1919, three Activists were elected to Parliament besides many others of Flemish sympathies in the Catholic party, so that, for a time, the government considered offering a Fleming a cabinet portfolio. In 1921, the line of division became sharper. As a result of continued agitation, the lower house passed a bill for the installation of both languages in the administration, to go into effect Jan. 1, 1922. The measure occasioned a storm of disapproval. Debate in the house was heated, and for the first time in parliamentary annals, Walloons and Flemings voted against each other in solid blocs. It became increasingly perceptible that the Flemings could not be denied. Their attacks on the influence of the French became more bitter, their focal point in particular being the University of Ghent. Despite the pleas that the French language was necessary to bridge the gap of the patois used by both branches of the population and that the University was therefore necessary as the seat of a common culture, the lower house in 1922 voted for the use of the Flemish language at Ghent. In June, 1923, the Flemish question almost occasioned the fall of the Theunis government. This question, and the new economic and social problems which the War had brought in, had a curious effect on political groupings. The traditional three parties were in a process of disintegration which showed itself in alliances cutting athwart party lines. Thus, the Catholic Right, under the control of the Flemings, was split up into Christian Democrats, Agrarians, Moderates, and Conservatives; the Socialists belonged to national and international groups, the latter Fleming in sympathy; the Liberals were either Conservative or Socialist in their leanings. Government, therefore, was falling more and more into the bloc system. On the Flemish question, the Catholics, international Socialists, and some Liberals stood together, and as this policy was antipathetic to France, the group also opposed a French alliance and favored one with Holland. However, on the question of military service the group did not hold together, so that another alliance was necessary to effect legislation. The same situation held in the question of the extension

of the provincial and parliamentary franchise to women. The Catholics, for reasons of political expediency and because of the innate conservatism of the women, favored the project. The Liberals and Socialists, though they were committed to the principle of political equality for women, strenuously opposed. The result, because of these mixed loyalties, was an impasse after the election of 1921 which had ended in the return of a majority for no party. Only with the greatest difficulty was Colonel Theunis able to form a cabinet composed of Catholics and Liberals.

In the domain of foreign policy an attempt was made to strike a new and more independent note, with little success, however. Belgium's plea for revision of the treaty of 1839 by which she had lost to Holland the Province of Limburg and had been compelled to share with the Dutch the control of the Scheldt, was not entertained by the Peace Conference, and subsequent negotiations with Holland were equally fruitless. (See HOLLAND and LIMBURG). Her territorial gains as a result of the War were very small. To her fell the districts of Eupen and Malmédy and the tract of Moresnet on the German frontier, in all containing 382 square miles and a population of 64,000, and important for tanning and textile works. Only a small number of the population having indicated their desire to remain under German sovereignty, these regions were formally annexed in September, 1920. (See EUPEN, MALMÉDY, AND MORESNET.) In Africa, Belgium obtained Ruanda and Urundi, districts in western ex-German East Africa, which have an area of 18,000 square miles and a population of 3,500,000, and are important agriculturally because of their uplands. (See CONGO, BELGIAN). In 1918, Belgium effected with France a defensive alliance, and a military convention was concluded in 1920. An economic convention designed to cement still further the interests of the two countries was rejected in the Belgian Chamber, in February, 1924, by a coalition of Socialist and Flemish Catholic deputies, whose opposition led Premier Georges Theunis to reorganize his cabinet, dropping out M. Jaspar and replacing him with M. Paul Hymans as Foreign Minister. In 1922, Belgium concluded a treaty with Luxemburg by which all customs barriers were abolished. As for Russia, though the government in 1920 seemed favorably disposed toward a resumption of commercial relations, in 1922 it definitely sided with France at the Genoa Conference against any recognition, unless Russia conceded the rights of private property. The reasons for the Belgian hostility were plain: it was indicated that Belgians had controlled about 150 Russian industrial and mining enterprises, capitalized at \$700,000,000.

By the Peace Treaty, in addition to 8 per cent of the German indemnity, Belgium was assured reimbursement from Germany for the 5,000,000,000 francs borrowed from the Allies and expended in the War. In the controversies with Germany regarding reparation payments, Belgium, like France, was disposed to insist rigorously on execution of the Versailles Treaty, and with France Belgium joined in occupying the Ruhr, January, 1923. Subsequently, however, French and Belgian policies tended to diverge, until the report of the Dawes Commission in 1924 offered a new basis of agreement. See REPARATIONS.

BELGIUM, COMMISSION FOR RELIEF IN. See BELGIUM.

BELL, CLIVE (1881-). An English art and literary critic, educated at Trinity College, Cambridge. In his critical essays he has harshly rebuked all artists who follow the doctrine of exact representation and lauded those wielding their talent for the expression of personal emotion. He is the author of *Art* (1914), *Peace at Once* (1915), *Pot Boilers* (1918), *Poems* (1921), *Since Cézanne* (1922), and *On British Freedom* (1923).

BELL, GERTRUDE M. L. (1868-). An English traveller and geographer, born at Washington, Durham, and educated at Queen's College, London, and Lady Margaret Hall, Oxford. During the War she was in a position, because of her adventurous journeys through northern Arabia (1913-14), to give valuable information concerning unknown routes and so to aid the British army in its advance into Palestine. She was connected with the Red Cross Bureau of the Missing (1914-15) and the Admiralty Intelligence Office in Cairo (1916-17). In 1917, she went with the British army to Bagdad and later acted as assistant political officer. She has received the founder's medal of the Royal Geographical Society. Her publications include *Poems from the Divan of Hafiz* (1897); *The Desert and the Sown* (1907); *The Thousand and One Churches*, with Sir W. M. Ramsay (1909); *Palace and Mosque at Ukhaider* (1914), and *Review of the Civil Administration of Mesopotamia*, issued by the Indian Office (1920).

BELL, JAMES FRANKLIN (1856-1919). An American soldier (see VOL. III). He commanded the second division of the United States army in Texas, 1914-15; the western department at San Francisco to May, 1917, and the Eastern department to September, 1917, when he became commander of the 77th Division of the army, at Camp Upton.

BELL, LOUIS (1864-). An American electrical engineer, born at Chester, N. H. He was graduated at Dartmouth in 1884 and won a fellowship at Johns Hopkins. During 1888-89 he was professor of applied electricity in Purdue University and during 1890-92 he was editor of *The Electrical World*, but after 1893 was in practice in Boston as a consulting engineer. He was active for many years in the General Electric Company and organized its electric power transmission department; he designed the first polyphase plant used in the United States, both for power and lighting, as well as for railway service. His original investigations have included studies on spectroscopy, alternating current phenomena, wireless telephony, physiological optics, and the interpretation of albedo. During 1905 he lectured on electrical power of transmission at the Massachusetts Institute of Technology, and he has also lectured at Harvard on public lighting and since 1914 at Harvard Medical School on illumination. In addition to many scientific papers and monographs he is co-author, with Oscar T. Crosby, of *The Electric Railway* (1892), *Power Distribution for Electric Railroads* (1896), *Electric Power Transmission* (1897), *The Art of Illumination* (1902), and *The Telescope* (1922).

BELLINGER, PATRICK NELSON LYNCH (1885-). A naval airman born at Cheraw, S. C., and educated at the United States Naval Academy. During the seizure and occupation of

Vera Cruz in 1914 he was in charge of the airplane section and made daring flights over enemy territory. In 1919 he assisted in selecting a starting-point for the Transatlantic flight and commanded the *NC1* during the flight (May 3-June 16). Later he had charge of the material division of naval aviation. During the War he received the order of the Commande-Torre Espada from the Portuguese Government and the Navy Cross.

BELLOC, HILAIRE (1870-). An English author, born in France (see VOL. III). Since 1913 Mr. Belloc has lengthened the list of his works with *A Continuation of Linguard's History to the Death of Edward VII* (1914), *The Last Days of the French Monarchy* (1916), *General Sketch of the European War, second Phase (The Battle of the Marne)* (1916), *Europe and the Faith* (1920), *The House of Commons and the Monarchy* (1920), *The Jews* (1922), *The Mercy of Allah* (1922), and *A Contrast* (1923).

BELLOWS, GEORGE WESLY (?-). An American artist (see VOL. III). In the last few years he won a very long list of awards for his very unusual paintings. The chief awards included the Carnegie Institute bronze medal (1914), gold medal Panama Pacific Exposition (1915), bronze medal from the Art Institute of Chicago (1916), Isidor medal National Academy of Design (1916), Temple medal of the Pennsylvania Academy (1917), landscape prize from the Newport A. A. (1918), gold medal from the Pennsylvania Academy (1921), bronze medal from the Art Institute of Chicago (1921) and first prize at Carnegie Institute (1922).

BELMONT, ALVA E. SMITH (MRS. O. H. P.). An American feminist, born at Mobile, Ala., and educated in France. While actively and generously interested in all movements for social betterment, such as hospitals, children's homes, the abolition of child labor, and the improvement of working conditions for women engaged in industry, she is known preëminently for her efforts in the cause of woman's rights. A well-known speaker and writer on woman suffrage, she was founder and later president of the Political Equality Association. She was an organizer of the Woman Voters' Convention in 1915, and a liberal donor to the Woman's Party.

BELOIT COLLEGE. An institution at Beloit, Wis., founded in 1846. The number of students increased from 395 in 1913-14 to 519 in 1923-24, the number of members in the faculty from 35 to 47, and the library from 50,000 to 70,000 volumes. The endowment rose in the same period from \$1,268,966 to \$1,802,531. Edward Dwight Eaton, D.D., LL.D., who had been president since 1886, was succeeded in 1917 by Melvin Amos Brannon, Ph.D., LL.D., but was acting president again in 1923. President, 1924, Irving Mauer, M.A., B.D.

BELOW, OTTO VON (1857-). A German soldier born at Danzig. In the War he took part as an army commander in the battles of the Masurian Lakes (February, 1915), the Macedonian campaigns of 1916, the Italian campaigns of 1917, and the battles on the western front in 1918. In the last, he commanded the 17th army. He retired in 1919.

BEMONT, CHARLES (1848-). A French historian and palæographer. He was born at Paris and pursued his education at the Lycée of Versailles and at the University of

Paris, whence he was graduated as an archivist and palæographer. He became subsequently the director of the Ecole Pratique des Hautes Etudes, an institution maintained by the French government for the encouragement of disinterested scholarship outside of the academic degrees. He was also editor of the *Revue Historique*. The list of his works includes *Simon de Montfort, Comte de Leicester* (1884); *De la Condamnation de Jean-sans-Terre* (1884); *Rôles Gascons; Chronique Latin sur le Premier Divorce de Henry VIII* (1917); *Le Conte de l'Île d'Oleron* (1917), and *Histoire de l'Europe de 395 à 1270*, in collaboration with Gabriel Monod (1921).

BEN-AMI, JACOB (?-). A Jewish actor born abroad who came to the United States and played rôles in Yiddish for the Yiddish Art Theatre. He was discovered by Arnold Daly and played in a special production of the Theatre Guild with Daly's company *The Race with the Shadow*. Later he made a success as Samson in *Samson and Delilah* for Arthur Hopkins. In 1923 he starred in *The Failures* with Winifred Lenihan and in 1924 in *Man and the Masses*, both Theatre Guild productions. He also played with Doris Keane in *Welded* and on the vaudeville stage.

BENAVENTE Y MARTINEZ, JACINTO (1866-). A Spanish playwright and author born in Madrid, where he attended the University. He later traveled with a circus and appeared on the stage. His first literary work was a volume of poems (1893), but his forte was drama. Benavente has been closely connected with a twentieth century renaissance in Spain. Nearly all his plays are woven about the awakening of Spain. As editor of *La Vida Literaria*, he assumed intellectual leadership of a group of writers connected with the modern movement. *Gente Conocida (In Society)* (1896) established his reputation. In his works the Spanish tradition of melodramatic artificiality has been discarded, and its place has been taken by a forceful impressionism and finished workmanship. Among his works are *Autumnal Roses* (1905); *The Evil Doers of Good* (1905), one of his best; *The Bonds of Interest* (1907); *Princess Bebe* (1909); *La Malquerida* (1913); *Nuevo Coloquio de los Perros* (1916); *Cartas de Mieres* (1917); and *Tigulinas* (1921). Benavente received the Nobel Prize in 1922.

BENCHLEY, ROBERT CHARLES (1889-). An American editor and humorist, born at Worcester, Mass., and educated at Harvard University. In the period 1912-14, he was with the Curtis Publishing Company and subsequently joined the editorial staff of the *New York Tribune* (1916-17). He was managing editor of *Vanity Fair* (1919-20), dramatic editor of *Life* (1920), and literary critic on the *New York World* (1920-21). Mr. Benchley's writings have the supreme virtue of genuine humor. *Of All Things* (1921) and *Love Conquers All* (1921), collections of essays, introduce commonplaces so quietly and ludicrously as to tickle the stiffest humor.

BENCKENDORFF, COUNT ALEXANDER (1849-1917). A Russian diplomat, educated in France and Germany. He entered the diplomatic service in 1869, acting as attaché to the Russian embassies in Rome and Vienna. From 1897 to 1903 he was minister to Denmark, and from the latter year until his death he was ambassador to Great Britain. Largely responsi-

ble for the reconciliation between Russia and England, he negotiated the Anglo-Russian agreement of 1907 which resulted in the Triple Entente.

BENDA, JULIEN (1867-). A French critic and novelist. In a period dominated by literary Bergsonism, he became the vigorous defender of intellectualism and classical æsthetics. His *Belgephor* (1918) is an attack on the artistic standards of the twentieth century and its cultivation of feminine sentimentalities. His novels, *Les Amourandes* (1922) and *La Croix des Roses* (1923), are as intellectual as his critical theory. Before the War, he published two polemical works against the new philosophy of Bergson, *Le Bergsonisme, une Philosophie de Mobilité* (1912), and *Sur le Sens du Bergsonisme* (1914). The *Dialogue d'Eleuthère* is a charming philosophical discussion of the follies of the modern age, particularly its subjection to women.

BENDA, WLADYSLAW THEODOR (1873-). A Polish-American illustrator educated in Cracow, Vienna, San Francisco and New York. He is best known for his illustrations for *The Century*, Scribner's, *The Cosmopolitan*, McClure's, Collier's, *Hearst's International*, and other magazines and for his creation of a new type of masks known on the stage as "Benda masks." He was awarded a silver medal for his work at the Panama Pacific International Exposition, in 1915.

BENEDICT XV, GIACOMO DELLA CHIESA (1854-1922). The two hundred and sixtieth successor of St. Peter, first bishop of Rome. He was born at Pigli, Italy, educated at the gymnasium of his native city, and graduated with a doctor's degree in jurisprudence at the University of Pigli. He was ordained as a priest in 1878 and later served as undersecretary to Cardinal Meriano Rampolla. He was created archbishop of Bologna in 1907 and elevated to the Cardinalate in May, 1915; in September of that year, just two months after the outbreak of the War, he was elected pope. Benedict XV was a modest and unassuming head of the Roman Catholic Church, a sincere patron of the arts, and, as his handling of the diplomatic situation at the Vatican during the chaos of the War proved, a subtle statesman. Among those who owed allegiance to Rome was Austria, the strongest supporter of the Vatican in Europe, and Belgium, equally faithful and receiving the sympathy of a world wholly out of accord with Austria and her allies. In the tension of the War Benedict XV was called pro-German because of his failure to protest to Germany and to act strictly as a representative of the Prince of Peace. Nevertheless it was only a week after his coronation that he exhorted rulers to "enter into a council of peace with all speed." He suggested a Christmas truce in December, 1914, but Russia and Turkey would not acquiesce. In March, 1916, having appointed special days of prayer for peace in the interim, he asked all belligerents for a statement of their demands and wishes and for "necessary sacrifices of pride and particular interests." He suggested to President Wilson in May, 1916, that the United States offer to conciliate the belligerents and expressed his approval of Mr. Wilson's peace note in 1917. In 1918, he made a final appeal for peace on the basis of "complete and reciprocal condonation," the evacuation of Belgium, and the freedom of small nations. Benedict XV modeled his policy on

that of Leo XIII and Pius X. During his pontificate friendly relations were restored between the Vatican and the French government, so that France was again represented at the Vatican by an ambassador, and the Vatican at Paris by a nuncio. Great Britain also had a representative in Rome for political reasons. On Jan. 16, 1922, the pope was suffering from a slight cold which speedily developed into pneumonia, and he succumbed on Jan. 21, 1922.

BENELLI, SEM (1877-). An Italian playwright whose work is characterized by a certain freshness of poetic fancy, well illustrated in his most recent productions, *Ali*, *The Love Thief*, and *La Santa Primavera*. One of his best known early plays, *La Befia*, put on at the Théâtre Sarah Bernhardt (Paris) in a French adaptation in 1910, was repeated several years later in New York as *The Jest*, with John and Lionel Barrymore. During the War he wrote some verses published as *L'Altare* (1916). His other recent work includes *L'Arzigagolo*, *Poema Buffonesco*; *La Gorgona*; *The Love of the Three Kings*, translated into English by Howard Mumford Jones; *La Maschera di Bruto*; *Le Nozze dei Centauri*, and *Parole di Battaglia*. On *The Love of the Three Kings* (*L'Amore dei Tre Re*), Italo Montemezzi has composed one of the most moving and beautiful of modern operas.

BENES, DR. EDWARD (1884-). A premier of the Czecho-Slovak Republic, born at Kozlany, Bohemia, and educated at the University of Prague and the Sorbonne. During the War he went to Paris as a journalist and diplomat, working with T. G. Masaryk, later president of the Czecho-Slovak Republic, for the setting up of the independent Czecho-Slovak Republic. He was general secretary of the Czecho-Slovak National Council in Paris at 1917 and a member of the Czecho-Slovak delegation to the Peace Conference at Paris at the end of the War. He published *La Problème Autrichien et la Question Tchèque* (1908); *The History of the Labor Movement in Austria* (1913); *Quelques Vérités Simples sur la Fédéralisation de l'Autriche-Hongrie, dans la Nation Tchèque* (1914-18); *Bohemian Case for Independence* (1917); *La Boemia contra l'Autria-Ungheria* (1917); *Détruisez l'Autriche-Hongrie* (1916); *Le Socialisme Autrichien et la Guerre*; *Political Partisanship* (1914); *The War and Culture* (1915), and *The Spirit of the Czecho-Slovak Revolution* (1923).

BENÉT, STEPHEN VINCENT (1898-). An American author, born at Bethlehem, Pa., and educated at Yale University. As a student at Yale he published *Young Adventure* (1918) and won a poetry prize. These early poems showed a precocious facility which has since developed into whimsical and bizarre expressions, in which he is at his best. Other publications of his include *Heavens and Earth* (1920); *The Beginning of Wisdom* (1921); *Young People's Pride* (1922), and *Jean Huguenot* (1923).

BENÉT, WILLIAM ROSE (1886-). An American author and editor. He was born at Ft. Hamilton, New York Harbor, and was educated at the Sheffield Scientific School of Yale. From 1907 on he engaged in journalism and editorial work, first in California and later as a member of the editorial staff of *The Century* (1911-18) and the *Nation's Business* (1919-20). In 1920 he became associate editor of the important *Literary Review of the New York*

Evening Post. He wrote poetry of merit characterized by an excellent sense of form and a real imaginative talent, besides a finely drawn romance and many critical papers. Among his published works were the volumes of verse, *Merchants from Cathay* (1913); *The Falconer of God* (1914); *The Burglar of the Zodiac* (1918); *Moons of Grandeur* (1920); the novel, *First Person Singular* (1922); essays in *Saturday Papers*, with H. S. Canby and A. Loveman (1921); and a translation with his wife of Claudel's *The East I Know* (1914). In 1923 he married Elinor Wylie, the poet.

BENJAMIN, MARCUS (1857-). An American editor, born at San Francisco, Cal., and educated at the Columbia University School of Mines. After following his profession of chemist for several years he turned to editorial work and has served on the staffs of the *Cyclopædia of American Biography*, the *Standard Dictionary*, the *Universal Cyclopædia*, the *New International Encyclopædia* and its year books and was editor-in-chief of *Appleton's New Practical Cyclopædia*, 6 vols. (1910). Since 1896 he has been the editor of the publications of the United States National Museum and has been a member of the annual United States Essay Commission. During the World War Dr. Benjamin was an aid in the office of Naval Intelligence and received the decoration of the golden palms with the rank of Officier de l'Instruction Publique from France in 1920.

BENJAMIN, RENÉ (1883-). A French writer and novelist. He leaped into prominence through the publication of his war novels, *Gaspard* (1915) and *Les Repatriés* (1918). The former was unanimously awarded the Prix Goncourt for 1915. M. Benjamin excels in portraiture of Parisian working types and reproduces argot in the naturalistic manner of Zola. Unlike Zola, he has no sociological ax to grind, and his types are singularly rich and good humored. Of his other works several are satires, like the *Farce de la Sorbonne*. *Le Palais et ses Gens de Justice*, *Amadou Bolchéviate*, and *Sous le Ciel de France*. *Les Plaisirs du Hasard* is a light-hearted, sparkling play, produced in Paris in 1922.

BENNETT, (ENOCH) ARNOLD (1867-). An English writer (see Vol. III). Some of his latest works are *A Great Man* (1915) *Over There: War Scenes on the Western Front* (1915); *These Twain* (1916); *The Lion's Share* (1916); *Books and Persons* (1917); *The Pretty Lady* (1918); *The Roll Call* (1919); *From the Log of the Velsa* (1920); *Our Women: Chapters on the Sex Discord* (1920); *Things That Have Interested Me* (1921); *Mr. Prohack* (1922); and the plays, *The Title* (1918), *Judith* (1919), *Sacred and Profane Love*, 2d ed. (1919), *The Love Match* (1922), etc.

BENNETT, RICHARD (1873-). An American actor born at Deacon's Mills, Ind., who made his first stage appearance in Chicago in 1891 as Tombstone Jake in *The Limited Mail* and appeared continuously after that time. In 1906 he made his first London appearance but after 1907 acted chiefly in New York. He is best known for his characterizations of George DuPont in Brieux's *Damaged Goods* (1914); Julien Brignac in *Maternity*; Chick Hewes in *Kick In*; Peter Marchmont in *The Unknown Purple*; Christopher Armstrong in *For the Defense*; Robert Mayo in Eugene O'Neill's *Beyond the Horizon*; "He" in Andréev's *He Who Gets*

Slapped (1922), and the leading rôle in Sir Gerald du Maurier's *The Dancers* (1923).

BENOIT, PIERRE (?-). A French novelist. After the War he was one of the most widely read of French authors. Critics found in his work a mixture of the romantic and the entertaining to induce forgetfulness of the sorrows of war. Just after the Armistice, *Königs-mark* appeared, with a fatalistic setting of a small German principality. Benoit successfully exploits this air of fatality, eventually dispelled by a happy ending, in almost all his novels. *L'Atlantide* (1919), which earned the author the Grand Prix du Roman of the Académie Française, is an Oriental fairy tale of Northern Africa. Its art was likened to that of Stevenson's South Sea romances. In *Don Carlos* (1920), *Le Lac Salé* (1921), and *La Chaussée des Géants* (1922), his subject was again a woman marked by the finger of doom and saved in the last chapter. Benoit conveyed in his works the impression of discussing some great problem of the day, feminism in *Don Carlos*, Mormonism in *Le Lac Salé*, and the Irish question in *La Chaussée des Géants*. And in his most recent book, *L'Oublié*, he manages to bring in the problem of Armenia, without, however, spoiling the interest of the story. The majority of M. Benoit's novels have been translated into English.

BENRIMO, J. HARRY MCALPIN (1874-). An American dramatic author and director, born at San Francisco, where he made his first stage appearance in 1892. In 1897 Benrimo acted for the first time in New York (Manhattan Theatre) and in London. Subsequently he appeared in popular successes in New York and London, but is probably best known as the co-author of *The Yellow Jacket*, with George C. Hazelton (1912). He is also co-author of *Taking Chances* (1916) and *The Willow Tree* (1917). He has lived in London in recent years, devoting his time to stage direction and consultation.

BENSON, ALLEN L. (1871-). An American editor and writer on pacifism. He was born at Plainwell, Mich., and educated in the public schools. He was a member of the reportorial or editorial staffs of newspapers in Chicago, Salt Lake City, and San Francisco (1890-97); assistant managing editor of the *Detroit Journal* (1897-1901); managing editor of the *Detroit Times* (1901-06), and of the *Washington (D. C.) Times* (1906-07); and a writer on political and economic subjects for *Pearson's Magazine* (1908-16), and of signed editorials for *The Appeal to Reason* (Girard, Kan., 1914-16). He early identified himself with the Socialist party and with the pacifists. Soon after the beginning of the War, he proposed an ingenious plan for preventing war, his theory being that an aggressive war should be declared only by vote of the people, and those voting for it should be compelled to fight immediately. In 1916, he was nominee of the Socialist party for president of the United States, but in 1918, he resigned from the party, and in the latter year founded, with W. F. Cochran, the *Reconstruction Magazine*. He is well known as a writer on socialism, government, war, etc. and is author of *The Usurped Power of the Courts* (1911); *Common Sense about the Navy* (reprinted after 1911 by the Anti-preparedness Committee); *The Truth About Socialism* (New York, 1914); *Our Dishonest Con-*

stitution (New York, 1914); *A Way to Prevent War* (1915); *Inviting War to America* (New York, 1916); *What Ford Wages Have Done* (1917), and others.

BENSON, SIR FRANK (1858-). An English actor born at Alresford, Hants, and educated at Winchester and New College, Oxford. He was knighted in 1916. During the War he served as an orderly in a canteen and as an ambulance driver, receiving the Croix de Guerre on the battlefield near Oudenarde. Benson came of a very talented family; one of his brothers was W. A. S. Benson and the other Godfrey Benson, an active Liberal politician. At Oxford, Sir Frank appeared in Greek plays; immediately after leaving college, he went on the stage and made his first appearance under Henry Irving at the Lyceum Theatre in *Romeo and Juliet* (1882). He very shortly became manager of his own company, which had the reputation of putting the future stars of the English theatre through their first stage exercises. In 1901 Benson founded a dramatic school. From 1888 he managed the Stratford-on-Avon Shakespearean Festival and was presented with the freedom of the city (1910) in recognition of his services. On the occasion of the Shakespeare tercentenary he played the title role in *Julius Cæsar* and was knighted by the King of England after the performance.

BENSON, FRANK WESTON (1862-). An American artist (see Vol. III). He won the Corcoran gold medal and first W. A. Clark prize at the Corcoran Gallery Washington (1919); the Logan medal and prize from the Art Institute of Chicago (1922); the Logan prize from the Chicago Society of Etchers (1918).

BENSON, WILLIAM SHEPHERD (1855-). An American naval officer, born in Macon, Ga., and educated at the United States Naval Academy. In 1881 he was made ensign and rose through the various grades, becoming lieutenant-commander in 1900, captain in 1909, and rear-admiral in 1915. He served on various assignments at the United States Naval Academy and afloat, including division and squadron commander. He was commandant of the Philadelphia Navy Yard (1913-15) and in 1915 was appointed Chief of Naval Operations. In 1917 he was a member of the commission appointed by President Wilson to confer with the Allies in Europe and was also a member of the special commission abroad. He served as naval representative in drawing up the naval terms of the Armistice with Germany and the Central Powers, and was naval adviser to the American Commission at the Peace Conference at Paris. He continued to serve as Chief of Naval Operations until Sept. 25, 1919, when he was retired by operation of law. In 1920 he was appointed chairman of the United States Shipping Board and in the following year became a commissioner of that board.

BENTLEY, MADISON (1870-). An American psychologist, born at Clinton, Iowa, and educated at the University of Nebraska and Cornell University. He was instructor and assistant professor of psychology at Cornell University from 1898 to 1912 and has been professor and director of the psychological laboratories at the University of Illinois since 1912. He has continued the tradition of the Cornell school and has edited and supervised studies in social and general psychology (1916), and crit-

ical and experimental studies in psychology (1921), both reporting the researches carried out in the Illinois laboratory. He is editor of the *Psychological Index* and took a prominent part in the war activities of the American Psychological Association.

BÉRAUD, HENRI 1885-). A French novelist born at Lyons. Although he began publishing in 1905, he attained prominence only recently when the Académie Goncourt crowned his two novels *La Martyre d'un Obèse* and *Peau de Fesse* (1922). The first named is a Gallic farce of the martyrdom of a fat man in love with a svelte charmer. *Le Vitriol de Lune* (1921), *L'Héritage des Symbolistes* (1905), *Les Morts Lyriques* (1912), *Textes pour l'Album, Eau de Bib* (1921), are among his other works. M. Béraud is regarded as holding a position of promise among the *jeunes*.

BERCHTOLD, LEOPOLD, COUNT (1863-). A former Austro-Hungarian foreign minister (see Vol. III). After the outbreak of the War he tried to persuade Italy and Rumania to fulfill their obligations to Austria and bent all his energy to securing new allies for the Central Powers. He was, however, unsuccessful for the most part, as he would not consent to the concession of Austrian territory, even though Germany urged it. He came into conflict with German statesmen and military leaders on other grounds also. He accused them of not supporting Austria sufficiently against Russia. In 1915 he fell from power, and the following year was appointed Lord High Steward to Charles Francis Joseph, the heir to the throne. Later he became Lord High Chamberlain but retired from politics on the fall of the dynasty.

BEREA COLLEGE. A nonsectarian, co-educational institution at Berea, Ky., founded in 1858, in the special interest of the mountain people of the Southern Appalachians. There are five departments; the college, the normal school, the academy, the vocational school, and the foundation school, the latter for belated students still in the grades. The college department registered a growth from 104 students in 1913 to 344 in 1923-24, and the total enrollment of all the schools increased in the same period from 1736 to 2729. Six brick dormitory and educational buildings were constructed during the decade besides a hospital and detention ward accommodating 150 patients. An important weaving industry was established; also a broom industry, which in 1922-23 manufactured 7200 dozen brooms. A dairy of 100 cattle, a farm of 350 acres, a garden of 65 acres, a forest of 5600 acres, and a cannery were all operated to reduce the cost of an education, so that no student should be debarred on account of poverty. The staff of commissioned workers was increased from 101 to 146; and the number of books in the library from 26,000 to 42,600 volumes. William Goodell Frost, LL.D., who guided the college during the period of its great expansion, retired from the presidency in 1920, and was succeeded by William James Hutchins, D.D.

BERENSON, BERNARD (1865-). An American art critic (see Vol. III). His recent publications include: *Venetian Painting in America, the Fourteenth Century* (New York, 1916), and *Essays in the Study of Siennese Painting* (ib., 1918).

BERENT, WACLAV (1869-). A prominent Polish writer, born at Warsaw. Berent attracted the attention of serious literary critics

by his remarkable characterization of modern types in the novels *Fachowiec* (1903) and *Prochno* (1904), the latter a profound analysis of the metropolitan decadent artist. Other stories are *Ozimine* (1911) and *Zwe Kamienie* (1922). He made a successful début as a dramatist and has been looked on as the coming writer of Polish drama. Berent also collaborated on a Polish edition of Nietzsche.

BERESFORD, JOHN DAVIS (1873-). An English author, born at Castor, near Peterborough, and educated at Oundle and Peterborough. He studied architecture in London but gave it up to turn to writing. He has since published several plays and many novels, in which he has portrayed characters exceptionally real. His style is dry but is vitalized by unusual psychological insight. His publications include the *Jacob Stahl* trilogy; *Goats* (1913); *The Mountains of the Moon* (1915); *These Lynnekers* (1916); *The Wonder* (1918); *The Jervaise Comedy* (1919); *The Prisoners of Hortling* (1922); and *Love's Pilgrim* (1923).

BERG, DAVID EMMANUEL (1890-). An American sociologist, born at Minneapolis, Minn., and educated at the University of Minnesota. From 1912 to 1914 he was superintendent of schools in various towns in Minnesota. In 1914 he was with the University of Wisconsin survey and in the following year was a member of the Madison (Wis.) Chamber of Commerce. In 1915-16 he was assistant director of the Bureau of Municipal Research in Akron, Ohio, in 1917 assistant secretary of the Committee on Criminal Courts of the Charity Organization Society of New York City, and from 1917 to 1921 secretary of the Charities and Welfare Committee of the Philadelphia Chamber of Commerce. He was also secretary of the Americanization Bureau and of the Philadelphia Welfare Federation. In 1918 he was lecturer on social statistics at Fordham University. During the War he fought with the American forces in France. He is author of *Pick Your Prof.* (1920) and *Personality Culture by College Faculties* (1920).

BERGENGREN, RALPH WILHELM ALEXIS (1871-). An American essayist, born at Gloucester, Mass., and educated at Harvard University. He was cartoonist for the *Boston Sunday Globe* (1897-99), dramatic critic and editorial writer for the *Boston Budget*, a member of the editorial staff of the Boston Publicity Bureau (1902-05), and art critic for the *Boston Advertiser* (1904-07). He is the author of several volumes of humorous, informal essays and of a book of poems for children which has been compared to Stevenson's *Child's Garden of Verse*. In addition he has written a book of fanciful short stories and articles, in magazines and newspapers. His works include *The Comforts of Home* (Boston, 1918), *The Perfect Gentleman* (Boston, 1919), *The Seven Ages of Man* (Boston, 1921), *David the Dreamer* (Boston, 1922), and *Gentlemen All and Merry Companions* (Boston, 1922).

BERGER, VICTOR L. (1860-). An American Socialist politician (see Vol. III). He never became acquiescent toward the War and often wrote against it with the result that he, in company with four other Socialists, was brought to trial for violation of the Espionage Act in December, 1918. After a bitter legal battle which attracted national attention he was found guilty (Jan. 8, 1919) and sentenced to prison for 20 years. His position took on par-

ticular interest when the House of Representatives, in November, voted his exclusion from the seat to which he had been elected the year previous. In December, 1919, he was once again elected by his Milwaukee constituency and was again denied his seat. In January, 1921, the United States Supreme Court reversed his conviction; in November, 1922, the indictments against him were dismissed; and in the same month he was returned for the fourth time to Congress, this time as the only Socialist party representative. His socialist doctrine was modeled after that of the German revisionist school of Kautsky and Bernstein, and therefore he rejected Sovietism. In 1924, with Morris Hillquit and others, he supported the candidacy of Robert M. La Follette for President.

BERGER, VILHELM (1867-). An editor and author, born at Värmland, Sweden; he was educated in the high school there and later in Upsala College, N. J. He was traveling agent for Swedish-American publications (1897-1903), editor of New York *Nordstjernan* (1903-15), and office manager and director of the Swedish Lutheran Immigrant Home (1913-15) and the Swedish Augustana Home for the Aged, Brooklyn. He is the author of numerous books in Swedish, dealing especially with the problems and conditions of the Swedes in America, published from 1902 to 1918.

BERGONIE, JEAN-ALBAN (1867-). He graduated in medicine at the University of Bordeaux in 1883 and was later appointed professor of biological physics and electrotherapy there. Since 1893 he has edited the *Archives d'Electricité Medicale*, a periodical of great merit. Bergonie, in addition to publishing many articles on high frequency and other modalities of electricity, devised (1909) a method of treating obesity by passive exercise, in which the patient sits in a specially devised chair while his muscular system is thrown into successive contractions by faradism. This method, which the author terms passive ergography, appeared to be very successful in reducing weight without putting stout subjects to the necessity of voluntary exercise.

BERGSON, HENRI LOUIS (1859-). The most notable of contemporary French philosophers (see Vol. III). He was elected a member of the French Academy in the spring of 1914; he had already become a member of the Academy of Moral and Political Science in 1903. The War caused an interruption of his philosophic activity and he devoted his talent to the French cause. Besides publishing a pamphlet on the *Significance de la Guerre* (1915), he went twice on diplomatic missions to Washington and was instrumental in preventing the recognition of the Soviet Government by the United States. On the occasion of the San Francisco Exposition he prepared a short survey of French philosophy, published in the collection *La Science Française* 2 vols., (1915); this constituted his only scientific production during the four years of hostilities. If Bergson refrained from philosophizing in this time of stress, his fellow philosophers in Germany published numerous articles and books to prove that the Bergsonian philosophy was plagiarized from German sources, particularly from Schelling; this literature of *Schrecklichkeit* stands as mute testimony to the frailty of human reason in time of war. In 1918, the Academy having resumed its meetings, Bergson delivered an address before it on the life

and works of his predecessor, in its membership, Emile Ollivier. This was published with the *Discours de Reception* by René Doumic (1918). At the close of the War, Bergson gathered up a number of his shorter writings and published them under the title of *L'Energie Spirituelle* (1919), translated into English as *Mind Energy* (1920). He took a leave of absence from the Collège de France in 1919 in order to devote himself to philosophic writing, and at the beginning of 1922 he resigned his chair definitely. Edouard LeRoy, one of his disciples, was elected to succeed him. Bergson was at work for some time on the revision of the Gifford lectures delivered in 1912. In 1922 a short volume came out, *Durée et Simultanéité, d'après la Théorie d'Einstein*. As the title suggests, the book attempted to reconcile the theory of relativity with the Bergsonian conception of duration. M. Bergson insists that the relativity of mathematical times, which must depend necessarily on the orientation of the observer, does not preclude the existence of an absolute qualitative time, revealed by psychological introspection. He attacks therefore not the mathematical theory of Einstein but the metaphysical interpretations which have been grafted on it.

The literature on Bergson's philosophy continued to increase at a rate which makes him the subject of more commentaries than any other modern thinker except Kant. Among the recent books in English which may be consulted are H. Wildon Carr's *The Philosophy of Change* (1914); and G. W. Cunningham's *Study in the Philosophy of Bergson* (1916); J. Alexander Gunn's *Bergson* (1921); and Mrs. Karin Stephen's *The Misuse of Mind* (1922).

BERKEY, CHARLES PETER (1867-). An American geologist, born at Goshen, Ind., and educated at the University of Minnesota. In 1892-1903 he was an instructor in geology at Minnesota, and in the latter year went to Columbia, where he became a full professor in 1916. As assistant geologist to the State surveys of Minnesota and Wisconsin, he devoted special attention to the geology and mineralogy of certain Keweenaw and Cambrian areas of these States and later held a similar relation to the New York survey, for which he studied the structural and stratigraphical features of the Highlands, and the structural, areal, and engineering geology of New York City. More recently, as consulting geologist to the New York City Board of Water Supply he made an elaborate investigation of the geology of the Catskill Aqueduct region. His original researches have also included studies on the geology of Porto Rico and China.

BERKSHIRE FESTIVAL. See **MUSIC, Chamber Music.**

BERLIN, IRVING (1888-). An American composer, born in Russia and educated in the public schools of New York City. At 16, Berlin commenced his career as a performer in the restaurants and cafés of New York. *Alexander's Rag-Time Band* (1905) established his position as the king of syncopation. He is the writer and composer of the musical plays and revues, *Watch Your Step* (1914); *Stop! Look! Listen!* (1915); *The Century Girl*, with Victor Herbert (1916); *The Ziegfeld Follies of 1918*; *The Canary*, with Ivan Caryll (1918), and many other popular song and dance successes. He is the proprietor, with Sam H. Harris, of the

Music Box (New York) and composed the score of the *Music Box Revues* for 1921, 1922, and 1923.

BERLINER, EMILE (1851-). A German-American inventor (see Vol. III). He was elected president of the District of Columbia Tuberculosis Association in 1915. In November, 1919, under his direction, his son, Henry A. Berliner, designed and used the first successful helicopter.

BERLINER, HENRY A. (1895-). An engineer, born Washington, D. C., son of the inventor Emile Berliner, and educated in Washington and at Cornell and the Massachusetts Institute of Technology. He designed, constructed, and flew the helicopter (1919) on which his father had experimented since 1903, and in 1924 was engaged in helicopter development.

BERMUDA ISLANDS. The British colony composed of approximately 350 small islands lying 518 miles east of Cape Hatteras. The area of the group is 19.3 square miles; the population, in 1922, 20,410, of whom all but 700 were Negroes. The chief town, Hamilton, on the Island of Bermuda, has a population of 7000. Barely one-third of the area was fit for cultivation and on this were planted early spring leguminous crops for the United States market. Similarly, most of the commodities imported come from the United States. The import trade totaled, in 1922, £1,266,696 (a gain of 122 per cent over 1913); and exports, 233,296 (a gain of 157 per cent over 1913). In 1922, the total tonnage cleared was 2,178,562 tons (a gain of 73 per cent over 1913). Until 1920, alcoholic liquors were exported to the United States in large quantities, but, with the coming of Prohibition and the falling off of this traffic, experiments were conducted for the conversion of the alcohol into motor spirits. The Bermudas continued to attract American tourists and winter colonists, as many as 20,000 making their residence here annually.

BERNARD, TRISTAN (1866-). A French novelist. He is the author of two outstanding novels, *L'Enfant Prodigue du Vesinet* (1920) and *Le Jeu de Massacre* (1921).

BERNARDES, ARTHUR DE SILVA (1875-). A president of Brazil, born at Vicosia, Minas Geraes. After two years at Caraca College, he became a clerk in a store at the age of 13 to earn enough to begin a college course at Ouro Preto. He maintained himself there by doing newspaper work. Later he took up law and began practice at Vicosia. He was elected to the Congress of his native state, was its first secretary, and later secretary of the treasury of Minas Geraes. In September, 1918, he was elected governor of Minas Geraes, and was occupying this position when he was made president of Brazil in 1922.

BERNAUER, RUDOLF (?-). A librettist known chiefly for his adaptation, with Carl Meinhard, of the play *Johannes Kreisler*, from *Die Wunderlichen Geschichten des Kapellmeisters Kreisler*, produced in New York (1922-23). Bernauer also wrote with L. Jacobson and O. Straus the comic opera *The Chocolate Soldier*, founded on *Arms and the Man* by George Bernard Shaw and revived at the Century Theatre in 1921.

BERNHARDI, FRIEDRICH VON (1849-). A German military leader and writer, born at Petrograd. He served in the Franco-Prussian War, and from 1891 to 1894 was at Berne as

military attaché; later he went to Berlin as head of the history department of the Grand General Staff. He was general of cavalry and commander of the 7th Army Corps from 1907 to 1909, retiring in the latter year to write on military subjects. He attracted international attention by his book, *Germany and the Next War* (1912). At the outbreak of the War he was again given command of an army corps and served with distinction on the Stochod and on the western front. He published in English *Cavalry in War and Peace* (1910); *On War of To-day* (1914), and *Britain as Germany's Vassal* (1914).

BERNHARDT, SARAH (1844-1923). A French actress (see VOL. III). In 1914, at the age of 70, the great tragedian was forced to undergo a leg amputation. Despite this disability she refused to abandon the stage. She carried out a successful tour of America in 1915, and on returning to France she played in her own productions almost continuously until her death, March 26, 1923. Her later successes included *Daniel* (1920), *La Gloire* (1921), and *Regine Armand* (1922). Her physical condition confined her practically to immobility on the stage, but the charm of her voice, which had altered little with age, insured her triumphs.

BERNHEIM, BERTHA MOSSES (1880-). An American surgeon, born at Paducah, Ky., and educated at Johns Hopkins and abroad. He is known for his original work in blood transfusion and surgery of blood vessels. During the World War he served with the Johns Hopkins Hospital Base Unit. He is the author of *Blood Transfusion* (1917), *Surgery of the Vascular System* (1913), and a volume of his experiences at the war front, *Passed as Censored* (1918).

BERNHEIM, HIPPOLYTE (1840-1919). A French physician, renowned for his development of our knowledge of suggestion as a cause and remedy for disease. With his chief, Liébeault, he founded the so-called Nancy school of psychotherapeutics, although he remained throughout a general practitioner of medicine and professor of medicine in the local university. His books have been widely translated and his clinic at Nancy visited by physicians from many countries. His first book, devoted to general medicine, *Leçons de Clinique Médicale*, appeared in 1877 and was translated into Spanish. His first work on suggestion, *De la Suggestion et de Ses Applications à la Thérapeutique* (1888), was translated into German by Freud and also into English. *Hypnotisme, Suggestion et Psychothérapie* appeared in 1891; *L'Hystérie* (1913); *L'aphasie* (1914), and *Automatisme et Suggestion* (1917).

BERNSTEIN, EDUARD (1850-). A German politician (see VOL. III). In 1920 he was again elected to the Reichstag and became Town Councillor of Berlin. He also published a new edition of his book *Voraussetzung des Sozialismus und Anfang der Sozialdemokratie* (1915), besides *Völkerrecht und Völker-Politik* (1919) and *Wirtschaftswesen und Wirtschafts-verden* (1920).

BERNSTEIN, ELSA ("ERNST ROSMER") (1866-). A German dramatist born at Vienna. Frau Bernstein is the daughter of Heinrich Porges, a writer on music and one of the earliest champions of Wagner, and the wife of Dr. Max Bernstein, a prominent lawyer and successful playwright of Munich. She was an

actress but left the stage on account of failing eyesight and wrote the dramas *Wir Drei* (1893) and *Dämmerung* (1894), and a volume of stories, *Madonna*. Her greatest success was achieved with the poetical drama *Königskinder* (1899), which was played by Sir Arthur Harvey and his company in New York under the title *Children of the King*. The play was made the libretto of Humperdinck's opera *Königskinder*, in which Geraldine Farrar excelled as the Goose-girl. Other works of Frau Bernstein are *Tedeum*, a comedy of musical life, the tragedies *Themistocles* and *Achilles* (1910), and the dramas *Dagny*, *Merele*, *Johannes Herkner*, *Mutter Maria* (1900), *Nausikaa* (1906), *Maria Arndt* (1908), and *Schicksal* (1914).

BERNSTEIN, HENRY LEON GUSTAVE CHARLES (1875-). A French dramatist (see VOL. III). He continued to occupy a leading position among writers of high-class theatrical thrillers. His war play, *L'Élévation*, was acclaimed in France as a work of genuine sincerity, and in the United States, where it was produced with Grace George in the season 1917-18, it was hailed as a drama of spiritual rebirth. The play dealt with the customary French triangle and attempted to show a purification of emotions in the white heat of the War. No doubt the plot had the appearance of sincerity, but the piece was an example of self-deception induced by the war fever. Another play by Bernstein, *The Claw*, was produced in 1921 with Lionel Barrymore and Irene Fenwick in the leading rôles. It was a vigorous character study of a French statesman fallen into moral decay and was built up with effective situations.

BERNSTEIN, HERMAN (1876-). An American journalist and translator of Russian literature. He was born at Neustadt-Scherwindt, Poland, of Russian parents, and emigrated to the United States in 1893. He visited Europe at various times during a long period of years as special correspondent of American newspapers including the *New York Times*, which he represented during 1908-12 and again in 1915, when he made a study of the conditions of the Jews in the war-stricken countries; the *New York Herald*, 1917-19, in Russia, Siberia, Czechoslovakia, Poland, and at the Paris Peace Conference; and the *New York American* (1920-21). He was founder and editor of *The Day* (1914-16) and editor-in-chief of *The American Hebrew* (1916-19), to which he returned in 1923 as editor. He began by writing poems and a novel of orthodox Jewish family life (*Contrite Hearts*) but is better known for his translations of Russian authors, especially Andréev, and for his discovery and publication of the secret telegrams exchanged between the Czar and the Kaiser (1904-07), known as the *Willy-Nicky Correspondence*.

BERNSTORFF, JOHANN-HEINRICH A., COUNT VON (1862-). A German diplomat, ambassador plenipotentiary to the United States from 1908 until the entrance of the latter into the World War (see VOL. III).

BERRY, EDWARD WILBER (1875-). An American palæobotanist, born at Newark, N. J., and educated privately. In 1897 he became associated in the management of the *Passaic Daily News*; he was later president of the company publishing it. In 1905 he entered Johns Hopkins University, where he soon became a member of the teaching staff and in 1917 pro-

fessor of palaeobotany, a subject on which he is accepted as one of the foremost authorities in the United States, specializing on the plants and geological history of southeastern North America, in connection with which he has traveled extensively in those regions. In 1919 he visited South America as a member of the Williams Memorial Expedition. Since 1910 he has been associated with the United States Geological Survey and has contributed to its publications important memoirs on *The Upper Cretaceous and Eocene Floras of South Carolina and Georgia* (1914) and *The Lower Eocene Floras of Southeastern North America* (1919). He has published reports to the Maryland State Geological Survey on *Lower Cretaceous of Maryland* (1911) and *Upper Cretaceous of Maryland* (1916). After 1917 he held the office of assistant State Geologist on that Survey. In 1901 he received the Walker Prize of the Boston Society of Natural History. He belongs to many scientific societies in the United States and abroad, including the Palaeontological Society of America, of which he was president in 1924; the Geological Society of America, of which he was vice-president in 1924; and the National Academy of Sciences, to which he was elected in 1922. He is the author of more than two hundred scientific papers and a book, *Tree Ancestors* (1923).

BERTHELOT, PHILIPPE JOSEPH LOUIS (1866-). A French diplomat and son of Marcellin Berthelot, the famous savant and statesman. He passed through the regular apprenticeship of the diplomatic career and was sent on a mission to the Far East in 1902. He returned to the Foreign Office and advanced rapidly to the position of *Chef de Cabinet* and finally to director-general of the Quai d'Orsay. From this post he ruled French foreign policy and was trusted alike by Clémenceau, Millerand, and Leygues. During Leygues' premiership he exceeded his power and sent a telegram in the premier's name instructing the French ambassador in London to ask the Bank of England to assist the Banque Industriel de Chine. This telegram was made the subject of a subsequent interpellation in the Chamber of Deputies, and Premier Briand was compelled in March, 1922, to put Berthelot on the retired list for 10 years. Despite this political scandal, Berthelot was recognized by friends and foes alike as one of the ablest diplomats in France.

BERTOLINI, PIETRO (1853-1920). An Italian statesman, born at Montebelluna. He devoted himself to economic and administrative questions and represented his native town in the Italian Parliament (1891). After an active career in which he held various public offices and was at one time Minister of Public Works (1907) and at another Minister of the Colonies (1912), he became a supporter of the extension of the suffrage bill and devised a worthy system for allowing illiterates to vote and at the same time reducing electoral corruption. He remained in retirement during the War and was afterward appointed Senator and headed the Italian delegation at the Reparations Commission. He is the author of several important works on politics and economy and on local government in England.

BERTRAND, LOUIS (1866-). A French novelist, disciple of Flaubert. He sought to continue the naturalistic and psychological novel. *Anguiss Martyrum* (1918) shares the Carthagin-

ian setting and even the general perspective of Flaubert's *Salammbo*. Bertrand, however, has not attempted to be completely historical and is satisfied with portraying emotions which were the same in the days of the War as in those of the Christian martyrs. His works include a biography, *Flaubert à Paris, ou le Mort Vivant* (1921), and the novels *Les Villes d'Or*, *L'Infante* (1920), *Le Rival de Don Juan*, *Bains de Phalère* (1921), and *Cardenio* (1922).

BERWALD, WILLIAM (1864-). An American conductor, born at Schwerin, Germany. A pupil of Rheinberger and Faiszt, he began his career as conductor of the Philharmonic Society at Libau in Russia. In 1892 he settled in Syracuse, N. Y., where he has since been head of the department of musical theory at the University. In 1922 he was appointed conductor of the newly organized Syracuse Symphony Orchestra. As a composer he is known by his cantatas, *The Seven Last Words of Christ* and *Crucifixion and Resurrection*; two overtures for orchestra; chamber music; and many songs and pieces for piano.

BESELER, HANS VON (1850-). A German soldier, born at Greifswald in Prussia. In the War he led the assault on Antwerp, which he took on Oct. 9, 1914. With the occupation of Poland in 1915 he became German governor at Warsaw where his attempts to set up a Polish national government buttressed by German arms met with only slight success. In 1918 the Armistice ended his activities.

BESNARD, PAUL ALBERT (1849-). A French painter (see VOL. III). He was head of the French School at Rome in 1913-21 and director of the Ecole des Beaux Arts since 1922. He was represented in the official exhibition of French art held in the United States in 1919-20 by a symbolic portrait of Cardinal Mercier. An important exhibition of his works was shown in different cities of the United States in 1924.

BESSARABIA. A former government of the Russian Empire but since 1920 a Rumanian province. It has an area of 17,146 square miles, an estimated population (1919) of 2,344,800, and is a country of rich cereal lands. The population is of a mixed character containing large communities, in the southern districts, of Ukrainians and Germans, as well as considerable numbers of Jews, Poles, Bulgars, Armenians, and Tatars. The collapse of the Russian Empire in 1917 gave impetus to the separatist movement, which had long attracted the enthusiasm of the Rumanians in the province, with the result that a request was made to the new republican government for the establishment of an autonomous Bessarabia. But the success of the Bolshevik revolution encouraged the Rumanians to hope for loftier things. On Dec. 15, 1917, a "Council of the Land" proclaimed Bessarabia free, under the name "Moldavian Republic." Its independence, however, was short-lived. The hostility of the Ukrainians prompted the Rumanian government to send an army into the country and commence a carefully fostered agitation for annexation. From January, 1918, on, in spite of an Allied attempt in March to bring Rumania and Soviet Russia to terms, the Rumanians remained in occupation of the country. The Bessarabian National Council, which was erected by the Rumanians, twice, in 1918, asked for annexation to Rumania. While sweeping promises of political and religious liberties were held out to the people and the estates of

the large landowners were proceeded against, dissent was treated with a high hand: deportations and imprisonments were frequent; local governments were dissolved; Bessarabian judges were dismissed and the courts closed. Conversations were carried on between Russia and Rumania in 1919 and 1920, but unknown to Russia, Rumania at the very moment was secretly treating with the Allies. On Oct. 28, 1920, a treaty was signed by which Great Britain, France, Italy, and Japan recognized Rumania's sovereignty over Bessarabia. To 1924, however, only the British government had given formal assent to the treaty. In spite of the protests of the Soviet government that it could not recognize the validity of a treaty concerning Bessarabia which had been signed without its participation and to which only foreign powers were signatories, no warlike measures were taken. However, that the matter was not closed was seen in the frequency with which Russia complained, throughout 1920-23, of irregularities on the frontier and in the control of the Dniester River, and of raiding parties originating in Bessarabia, etc. In October, 1921, commissioners of both countries met at Warsaw in an attempt to resume friendly relations but the conference soon collapsed. The same was true of the Vienna conference held early in 1924. Russia regarded French interests in Rumanian affairs with suspicion; Rumania demanded, before any agreement was to be reached, the return of some \$80,000,000 in Rumanian treasure which had been sent to Russia for safekeeping during the War. In short, animosities still existed on both sides; no solution seemed in sight in 1924, and at any moment it appeared that the hatreds might be fanned into war. The attempts, in April, 1924, of the Rumanian king to negotiate a defensive treaty with France, whose purpose could be only the maintenance of Rumanian sovereignty in Bessarabia, were regarded with breathless interest by the western world. For France to take such a course meant only one thing: the possibility of war with Russia.

BEST, HARRY (1880-). An American sociologist, especially interested in the problem of the deaf, dumb and the blind. He was born at Millersburg, Ky., and educated at Centre College, Danville, Ky., George Washington University, Gallaudet College (Washington), Columbia University, and the New York Law School. Before 1912 he held various instructorships in schools and colleges for the deaf and dumb. He was a resident worker in the University Settlement in New York from 1912 to 1919, and in the latter year became professor of sociology in the University of Kentucky. He is the author of two standard texts, *The Deaf* (1914) and *The Blind* (1919), and of contributions to periodicals.

BESTOR, ARTHUR EUGENE (1879-). A president of Chautauqua Institution, born at Dixon, Ill., and educated at the University of Chicago. He was professor of history and political science at Franklin College, Ind., 1901-03, and lecturer on political science in the Extension Division of the University of Chicago, 1904-12. He was assistant general director of Chautauqua Institution, 1905-07; director, 1907-15, and since 1915, president. During the period 1917-18 he was chairman of the Committee on Lectures and Entertainments in the Training Camps of the National War Work Council of the Y. M. C. A.

and director of the speaking division of the Committee on Public Information.

BETHLEHEM BACH FESTIVAL. See *MUSIC, Festivals*.

BETHMANN-HOLLWEG, THEOBALD VON (1856-1921). A German statesman and Chancellor of the German Empire, 1900-17 (see VOL. III). As chancellor, Bethmann-Hollweg's place in domestic and foreign affairs was decidedly subordinate; his movements were continually being circumscribed by the caprices of his royal master and the intrigues of the military party led by von Tirpitz. He entertained the same ambitions for Germany's expansion as all Germans of the ruling class and regarded the violation of the Belgian treaty and the declarations of war which followed it with complacency. To his credit, he refused to accede to the unlimited submarine warfare inaugurated in 1917. His compromising and equivocal attitude satisfied neither his masters nor his critics. When the military command attempted in July, 1917, to interfere in affairs which he regarded as peculiarly his own, he handed in his resignation. He retired from public life to Hohenfinow, where, after preparing *Reflections on the World War* (1919), he died on Jan. 1, 1921. See *GERMANY, History*.

BETTELHEIM, ANTON (1851-). An Austrian author (see VOL. III). In 1917 he published *Leben und Wirken des Freiherrn Roch, von Liliencron, mit Beiträgen zur Geschichte der Allgemeinen Deutschen Biographie* (New Series, 1919, with Ludwig Augengruber).

BETTS, LOUIS (1873-). An American portrait painter, born at Little Rock, Ark., who was the pupil of his father, E. D. Betts, Sr., of William Chase, and of the Art Institute (Chicago). He was elected an Associate Member of the National Academy in 1912 and a full member in 1915. He is also a member of the National Institute of Arts and Letters. Louis Betts, who began painting as a child, received the Cresson Travelling Fellowship from the Pennsylvania Academy of Design after studying with Chase and went to Europe to familiarize himself with the work of Franz Hals and Velasquez. He attracted attention as a copyist. His portraits are painted with regard to emphasizing character above everything else, and he gains his effects without the use of accessories or non-essentials. He has painted portraits in Chicago, New York, London, Paris, Amsterdam, and Madrid, and his work is represented in the permanent collections of the National Arts Club and the Art Institute of Chicago.

BEVERIDGE, ALBERT JEREMIAH (1862-). An American politician and lawyer (see VOL. III). Since 1915 he has published *What Is Back of the War?* and *A Life of John Marshall*, 4 vols. (1916-19).

BEWER, JULIUS AUGUST (1877-). A professor of theology, born at Ratingen, Germany, and educated at the Royal Gymnasium (Düsseldorf), Union Theological Seminary (New York), and the universities of Basel, Halle, and Berlin. He was professor of Old Testament language and literature at the Oberlin (Ohio) Theological Seminary (1902-04), becoming ordained two years later in the Congregational ministry. He was called to Union Theological Seminary in 1904 as assistant professor of Biblical philology. In 1914 he was made professor. He became a member of the faculty of philology of Columbia University in 1913 and lecturer at

Teachers' College in 1912. He is author of several critical essays on the Old and New Testaments.

BEWLEY, LUTHER BOONE (1876-). An American educator in the Philippine Islands. He was born at Mosheim, Tenn., and educated at Maryville College. In 1902 he went to the Philippines as a teacher and held various positions until he was appointed superintendent of schools in Manila in 1914. He became director of education in the Philippine Islands in 1919.

BEYERLEIN, FRANZ ADAM (1871-). A German novelist and playwright (see VOL. III). He is author of *O Deutschland, Heiliges Vaterland*, a novel (1915); *Der Philister*, essays (1919); and *Besuch*, four one-act plays (1919).

BIANCHI, LEONARDO B. (1848-1916). A distinguished Italian alienist who became Minister of Public Instruction for Italy. Born in San Bartolomeo he received his M.D. from the University of Naples in 1871. After holding several minor chairs in his alma mater he became clinical professor of psychiatry and neuropathology and was for years director of the Provincial Asylum at Naples. He is the author of treatises on neurological subjects which include *L'Emiplegia* (1886); *Semeiotica delle Malattie del Sistema Nervoso* (1891); *Malattie del Cervello* (undated). In 1905 appeared the *Trattato de Psichiatria* which was at once translated into English, the translator stating that in knowledge of the physiology of the brain, normal and morbid, it was superior to any textbook in English. Not until 1920, four years after his death, did another distinctive work by Bianchi appear, *La Meccanica del Cervello e la Funzione dei Lobi Frontali*. This was also translated into English by MacDonald of Glasgow in 1921.

BIBESCO, PRINCE ANTOINE (?-). A Rumanian minister to the United States and the husband of Elizabeth Asquith, the daughter of the former British Premier. He was educated in France, and later served as counselor to the Rumanian Legations in London, Petrograd, and Paris. In 1921 he was made Envoy Extraordinary and Minister Plenipotentiary from Rumania to the United States.

BIBLE SOCIETY, AMERICAN. A society founded in 1816 which strives for a world circulation of the Bible to all people without denominational or racial discrimination. The Bibles were furnished at cost price and distributed at cost price through the society's home, foreign, and other agencies. The Scriptures issued by the society in 1923 totaled 7,101,289 volumes; 3,856,190 from the Bible House, New York, and 3,245,000 in foreign lands. These Scriptures were in 175 different languages. During the War, from August, 1914, to the end of 1919 the society distributed 6,808,301 copies of the Bible free of cost among the armed forces of the belligerent nations; of these 4,920,543 were given to men in the service of the United States, and 1,887,758 to those of other nations. The translation and revision of the Bible in other languages was an important part of its work. A translation of the whole Bible into Mandarin was finished in 1919; the Portuguese version was completely revised in 1917; a revision of the Spanish New Testament was issued in 1923, as was the New Testament in Bolivian Quechua; and portions of the Bible were translated into several other tongues. The official publication

of the organization was the monthly *Bible Society Record*.

BIDDLE, ANTHONY J. DREXEL (1874-). An American author, born at Philadelphia and educated at Heidelberg. He lived in the Madeira Islands for a number of years, studying conditions there, and returning to the United States in 1891, when he took up editorial work. He was first on the staff of the *Philadelphia Public Ledger* and in 1895 became editor of the *Philadelphia Sunday Graphic*, which he received. From 1895 to 1904 he was head of the publishing house of Drexel Biddle (New York, San Francisco, and Philadelphia), and founded the Drexel Biddle Bible Classes in the United States, the West Indies, Great Britain, and Canada. In 1918 he was in France as Marine Corps Captain of the Reserve Forces. He is the author of several novels, but his most important work is *The Madeira Islands* (1900), an account of the history, customs, inhabitants, etc., which has, however, been criticized as biased and exaggerated.

BIDDLE, CHARLES J. (1890-). An American Ace, officially credited with the destruction of eight enemy airplanes during the War. He recently wrote *The Way of the Eagle*. He was trained in French aviation schools and was in active service, 1917-19. He won high honors including the Distinguished Service Cross, the French Legion of Honor, Croix de Guerre with four palms, and the Belgian Order of Leopold.

BIER, AUGUST C. G. (1861-). A prominent German surgeon (see VOL. III) and professor of surgery in the University of Berlin, who recently published many articles founded largely on his military experiences. His favorite subject is regeneration in the human body. In 1917 an edition appeared of *Chirurgische Operationslehre* by Bier, Braun and Kümmel.

BIERSTADT, EDWARD HALE (1891-). An American author and editor, born in New York City and educated at the Taft school at Watertown, Conn. He has held various editorial positions with publishing firms, including the Century Company, and was editor of the *Opera Magazine* (1914-1915). In addition to frequent contributions to *The Bookman*, *New Republic*, etc., he is the author of *Dunsany, the Dramatist* (1917), *Aspects of Americanization* (1922), *Sounding Brass* (1922), and *Lost Trails of the Spanish Main* (1922). He edited *Three Plays of the Argentine* (1920); *Portmanteau Plays* by Stuart Walker (1919), and *More Portmanteau Plays* (1919).

BIG BERTHAS. See ARTILLERY.

"BIG FOUR." See PEACE CONFERENCE AND TREATIES.

BIGGERS, EARL, DERR (1884-). An American author born at Warren, Ohio, and educated at Harvard. From 1908 to 1911 he was identified with the *Boston Traveler* as conductor of a humorous column and dramatic critic. He has written *If You're only Human* (1913); *Thieves*, with Grover Harrison (1913); *Inside the Lines* (1915); *A Cure For Ourables*, with William Hodge (1917), *See-saw* (1919), and the popular novel, *Seven Keys To Baldpate*, dramatized by George M. Cohan (1913).

BIGGS, HERMANN MICHAEL (1859-1923). An American physician (see VOL. III) who was distinguished as a clinician, pathologist, bacteriologist, and sanitary officer. In 1914 he became State Commissioner of Health for New

York. He was appointed medical director of the General League of Red Cross Societies at Geneva in 1920 and was knighted by the King of Spain for services in preventive medicine.

BILLIARDS. See SPORTS.

BILLINGS, FRANK (1854-). (See VOL. III). Dr. Billings summed up his doctrines in a monograph *Focal Infection* (the Lane Medical Lectures) in 1916 and with Salisbury has completed the reference work *General Medicine*, 15 vol. (1918). During the War he served in the American Expeditionary Force as chief provost marshal, attached to the office of Surgeon General.

BINET SCALE. See MENTAL MEASUREMENT.

BINET-VALMER, GUSTAVE (1875-). A French novelist. He is the very popular author of more than a dozen novels. These include *La Passion* (1914); *Le Mendiant Magnifique* (1919); *Antonine Jassart, Veuve* (1921); *L'Enfant qui Meurt* (1921); *Les Seigneurs, les Dames, et les Petits Messieurs* (1922); and *Les Jours sans Gloire* (1922).

BINGHAM, HIRAM (?-). A professor of Latin-American history at Yale. Well known for his recent books on aviation and other subjects. These include *Five Straws; Journal of an Expedition across Venezuela and Colombia; Across South America; The Monroe Doctrine an Obsolete Shibboleth; Vitcos, the Last Inca Capital; The Wonderland of Peru, and An Explorer in the Air Service*. He also organized the United States Schools of Military Aeronautics and was on active service 1917-19.

BINGHAM, JOSEPH WALTER (1878-). An American professor of law, born at Indianapolis and educated at the University of Chicago. He was admitted to the Illinois bar in 1904 and practiced in Chicago during the following year. He was acting assistant professor of law at Cornell University, 1905-07, and at Stanford University, 1907-08, becoming professor in the latter institution, in 1912. In 1918 he was assistant director of the Bureau of War Trade Intelligence of the War Trade Board. He is author of *Cases on the Law of War Rights* (1916) and articles in law journals.

BINGHAM, WALTER VAN DYKE (1880-). An American psychologist born at Swan Lake, Iowa. He was educated at the University of Chicago and the University of Berlin and devoted himself to educational and applied psychology. He taught at the University of Chicago; Teachers' College, Columbia University; and Dartmouth College. Since 1915 he has been the head of the division of applied psychology of the Carnegie Institute of Technology and has carried out a number of researches regarding the application of psychological theory to education and in business advertising. During the War, Professor Bingham served as executive secretary of the committee on the classification of personnel and was made Lieutenant-Colonel on the General Staff of the United States Army.

BINSWANGER, OTTO LUDWIG (1852-). A distinguished German neurologist born at Münsterlingen, Switzerland, who received his medical degree from the University of Königsberg in 1878, took up the study of neurology and psychiatry, and in 1882 was appointed professor in these branches in the University of Jena and director of the Grand Ducal Insane Asylum. In 1911 he became rector of the Uni-

versity. Binswanger is known chiefly for his exhaustive treatises on various nervous affections, *Die Pathologie und Therapie der Neurosen* (1896); *Die Epilepsie* (1899); and *Die Hysterie* (1904). Finally, in collaboration with Siemerling, he published his *Lehrbuch der Psychiatrie* (1907) and also edited the periodical *Epilepsia*, 1909-14. His three treatises named above were translated into English as volumes of Nothnagel's *Special Pathology and Therapy*.

BIOCHEMISTRY. This subject has been defined as the chemistry of physiology and hence is naturally subdivided into the chemical phenomena of the separate functions of living organisms, as digestion, respiration, metabolism, etc. Biochemistry, however, is a much more comprehensive subject, for it comprises the chemical composition of animal tissues, agricultural and plant chemistry, physico-chemistry of the body including electrochemical reactions, the chemistry of foods, the chemistry of disease processes and products, the chemical aspect of therapeutics, etc., etc. Since most of these subdivisions are separately considered, the subject of biochemistry is regarded by some authorities as an artificial one. These authors retain the old name of physiological chemistry and narrow the scope to the dynamic chemistry of the animal functions, although these should be found intact in any good work on physiology. The chief use of the term Biochemistry may be to call attention to certain subjects which do not receive proper attention in works on physiology and of these there are not a few. There is, for example, the subject of the animal syntheses, which originated almost a century ago when Wohler first formed urea from extra-animal sources. Akin to this laboratory activity is the isolation of definite chemical bodies from animal tissues. Both animal synthesis and isolation of active principles have been going ahead steadily up to the present time and as a result we have long series of products which comprise adrenalin, synthetic suprarenin, thyroxin, etc. Thus far it well appears that in the narrower and technical sense, biochemistry really means laboratory analysis and synthesis which does not differ essentially from any other organic analysis and synthesis.

At one period in the history of physiology, advance in this science was at a standstill, until Liebig and other chemists helped materially in its development. Despite the fact that much of Liebig's teaching has been found erroneous, physiology has from that period largely assimilated animal chemistry. Another important phase of organic analysis and synthesis has to do with the protein substances and their dissociation into various aminoacids and polypeptides, some of which have specific nutritive and growth-promoting functions. In this connection it has been possible to nourish certain animals over considerable periods with inorganic nitrogen in place of protein matter. Fischer, who was one of the most active discoverers in this field, was similarly successful in the study of carbohydrates and in showing the practicability of using inorganic carbon in the diet. In the study of ferments, internal secretions and vitamins, inability to isolate the actual active principles—with a few exceptions—may keep this department out of biochemistry and leave it in the hands of physiology.

In like manner the subject of immunology and of preventive and curative sera remains within

the confines of experimental and practical medicine. The comparatively new study of physical chemistry which has numerous practical applications in physiology and medicine, is now covered in works on biochemistry with special reference to the optimum concentration of mineral matter in the fluids, the acid-alkaline balance and the subjects of hydrogen-ion concentration and acidosis. The art of diagnosis has been greatly enriched by numerous tests which are decidedly of biochemical character. Under therapeutics we see that withholding salt from the diet will rapidly clear up the severest dropsies, while the addition of a little iodine to the diet will prevent simple endemic goitre and the injection of alkalies will at times combat severe conditions due to acidosis.

From what has already been mentioned it is easy to form the impression that the word biochemistry should be limited to our knowledge of exact substances which can be isolated and employed in pure state. Thus construed it should be a simple matter to distinguish between chemistry on the one hand and physiology and other subjects on the other.

BIOLOGY. A term first applied by Lamarck in 1801 and Treviranus in 1802 to that study of living beings which differs in its point of view from either botany or zoology in that more attention is given to the fundamental laws of life and less to details of anatomy and classification. Obviously this branch of science assumed especial importance after 1859 when the evolution hypothesis furnished an interpretation for the resemblances which appear between the structures and activities of all living beings. In more recent years the term Biology has been used with two distinct meanings. On the one hand, General Biology deals with both plants and animals and uses representatives of either group according as one or the other better illustrates the principles under consideration; while on the other hand the distinction between plants and animals is retained and Animal Biology and Plant Biology are treated as distinct subjects, the word "biology" being here understood to mean a study of plants or animals respectively, deriving from a comprehensive examination of the anatomy, embryology, ecology, paleontology and classification of either group of conclusions as to the fundamental principles underlying their structures, their activities, their relations to one another and their ancestral history.

As a result of intensive investigation along these anatomical, physiological and other lines, each of these subdivisions of the subject has acquired the importance of a distinct science with its own technique and its own vocabulary. Moreover, it soon became evident that chemical reactions certainly accompany and probably play an important part in all life processes, so that the chemist has been called on to develop Biochemistry as an aid to further analysis of vital processes. Hence it follows that we have at the present time no such thing as a science of biology but rather a group of biological sciences all dealing with living matter and coöperating in the attempt to answer some fundamental biological problems: e.g.—What is the nature of living matter?—How may it have originated on the earth and to what extent is "life" a physical and chemical process?—How does living matter adjust itself to its environmental conditions?—If the present life of the earth

has evolved from earlier life, what are the forces which have produced these modifications?—What are the laws according to which the peculiar characteristics of living beings are transmitted to their descendants? While for purposes of instruction it is common practice to group the most important of these conclusions into a summary called biology, these biological sciences really differ so much from one another that they are best treated under distinct heads as given below. See ANATOMY, ANTHROPOLOGY, BIOCHEMISTRY, BOTANY, ECOLOGY; HEREDITY; ZOOLOGY, EVOLUTION. For an excellent brief summary of the subject consult *General Biology* by Burlingame, Heath, Martin and Pierce.

BIOMETRY. See HEREDITY.

BIRGE, EDWARD ASAHEL (1851–). An American educator (see VOL. III). He was chosen president of the University of Wisconsin in December, 1918. From 1897 to 1919 he was director of the Geological and Natural History Survey of Wisconsin, and from the latter date, president of the commission. He was one of the Conservation Commissioners, 1908–18 and in 1918 became president of the United Chapters of Phi Beta Kappa. He was the author of many books on zoölogy and limnology. Professor Birge's researches were mainly on the fauna of fresh-water lakes and the biology of the floating forms.

BIRMINGHAM. The largest city of Alabama. The population rose from 132,685 in 1910 to 178,806 in 1920, and to 223,507 by local estimate for 1924. A \$750,000 municipal auditorium and \$1,000,000 post office were built. In 1924, a \$3,500,000 bond issue was voted by the city for public school improvements, and \$650,000 for the public library. In 1922, a new fire-alarm system was put in service; and in 1924 a light and bell signal system for regulating downtown traffic. The number of manufacturing plants increased from 274 in 1914 to 565 in 1924, and the mining companies in the district from 48 to 141. Building permits increased also from 3524, valued at \$3,043,374 to 5390 valued at \$12,166,946; bank clearings from \$155,674,395.84 to \$1,305,871,257, and the weekly payroll from \$1,500,000 to \$3,125,000. Assessed valuation of real and personal property, based on a valuation of 60 per cent, increased from \$95,453,826 in 1914 to \$145,737,466 in 1924.

BIRNEY, LAURESS J. (1871–). An American bishop, born at Dennison, Ohio, and educated at Scio College and at the Boston University School of Theology. From 1895 until 1911 he was pastor of various Methodist churches in Ohio and Massachusetts. He was dean of the Boston University School of Theology from 1911 to 1920, and was elected bishop, in the latter year.

BIRRELL, RT. HON. AUGUSTINE (1850–). An English author and public official (see VOL. III). He was secretary for Ireland from 1907 to 1910, and under his rule the Irish Universities Act, the Irish Land Act, and the Home Rule Act were passed by Parliament. At the outbreak of the government rebellion, Easter 1916, he resigned. Although active in politics for many years, Birrell is better known as a writer of essays and of biographies. He published *Frederick Locker-Lampson*, a biography, in 1920.

BIRTH CONTROL. The World War synchronized with an almost world-wide awakening

of avowed public interest in the political, ethical, medical and practical aspects of family limitation. This was probably due fundamentally to a realization that international competition tended to be intensified by population pressure. It was realized that the open spaces of the earth are now small and relatively unattractive as compared with those into which the European stock had expanded during the nineteenth century. Moreover, the advancement in the complexity of social life with the resultant expansion of wants and especially the increasing freedom of women had brought into vigorous operation powerful social-psychological forces favoring the public discussion of birth control. A complete survey would show that there was no advanced country in Orient or Occident in which the subject was not agitated during the decade under review and especially since 1919.

American Movement. Active propaganda for birth-control began in the United States with the publication in 1924 by Mrs. Margaret Sanger of a magazine, *The Woman Rebel*, in which the use of preventive methods was advocated. Her indictment under the Federal law forbidding the sending of "improper matter" through the mail, the repeated postponement of her trial and the final quashing of the proceedings in February, 1916, gave wide publicity to the propaganda. The same may be said of the arrest and the sentence to thirty days in the workhouse of Mrs. Sanger and her sister for activities connected with a "birth control clinic" established in Brooklyn. The case was appealed and reached the Federal Supreme Court in October, 1919; it was dismissed on the ground of no jurisdiction. Interested persons by 1916 had formed the National Birth Control League; also a supporting Woman's Committee of One Hundred, headed by Mrs. Amos Pinchot, and the Committee of One Thousand, headed by Dr. Ira S. Wile. Birth Control Leagues were rapidly formed in more than a score of the larger cities during 1916 and 1917. Various other arrests in 1916 brought forward the issue of freedom of speech and press and led to the formation of the Free Speech League, headed by Leonard P. Abbott, interested in preserving the constitutional guarantees of liberty of expression. By the close of that year the propaganda was well organized, country-wide, and well supported. Every activity of the promoters was considered by the press to have considerable news value and the more decided the opposition the greater the publicity. While the drama and the motion picture were used to aid the propaganda, the most effective means were public addresses, public debates, the publication of the *Birth Control Review* (first issue, February 1917), and the distribution of leaflets. Considerable support was given the movement by its endorsement in October 1920 by the New York State Federation of Women's Clubs by a vote of 149 to 97. Many efforts to secure repeal of existing legislation, both State and Federal, proved ineffective.

In November, 1921, was formed the American Birth Control League, 104 Fifth Avenue, New York City, Margaret Sanger, president. The League organized the First American Birth Control Conference at New York, Nov. 11-18, 1921. One of the sessions was broken up by the police, as inquiry revealed, at the request of the office of the Catholic Archbishop. The city

council of Syracuse, New York, passed a resolution prohibiting the holding of the State Birth Control Conference there in February, 1924; the resolution was vetoed by the mayor after many elements in the community had been aroused over the free speech issue. The League held notable conferences at New York, November 1921, Philadelphia, January 1922, Cincinnati, November 1922, Albany, January 1923, and Chicago, October 1923 and is arranging the Sixth International Congress on Birth Control to be held in this country in 1925. In the year ending June 1924 it distributed 610,000 pieces of free literature, published 114,000 copies of the *Birth Control Review*, enrolled 15,000 new members and held meetings in 33 cities.

The Voluntary Parenthood League with Mrs. Mary Ware Dennett as director and headquarters at 10 West 44th Street, New York City, was formed in 1919. It began the publication of *The Birth Control Herald* in 1923. Its objects are: "1. To render available for the people's need, the best scientific knowledge as to how parenthood may be voluntary rather than accidental; and, as a first step the removal of the words 'prevention of conception' from the Federal obscenity laws. 2. The education of parents."

International. At the present time national organizations are found in England (founded in 1877), Holland (1885), Germany (1889), France (1895), Spain (1904), Belgium (1906), Switzerland (1908), Czechoslovakia (Bohemia) (1901), Portugal, Brazil (1905), Cuba (1907), Sweden (1911), Italy (1913), Algeria, Mexico (1918), and Japan (1921). These bodies constitute the Federation of Neo-Malthusian Leagues of which Dr. Alice Drysdale Vickery, London, is president. In 1922 Mrs. Sanger made a world tour in which she visited most of the countries of the northern hemisphere. The establishment of an organized movement in Mexico was soon followed by increased interest in South America.

In Europe increased activity and growing favor for propaganda were manifest in England, Germany and Austria, but not in France. In England widespread interest was aroused by the reports (see *Literature* below) of the first and second National Birth Rate Commissions organized by the National Council of Public Morals. These reports constitute a compendium of religious, social, medical and biological opinion for and against. Religious opinion in England appears divided, though the Catholics present the same opposition there as in this country. Medical and scientific opinion, as also of social workers, is overwhelmingly favorable. Great publicity was secured by the propaganda of Dr. Marie Stopes and her husband, Dr. H. V. Roe, who established in March, 1921, The Mothers' Clinic. Two additional clinics in London were opened the following year. The Fifth International Birth Control Congress was held at London July 11-14, 1922.

In France during the war the censorship greatly interfered with birth control publications and such efforts as revived in 1919 were terminated by an act of July, 1920, which drastically and comprehensively prohibited every sort of propagation of knowledge of contraception and abortion. The publication, transportation, and sale of literature is prohibited and public lectures forbidden. Violations, moreover, are to be tried by the judges of the Tribunal Correc-

tionnel instead of the juries of the Cours d'Assizes. This not only means secret proceedings and hence no propaganda value in the trials but places the guilty at the mercy of the judges. This legislation was undoubtedly a reaction of publicists, employers and militarists to the after-war desire for population increase to insure national safety and prestige. It had the support of numerous economists and demographers and of various organizations, such as, *L'Alliance nationale pour l'accroissement de la population française*.

In Vienna, Austria, a clinic was opened in November, 1923 by Johann Ferch, with the support of the League Against Forced Motherhood. This began agitation for repeal of the law prohibiting abortion. Dr. Ferch says, *Birth Control Review*, July, 1924: "We propose that poor and sick women in the first three months of pregnancy shall have the right, for social and health reasons, to interrupt the pregnancy." The proposed law was defeated in December, 1923 by the combined opposition of clericals and national militarists. An international congress on contraceptive devices was held at Amsterdam, Holland, Aug. 29-30, 1921. Representatives were present from the United States, England, France, Germany and Holland.

Japan, China and India all show increasing consciousness of overpopulation. Unchecked births and decreasing death rates compel a discussion of Neo-Malthusianism. In spite of official opposition a birth-control group was formed at Tokyo in 1921 with Baroness Ishimoto as head. In 1922 official objection to Mrs. Sanger's visit was withdrawn on the understanding she would hold no public meetings. Nevertheless, the Japan Birth Control League began issue of a magazine in May, 1922. The first supporting organization in China was formed by the women of the National University in 1922. About the same time organized propaganda began in India. See ABORTION.

Bibliography. *Birth Control Review*, 104 Fifth Avenue, New York City; William J. Robinson, *Woman: Her Sex and Love Life*, New York; The Critic and Guide Company, *Proceedings, First American Birth Control Conference*, November 1921; Margaret Sanger, *What Every Woman Should Know; The Pivot of Civilization*; S. Adolphus Knopf, M.D., *Birth Control—Its Medical, Social, Economical and Moral Aspects*; Adelyne More, *Uncontrolled Breeding, or Fecundity versus Civilization*; National Birth-Rate Commission, *The Declining Birth Rate, Its Causes and Effects*, London, 1916; *Problems of Population and Parenthood*, London, 1920; Harold Cox, *The Problem of Population*, contains the best presentation of the ethical aspects of birth control; Eden and Cedar Paul (Ed.), *Population and Birth Control*; H. H. Laughlin, *Eugenical Sterilization in the United States*; Rev. James Marchant (Ed.), *Control of Parenthood*; Rev. John M. Cooper, *Birth Control*, a most effective presentation of the Catholic viewpoint, National Catholic Welfare Conference, Washington, D. C.

BIRTH CONTROL LEAGUE, AMERICAN. A Society organized Nov. 2, 1921 and incorporated under the laws of New York State, Apr. 5, 1922. The purposes of the society were stated as follows: To enlighten and educate all sections of the American public in the various aspects of the dangers of uncontrolled procrea-

tion and the imperative necessity of a world programme of birth control; to correlate the findings of scientists, statisticians, investigators, and social agencies in all fields; to organize and conduct clinics where the medical profession may give to mothers and potential mothers harmless, reliable methods of birth control; to enlist the support and coöperation of legal advisors, statesmen and legislators in effecting the removal of State and Federal statutes which encourage dysgenic breeding. The League is in close relation with European organizations carrying on the same work. In 1924 there were 27,500 members. It published leaflets, pamphlets and books, and the monthly *Birth Control Review*. Besides the headquarters in New York the League maintained 10 branches in Pennsylvania, Ohio, Indiana, Michigan, Massachusetts, Connecticut, Colorado, and British Columbia. President, Mrs. Margaret Sanger; vice-presidents, Mrs. Lewis L. Delafield, and Mrs. Juliet Barrett Rublee; Treasurer, Mrs. Frances B. Ackerman; Executive Secretary, Mrs. Anne Kennedy. Headquarters, 104 Fifth Avenue, New York City.

BIRTH REGISTRATION. See CHILD WELFARE, VITAL STATISTICS.

BISCHOFF, DIETRICH (1866-). A German author born at Bremen, formerly known under the pseudonym "Adam Ego." He has written prolifically on social ethics, masonry, insurance laws, and kindred subjects, and at the same time held the presidency of the leading insurance company of Leipzig. His works include *Die Soziale Frage und Ihre Lösung* (1896), *Echte und Falsche Gerechtigkeit* (1899), *Der Soziale Grundgedanke der Freimaurerlehre* (1900), *Der Individualismus in der Freimaurerei* (1901), *Maurerium und Menschheitstum* (1902), *Wesen und Ziele der Freimaurerei* (1912), *Freimaurerische Kriegsgedanken* (1914), *Vom Zukunftsberuf der Deutschen Freimaurer* (1915), *Religion und Freimaurerei* (1916), *Die Sozialisierung Unseres Wirtschaftslebens* (1918), *Sozialismus und Religion* (1919), *Die Sozialisierung der Geister* (1919), *Freimaurerei und Deutschtum* (1920), and *Vom Vaterländischen Beruf der Deutschen Freimaurer* (1919).

BISHOP, FREDERIC LENDALL (1874-). An American physicist, born at St. Johnsbury, Vt., and educated at the Massachusetts Institute of Technology and the University of Chicago. In 1898 he became head of the department of physics in the Bradley Polytechnic Institute and remained there until 1909, when he was called to the chair of physics in the University of Pittsburgh, and also became dean of its engineering college. His original investigations include studies on thermal conductivity and variations of wave length with pressure, surface tension, high temperature, and viscosity, on all of which he has published papers. Besides editing *Engineering Education*, he has served as secretary of the Society for the Promotion of Engineering Education and is a member of many scientific societies.

BISHOP, JOSEPH BUCKLIN (1847-). An American journalist and government official (see VOL. III). He is author of *A Chronicle of 150 Years* (1918), *Theodore Roosevelt and His Times*, and *Charles Joseph Bonaparte: His Life and Public Services* (1922). *Shown in His Letters*, 2 vols. (1920), and edited *Theodore Roosevelt's Letters to His Children* (1919).

BISHOP, LOUIS FAUGÈRES (1864-). An American physician born in New Brunswick, N. J., and educated at Rutgers College and Columbia University. He is professor of diseases of the heart and circulation in Fordham University Medical School and physician to Lincoln Hospital. He made many contributions to periodical literature on diseases of the heart and blood vessels and blood pressure, etc. His works include *Heart Disease, Blood Pressure, etc.*, (1909), translated into French the following year; *Arteriosclerosis* (1914), translated into French by Francon in 1921; and *Heart Troubles: Their Prevention and Relief* (1920).

BISSING, FERDINAND, BARON VON. See **BELGIUM, History.**

BISSOLATI-BERGAMASCHI, LEONIDA (1857-1920). An Italian Socialist politician and statesman, born at Cremona, the son of Demetrio Bergamaschi, and adopted son of the philosopher, Professor Bissolati. Using as tools his weekly editions, *La Critica sociale* and *La Lotta di Classe*, and the daily Socialist organ, *L'Avanti*, he became widely known as the leader of the Socialist element in Italy which remained faithful to the government during the War. He was elected to the Chamber from Pescarolo in 1897, later from Budrio, and in 1908, from the second division of Rome, which he represented until his death. Because he could not sympathize with the Socialists in their anti-patriotic sentiments, particularly in the Libyan War, Bissolati formed with Bonomi and other Socialist leaders what was called the Reformed Socialist group. On the outbreak of the War he enlisted as a sergeant of the Alpini, was wounded, and was decorated for his valour. In June, 1916, after the fall of the Salandra government, he was appointed to the cabinet and served under Premier Bosselli as well as in the succeeding ministry of Orlando. At the Armistice he resigned because of a disagreement over the Pact of London. Although he advocated the annexation of Fiume, he lost popular support because of his opposition to the annexation of Alto Adige and North Dalmatia. When he expressed these views in his speech at Milan on the League of Nations, he was severely criticized. He died at Rome on May 6, 1920. He had not been popular in the last years of his life but was greatly mourned at his death.

BITTERAU, THEODOR (1877-). A German historian, born at Nuremberg. He was professor at the universities of Erlangen and Munich, lecturer on history at the military academy of Munich, and writer of *Die Kurbairischen Polen im Siebenjährigen Kriege* (1901), *Geschichte des Rheinbundes* (1905), *Die Traditionen des Hochstiftes Freising* (1905-9), *Bayern als Königreich* (1906), *Die Deutschen Polen und die Entstehung des Krieges* (1915), *Napoleon I* (1916), *Friedrich der Grosse* (1916), *Geschichte der Französischen Revolution* (1921), and other historical works.

BITUMINOUS COAL. See **COAL.**

BITUMINOUS ROCKS. See **ASPHALT.**

BJERKNES. See **METEOROLOGY.**

BJORKMAN, EDWIN AUGUST (1866-). An American author, born at Stockholm, Sweden, where he was educated in the South-End Higher Latin School. When he was 25 years old he came to America and edited the *Minnesota Posten* at St. Paul (1892-94). His later work

in journalism took him as a reporter, music critic, and editor to *The Times*, Minneapolis (1894-97), the *New York Sun* and *New York Times* (1897-1905), and the *New York Evening Post* (1906). Subsequently he was a departmental editor of *The World's Work* and editor of the *Modern Drama Series* (1912-15). In 1915-17, he represented the British Department of Information in Sweden and directed the Scandinavian bureau of the Committee on Public Information (1918-19). Mr. Bjorkman became associate director of the League of Nations News Bureau in 1920. He wrote *Is There Anything New Under the Sun* (1911); *Gleams—A Fragmentary Interpretation of Man and His World* (1912); *Voices of To-morrow* (1913); *Scandinavia and the War* (1914); *The Cry of the Ukraine* (1915); and *The Soul of a Child* (1922). In addition he translated plays of Björnson, Bergstrom, Schnitzler, and others.

BJORNSTAD, ALFRED WILLIAM (1874-). An American army officer, born in St. Paul, Minn., educated at the University of Minnesota, which he left in 1896 to enter the army at the outbreak of the Spanish-American War. He was commissioned first lieutenant in the 13th Minnesota Infantry in 1898. In 1899 he was appointed Captain of Volunteers in the United States Infantry and in 1901 became first lieutenant in the Regular Army. He was promoted to the rank of major in 1917, to lieutenant-colonel in the National Army in the same year, and in 1918 rose to brigadier-general. From 1898 to 1904 he served in the Philippines. He was on duty with the General Staff in 1911-12 and served in various capacities with that body until 1917. He organized and directed, in that year, 16 training camps for training officers for the War. He served as Chief of Staff for the 30th Division in 1917 and organized and directed the Army General Staff College in France, 1917-18. He was Chief of Staff for the 3d Army Corps in 1918 and was commander of the 13th Brigade in 1918-19. In this capacity he took part in all the major engagements in France. After the War he resumed duty at the General Staff College and in 1920 was appointed commander at Fort Snelling, Minn. He received the Distinguished Service Cross and the Distinguished Service Medal and was decorated by the British and French governments.

BLACK, HENRY CAMPBELL (1860-). An American law author and editor, born at Ossining, N. Y., and educated at Trinity College. After studying law, he was admitted to the bar in 1883. He practiced for several years at Williamsport, Pa., and St. Paul, Minn. In 1888 he removed to Washington, where he devoted himself to legal literature. He was editor of the *Constitutional Review* and in 1917 lectured on constitutional government at Trinity College. Among his published books are *Constitutional Prohibitions* (1887); *Dictionary of Law* (1891-1910); *American Constitutional Law* (1895, 1897, 1919); *Income and Other Federal Taxes* (1917 and 1919); and *Relation of Executive Power to Legislation* (1919). He contributed frequently to legal periodicals and encyclopædias.

BLACK, HUGH (1868-). An English theologian (see VOL. III). He is the author of *The Open Door* (1914), *The New World* (1915), and *Lest We Forget* (1920).

BLACK, WILLIAM MURRAY (1855-). An American army officer (see VOL. III). In 1917

he was chairman of the Inland Transportation Committee of the Council of National Defense. He was a member of the United States Shipping Board in 1919 and retired from active service in the latter year. He was awarded the Distinguished Service Medal in 1918 for planning and administering the engineering and military railway service during the War. In collaboration with Prof. E. B. Phelps he invented a method of purifying sewage by aëration.

BLACK WART DISEASE OF POTATOES. See PLANTS, DISEASES OF.

BLACKWELDER, ELIOT (1880-). An American geologist, born at Chicago, Ill., and educated at the University of Chicago. In 1902 he was given a fellowship at Chicago, where he also became an instructor in geology, but in 1905 he transferred his allegiance to Wisconsin, where he remained until 1916, attaining full professorial rank in 1910. He was professor of geology and head of the department in the University of Illinois, 1916-19, and in 1919 was visiting professor of geology at Leland Stanford Junior University, where in 1922 he became a full professor. From 1906 to 1918 he was also connected with the United States Geological Survey at first as field assistant in Montana and Wyoming but after 1909 as a geologist studying problems in northern Utah, southeastern Idaho, western Wyoming, and then Alaska, especially the glacial and stratigraphic features and economic resources of these regions. He was a member of the California Petroleum Commission in 1917 and of geological expeditions to China and other foreign countries.

BLACKWELL, ALICE STONE (1857-). An American journalist (see VOL. III). She was editor-in-chief of the *Woman's Journal* (Boston) until 1917, when the *Woman's Journal*, the *Woman Voter*, and the *Headquarters News-Letter* were consolidated as the *Woman Citizen*. She became contributing editor to the latter. She is the author of *The Little Grandmother of the Russian Revolution: Catherine Brashkovsky's Own Story* (1917).

BLAKE, EDGAR (1869-). An American bishop, born at Gorham, Me., and educated in the common schools and in the Boston University School of Theology. During 1895-1908 he was pastor in Methodist churches of Salem, Lebanon and Manchester, N. H. He was elected bishop in 1920.

BLAKE, JOSEPH AUGUSTUS (1864-). An American surgeon, born in San Francisco, and educated at Yale and Columbia Universities. At the outbreak of the War he had charge of the surgical ambulance at Neuilly, France, and in 1917 became head of the American Red Cross Military Hospital. In 1917 he was given the Cross of the Legion of Honor. He has written much on surgical subjects and in 1918 published his *Gunshot Fractures of the Extremities*.

BLAKELOCK, RALPH ALBERT (1847-1919). An American landscape painter, one of the foremost of the school (see VOL. III). During his long confinement in the State hospital for the insane at Bennington, N. Y., his great paintings, from which he had been unable to eke a livelihood, brought record prices; "Moonlight," for example, was sold to the Toledo Art Museum for \$20,000. In 1916 he was released from the hospital as sane and endeavored to resume his work as a painter, but without success. He was taken back to the institution in 1918 and

died at the camp of a friend in the Adirondacks in 1919.

BLAKESLEE, GEORGE HUBBARD (1871-). An American professor (see VOL. III). He is the editor of *Recent Developments in China; Latin America; Problems and Lessons of the War; Mexico and the Caribbean*; and the *Journal of International Relations*. He organized the Clark University Conference on International Relations and in 1917-18 prepared reports on German colonies in the Pacific for the American Commission to Negotiate Peace. He was technical advisor to the American delegation at the Disarmament Conference in Washington, 1921.

BLAKEY, ROY GILLISPIE (1880-). An American economist, born at Shelbina, Mo., and educated at Drake, Missouri, Colorado and Columbia Universities. He began as a newspaper reporter, and later became a university instructor and member of various economic commissions. In 1919 he was made professor of economics of the University of Minnesota. Among his works are *The United States Beet Sugar Industry and the Tariff* (1912) and the brochure, *The Comparative Costs of State Governments* (1916).

BLANCHARD, ARTHUR HORACE (1877-). An American civil engineer, born at Providence, R. I., and educated at Brown and Columbia Universities. He began teaching in 1899 as an instructor in civil engineering and mathematics at Brown, where he remained until 1911, when he returned to Columbia as professor of highway engineering, a chair which he relinquished in 1917 and in 1919 went to the University of Michigan, where he became professor of highway engineering and highway transport. Meanwhile he was consultant to various official organizations. During the War he was a member of the Council of Defense and served as vice-chairman of the National Highway Commission. Besides being associated in the authorship of *Highways* (1910-12) and *Highway Engineering* (1913), he was editor-in-chief of the *American Highway Engineer's Pocketbook* (1919) and the *American Highway Transportation Handbook* (1920).

BLAND, EDITH NESBIT (MRS. HUBERT) (1858-1924). An English poet and novelist (see VOL. III). She is the author of *Garden Poems* (1914), *Five Children and It* (1921), *The Incredible Honeymoon* (1921), *The Story of the Amulet* (1921), *The Enchanted Castle* (1922), *The Lark* (1922), and *Many Voices: Poems* (1922). New editions of many of her earlier books have appeared.

BLAND-SUTTON, SIR JOHN (1855-). An eminent British surgeon, born at Enfield Highway. His writings, concerned chiefly with pathology and gynecological surgery, include *Introduction to General Pathology* (1886); *Ligaments, Their Nature and Morphology* (1887); *Evolution and Disease* (1890); *Surgical Diseases of the Ovaries and Fallopian Tubes* (1891), and *Tumors, Innocent and Malignant* (1893). The volume on tumors, his masterpiece, went through its seventh edition in 1922. He has also written *Gallstones and Diseases of the Bile-ducts* (1907); *Fibroids of the Uterus* (1913), and *Selected Lectures and Essays* (1920). In collaboration with Giles he wrote a textbook on *Diseases of Women* (1897), which has also seen its seventh edition.

BLASCHKE, PAUL (1850-). A German

lexicographer, born at Wigandstal, and educated at the University of Leipzig. After employment in the postal service, he spent several years as a tutor and finally became a lexicographer. During the period 1878-1916, he published innumerable books on French, Italian, Portuguese, and Spanish grammar, German-English-French guides to conversations, a German-English-French and French-English-German electrotechnical dictionary (1913), a Polish grammar (1916), and a German-English-French medical dictionary (1916).

BLASCO IBÁÑEZ, VICENTE (1867-). A Spanish novelist, journalist, and politician. In his youth he occupied a prominent place in the political and literary controversies of the day and often found himself in difficulties with the authorities. His first novel, *La Barraca*, appears in 1899; thereafter he wrote voluminously. He was introduced to the English-speaking world with his *Four Horsemen of the Apocalypse* (1918), which achieved an extraordinary popularity. Other works done into English were *Our Sea* (1920); *Torrent* (1923); and *The Temptress* (1923). For a time, Ibáñez ranked in the forefront of contemporary Spanish novelists, but his reputation declined as familiarity with other modern Spanish writers, Pio Baroja, for instance, grew. It was seen that while he had mastered narrative art, his work showed scarcely any contact with reality. During the period he continued to attract American attention by his sensational newspaper articles on Mexico, Europe, etc.

BLATCH, HARRIOT STANTON (1856-). An American lecturer and writer on feminism (see VOL. III). In 1917 she became head of the speakers' bureau of the Food Administration. She is the author of *Mobilizing Woman Power* (1918), *A Woman's Point of View* (1919), and *Elizabeth Cady Stanton as Revealed in Her Reminiscences, Letters and Diary* (1921).

BLEI, FRANZ (1871-). An Austrian writer, born at Vienna, and educated in political economy at the universities of Vienna, Paris, Berne, and Zurich. After traveling in France, Italy, and America, he entered the literary field as playwright, but soon devoted himself to the essay. His principal works include *Oscar Wilde* (1904), *Novalis* (1904), *Von Amourensen Frauen* (1906), *Felicien Rops* (1906), *Die Romantische Renaissance* (1906), *Landfahrer und Abenteurer* (1913), *Die Puderquaste* (1913), *Menschliche Betrachtungen zur Politik* (1915), *Summa* (1918), and *Retrung* (1920). He has also translated numerous works of French authors, among them Marcel Schwob's *Monelle*, André Gide's *Le Roi Candale*, Maurice Barrès's *Du Sang de la Volupté et de la Mort*, and others of Paul Claudel, Walt Whitman, and Oscar Wilde. He has also edited the works of Goethe, Reinhold Lenz, and others.

BLEIBTREU, CARL (1859-). A German author and historian, born in Berlin. (See VOL. III). He is said to have inaugurated the modern movement in German literature by his essay, *Die Revolution der Litteratur* (1885). His contributions to war literature are *Englands Waterlooölüge* (1915) and *Stegemanns Weltkrieg und die Marneschlacht* (1916).

BLEININGER, ALBERT VICTOR (1873-). A German-American chemist, born at Polling, in Bavaria, and educated at Ohio State University, where he became instructor in ceramics, attaining an associate professorship in 1906.

In 1907 he went to the University of Illinois and three years later was made full professor and director of the department of ceramics. During 1908-10 he was in charge of the clay products section of the United States Geological Survey and in 1912-20 of a similar division of the Bureau of Standards, becoming in 1920, chemist to the Homer Laughlin China Company. He has lectured on his specialty at the University of Chicago (1912) and at the Franklin Institute (1917) and was chairman of the committee on ceramic industry of the National Research Council. Professor Bleininger is a member of various technical societies including the American Ceramic Society, of which he was president in 1918. Besides editing various journals he has published the *Collected Works of H. A. Seger* (1903) and is the author of *The Manufacture of Hydraulic Cement* (1904).

BLEULER, PAUL EUGEN (1857-). A Swiss psychiatrist, known especially for his original conceptions of psychology and insanity. He has divided all mankind into schizoids and syntonics and has renamed dementia præcox by calling it schizophrenia; that is, the highest pathological expression of the schizoid mind. Bleuler was born at Zollikon, received his medical degree from the University of Berne, and was appointed professor of psychiatry in the University of Zürich. He wrote *Dementia Præcox oder Schizophrenia* (1911), translated into English by William A. White (1912); *Das Autistisch-undisziplinierte Denken in der Medizin* (1919), and *Lehrbuch der Psychiatrie* (1920), translated into English by A. A. Brill (1924). He was editor of the *Jahrbuch für Psychoanalytische und Psychopathische Forschungen* during 1909-13. He was the first of Freud's contemporaries to speak favorably of psychoanalysis; however, he has never been classed as a militant member of this movement.

BLICHFELDT, HANS FREDERIK (1873-). Mathematician, born in Denmark. He came to the United States in 1888, and after settling in Washington he became in 1892 a draftsman in the engineering department of the city and county of New Whatcom. Two years later he entered Leland Stanford Junior University. He studied also at the University of Leipzig. He then returned to Stanford as instructor in mathematics, and after passing through the lower grades he was made professor of that subject in 1913. Dr. Blichfeldt has made original studies of various subjects on continuous groups, linear homogeneous substitution groups, and the geometry of numbers, and has contributed papers on the results to the *American Journal of Mathematics* and especially to the transactions and bulletins of the American Mathematical Society, of which he was a vice-president in 1912. His published papers are about 30 in number and include *Finite Groups of Linear Homogeneous Transformations*, published as Part Two of the *Theory and Application of Finite Group* (1916).

BLINN, HOLBROOK (1892-). An American actor, born in San Francisco. He appeared on the legitimate stage as a child, played throughout the United States and in London, and did some good work for the moving pictures. His successes include *Molière* (1919), *A Woman of No Importance* (1916), *The Lady of the Camelias* (1917), *Getting Together* (1918), and *The Bad Man* (1920-23). In the

last he had perhaps his best stage part. In 1923-1924 he worked in moving pictures.

BLISS, GILBERT AMES (1876-). An American mathematician, born at Chicago, where he was educated at the university. As an instructor in mathematics he taught at the University of Minnesota. He went to Göttingen for a year in 1902 and then returned to Chicago as an associate. In 1904 he was called to the University of Missouri, and from there to Princeton, where he remained three years. Returning to Chicago in 1908 as associate professor, he continued in this capacity until 1913, when he attained full professorial rank. He has given special lectures in mathematics at Princeton in 1909 and at Harvard in 1911. The former were published as *The Princeton Colloquium Lectures, Part One: Fundamental Existence Theorems* (1913). During the War he served as a scientific expert on range firing sections in the United States Army. He has made special studies of differential equations, calculus of variations, and theory of functions of lines with an application to ballistics, on all of which he has contributed valuable papers to the *American Journal of Mathematics* and to the transactions and bulletins of the American Mathematical Society. Dr. Bliss was associate editor of the *Annals of Mathematics* in 1906-08 and of the transactions of the American Mathematical Society in 1908-16.

BLISS, TASKER HOWARD (1853-). An American soldier, born at Lewisburg, Pa., and for two years a student at the university of that city, now Bucknell University. He graduated from the United States Military Academy in 1875, was professor of military science at the Naval War College from 1885 to 1888, and spent two years as military attaché at Madrid. At the close of the Spanish-American War in which he had served during the Porto Rican campaign of 1898, he was appointed collector of customs at the port of Havana and in 1902 was made special envoy to Cuba, to negotiate the treaty of reciprocity between Cuba and the United States. He was commandant of the Army War College in 1903. From 1905 to 1909 he held commands in the Philippines. In the early part of 1911 he commanded the provisional brigade on the southern California border during the Mexican insurrection, after which he was for a short time commander of the Western Department. He was placed in command of the Department of the East on Aug. 12, 1911, and became chief of staff of the United States army, with the rank of general, on Oct. 6, 1917. Although he reached the legal age of retirement on December 31 of that year, he remained on active duty by order of President Wilson and was appointed to membership on the Supreme War Council in France. He was also a member of the American Commission to Negotiate Peace in Paris, 1918-19. On May 1, 1920, he was detailed by the President as governor of the United States Soldiers' Home. He received the United States Distinguished Service Medal.

BLOCH, ERNEST (1880-). A distinguished Swiss composer, born at Geneva. He received his musical education at the Conservatoire in Brussels and later at Hoch's Conservatory in Frankfurt. In 1909-10 he was conductor of the subscription concerts in Lausanne, and from 1911 to 1915 professor of composition at the Geneva Conservatory. In 1916 he came to New York, where he taught composition at

the David Mannes School of Music. In 1920 he became director of the Cleveland Institute of Music. His music is rather harsh and austere; he draws his inspiration mainly from Jewish subjects and consciously attempts to give expression to the aspirations and ideals of the Jewish race. His works include an opera, *Macbeth* (Paris, 1910); three symphonies, in C sharp minor, in F (*Israel*), and *Symphonie Orientale*, on Hebrew themes; two symphonic poems, *Hiver-Printemps* and *Vivre et Aimer*; *Trois Poèmes Juifs* for orchestra; *Poèmes d'Automne* for soprano and orchestra; *Schelomo* for 'cello and orchestra; Psalms 22, 114, and 137, for solo voices and orchestra; a string quartet in B; a violin sonata; and a viola sonata which won the Coolidge Prize at the Berkshire Chamber Music Festival, 1919. A second opera, *Jezabel*, was still unfinished in 1924.

BLOCH, JEAN-RICHARD (1884-). A French editor and author, born in Paris. In 1910 he founded the review *l'Effort*, which was later enlarged and entitled *l'Effort Libre*. He wrote essays, short stories and novels. His best known works are *Carnaval Est Mort*, a collection of articles whose general tenor is that there is no more art because there is no more faith; *Lévy*; *Premier Livre de Contes* (1912); and *Et Cie.*, a novel (1918). The two last works are stories constituting a sympathetic analysis of the Jewish character.

BLOCK, ALEXANDER A. (1880-1921). A Russian poet and playwright, born in Petrograd. He was one of the leaders of the Modernist school in Russia. His poetry shows two distinct phases of development; during the earlier period he seemed to live in a mystic land of unreality and dreams; later, he became vigorous, patriotic, hopeful. *Songs of the Beautiful Lady* (1905) belongs to the earlier phase, *Poems on Russia* (1915) to the later. His poetry is impressionistic, and he employs the so-called new rhythm, similar to that of German and English. Besides the works mentioned he is author of *The Unexpected Joy* (1907), *Snow-Mask* (1907), *Snow-Bound* (1908) *Night Watches* (1911), and *The Twelve*. The last is his masterpiece, giving a powerful picture of Petrograd at the beginning of the Bolshevik Revolution. Block, although not a Communist, was acclaimed by the Bolsheviks after the publication of *The Twelve*. He died from illness due to undernourishment under the Bolshevik régime, on Aug. 11, 1921.

BLOCK, PAUL (1862-). A German editor and author, born at Memel. He studied at Memel and Königsberg and specialized in history and literature. In 1899 he became connected with the *Berliner Tageblatt*, and has been its Paris correspondent (1906-11), war correspondent, and literary editor. His works are the novels, *Der Graumönch* (1885), *Am Leuchtturm* (1886), *Anno Sturm* (1887), *Die Diamanten der Königin* (1888); the plays, *Der Rächer* (1888), *Rübezahl* (1888), *Rolands Knappen* (1888), *In der Tiefe* (1889), *Bergmanns Glück* (1889), *Gift* (1890); a volume of Parisian sketches (1911); *Der Verwandelte Bürger* (1919), dealing with the outbreak of the revolution in Germany; and numerous translations.

BLOCKADE, ALLIED. The measures taken by Great Britain, with the approval of the other Allies, and to some extent assisted by them, to prevent goods from reaching Germany which could assist the latter in prosecuting the War,

did not constitute normal blockade of the German Coast in the earlier sense of the word. At first, it was less than a blockade as heretofore understood; by 1916 it had become the most drastic and effective control of neutral commerce ever attempted by belligerents. Submarine mines and submarine boats had made a close blockade of the old type absolutely impracticable. The blockade lines of cruisers were drawn across the English Channel in the south and between the north of Scotland and the Norwegian Coast. At the outbreak of war, the Allies announced that they would follow the rules of the Declaration of London, of which Great Britain and the United States were not signatories, with some modifications. No notice of formal blockade was given then or later, but lists of articles declared to be contraband were published; these lists were subsequently extended. The results of these measures were very unsatisfactory. In an intensive war, where the whole population is concerned in efforts to maintain the greatest field force possible, the receipt of almost any kind of goods from abroad will release some of the people to military service or to some industry which is engaged in supplying the fighting line. Nearly all goods thus become contraband in the sense that they assist the enemy in the prosecution of the war. Moreover, enemy goods sent to neutral countries furnished means for the purchase of goods for import in return.

In the cases of neutral countries whose land frontiers bordered Germany, interruption of traffic in goods originating in the neutral country or brought by land from some other neutral country was neither legal nor practicable. But in the case of goods imported by neutrals from overseas, the conditions were different. The doctrine of "continuous voyage" was amplified and extended. All such goods in excess of local neutral requirements were seized and condemned for purchase by the Allies or for confiscation. The restrictions imposed on this trade, especially in regard to insurance, censorship, cables, and the supply of coal and oil, forced the formation of mercantile associations in the neutral countries outside the Baltic, and these guaranteed the purely neutral destination of cargoes. When the United States entered the War, the source of supply of goods which could be passed on to the enemy via neutral territory was reduced to comparative unimportance, as control could be exercised at the place of export. The suppression of oversea trade designed to furnish supplies to Germany was then complete and was largely instrumental in forcing the enemy to sue for peace.

BLOMFIED, SIR REGINALD (1856-). An English architect, born at Aldington, Kent, and educated at Haileybury, Oxford University, and Exeter College. After spending three years in an architectural office and studying at the Royal Academy School of Architecture, he traveled on the Continent for a year and then started practicing in London in 1884. His style is late English Renaissance. Besides country houses he designed many public buildings in London and elsewhere including the Goldsmiths' College, New Cross; the Imperial War Cross, Chelsea, and the new buildings for Lady Margaret Hall, Oxford. He also designed part of the façade of the Quadrant in Regent Street, London. At the outbreak of the War he obtained a commission in charge of trench work and was afterward chosen principal architect

of the Imperial War Graves Commission. He was made Associate of the Royal Academy in 1905 and served as professor of architecture there from 1906 to 1910. He was awarded the gold medal of the Royal Institute of British Architects in 1913 and in the following year was elected president of that body. Well-known as an art historian and critic, he was made Officer de l'Instruction Publique by the French government. His works include *The Formal Garden in England*, with F. I. Thomas (1892), *History of Renaissance Architecture in England* (1897), *The Mistress Art* (1908), and *French Architecture*, successive volumes (1911 and 1921). He was knighted in 1919.

BLONDIN, PIERRE EDOUARD (1874-). A Postmaster General of Canada, born at Saint Francois du Lac, Yamaska, and educated at the Séminaire de Nicolet, St. Michel's College, Toronto, and Laval University, Montreal. In 1908 and 1911 he was elected to the House of Commons for Champlain and in the latter year was Deputy Speaker at the first session of the 12th Parliament. He was sworn of the Privy Council and appointed Minister of Inland Revenue in 1914. Blondin enlisted in 1917 and was given command of the 158th Battalion of the Canadian Expeditionary Forces; he went abroad in October of that year as Commander of the Legion of Honor. He was a Conservative member of Parliament for the county of Champlain in 1917 and in the following year was called to the Senate.

BLOOD PRESSURE. Since about 1914 many diagnosticians have formed the opinion that the ordinary measurement, the systolic, is insufficient to give a correct idea of the true state of the blood pressure. They have therefore advocated that the diastolic and differential pressures be given more weight, the differential or pulse pressure being the true index of the circulation. While this attitude is sound in theory, it is so difficult to obtain satisfactory readings of the pulse pressure that some practical men have returned to dependence on the systolic pressure alone. The practical value of the systolic pressure is still held to be great, but this value is restricted to a very few diseases. In regard to the prevention and relief of high blood pressure, certain factors commonly accused have never been proved to cause or maintain this condition. Remarkable reduction of pressure has sometimes been obtained by the use of certain diets, as the so-called basic or alkaline diet, and also by the use of alkalies themselves.

BLOOMFIELD, MAURICE (1855-). An American orientalist. He was born in Austria but came to America as a youth and studied at the University of Chicago and Johns Hopkins, as well as at Berlin and Leipzig. He has been professor of Sanskrit and comparative philology since 1885. His early works dealt with the Vedas, their religion, mythology and poetry. Recent publications of his are *Life and Stories of the Jarna Savior Paravanatha* (1916) and a work on the *Rig Veda* (1916).

BLOS, ANNA (1866-). A German social worker and teacher, born at Liegnitz. She has written on feminism and various social problems. Among her works are *Krieg und Schule* (1915) and *Frauenarbeit im Kriege* (1917). She is the wife of Wilhelm Blos, the author.

BLUE, RUPERT (1867-). An American sanitarian and public official (see Vol. III). In

1915 he was elected president of the American Medical Association and of the Association of Military Surgeons. In 1920-21 he was United States delegate to the International Office of Public Hygiene at Paris, and to the third Decennial Revision of International Nomenclature of Diseases.

BLUE, VICTOR (1865-). An American naval officer (see VOL. III). He commanded the battleship *Texas* in the North Sea under Admiral Beatty in 1917 and 1918. On Dec. 16, 1918, he was reappointed chief of the Bureau of Navigation and was made rear-admiral on Apr. 1, 1919. He was awarded the Distinguished Service Medal for service in the North Sea. He was retired in June, 1919, because of disability received in line of duty.

BLUNT, WILFRID SCAWEN (1840-1922). An English author (see VOL. III). In 1914 he published his complete poetical works. He also published *My Diaries*, in two parts (1919 and 1920).

BLYTHER, SAMUEL GEORGE (1868-). An American writer born at Geneseo, N. Y., where he was educated at the State Normal School. In the period 1893-99, he did editorial work for the *Buffalo Express*, the *Buffalo Courier and Enquirer*, and the *Cosmopolitan Magazine*. For the next seven years he was Washington correspondent for the *New York World*. He became a staff writer of the *Saturday Evening Post* (Philadelphia) in 1907. Among his publications are *We Have With us To-night* (1909); *Cutting It Out* (1912); *The Old Game* (1914); *The Fakers* (1915); *Hunkins* (1919) and *The Manikin Makers* (1921).

BOAS, ISMAR (ISIDOR) (1858-). A German physician and pioneer gastroenterologist, born at Exin in Posen, and educated at Halle. In 1886 he established at Berlin the first service for diseases of the stomach and intestines. In 1907 he became professor of gastroenterology in the University of Berlin, began to write on gastroenterological subjects in 1886 and republished his minor articles in 1906 under the title *Gesammelte Beiträge*. His book, *Diagnostik und Therapie der Magenkrankheiten*, published 1890-93, was often republished, and an American translation was made by A. Bernheim in 1907. His companion book, *Diagnostik und Therapie der Darmkrankheiten*, first published in 1898, was followed in 1901 by an American translation by Seymour Basch. Other well known works of his are *Die Lehre von der Okkulten Blutungen* (1914), *Diatetik der Magen- und Darmkrankheiten* (1920), and *Das Hemorrhoidalleiden* (1922). A monograph, *Habitual Constipation*, appeared in 1923 in a translation by Dr. T. L. Stedman.

BOCKENHEIMER, PHILIPP (1875-). German surgeon, born at Frankfurt-am-Main. In 1907 he was made professor of surgery in the University of Berlin. In 1904-06, in collaboration with Frohse, he published the *Atlas Typischer Chirurgischen Operationen* put into English by J. Howell Evans. The *Atlas Chirurgischer Krankheitsbilder* was issued by Bockenheimer alone in 1907 and translated into English by C. F. Marshall in 1908. Other works are the *Leitfaden der Frakturen-Behandlung* (1909); *Plastische Operationen* (1912), and *Die Neue Chirurgie*, (1921).

BODANKY, ARTUR (1877-). An Austrian conductor, born at Vienna. After graduation

from the Vienna Konservatorium he began his career in 1897 as violinist at the Hofoper and studied composition with A. von Zemlinsky. His first position as conductor was at the Stadttheater at Budweis, where he conducted only operettas. In 1901 he went to the Karltheater in Vienna, and two years later became Mahler's assistant at the Hofoper. He then conducted one season at the Theater an der Wien (1904) and at the Lortzing Theater in Berlin (1905). In 1906-09 he was conductor at the Deutsches Landestheater in Prague and also conducted symphony concerts. There his excellent work soon attracted attention, and in 1909 he was called to Mannheim as director and first conductor of the Grandducal Theater and conductor of the symphony and oratorio concerts. In 1914 he conducted the first performances of *Parsifal* at Covent Garden, where Gatti-Casazza was so impressed with his ability that he secured him as Hertz's successor at the Metropolitan Opera House in New York. This position he has filled with distinction since he began his American career with a masterly performance of *Götterdämmerung* (Nov. 17, 1915). Since 1916 he has also been conductor for the Society of the Friends of Music, and from 1919 to 1921 he led the concerts of the National Symphony Orchestra with conspicuous success. After the amalgamation of the latter organization with the Philharmonic Society (1921), he directed several Philharmonic concerts as guest-conductor. He is a conductor of the Mahler type, authoritative, electrifying, and forceful. He revised the scores of Weber's *Oberon* and *Freischütz*, setting all the spoken dialogues to music. Both works were brought out at the Metropolitan Opera House under his direction, the former on Dec. 28, 1918, the latter on Mar. 22, 1924. He has made an excellent German translation of the libretto of Mozart's *Don Giovanni* (1911).

BÖDEWADT, JACOB A. C. (1883-). German author born in Tondern (formerly Schleswig, now Denmark). He has specialized on political and literary subjects concerned with the Low Germans and is the author of *Johannes Dose, der Erfolgreiche* (1905), *Gustav Frenssen* (1906), *J. H. Fehrs* (1913), *Weltkrieg und Niederdeutschum* (1915), *Timm Kröger* (1916) and some one-act plays in Plattdeutsch dialect. He edited *Holstenart* (1914), *J. H. Fehrs's Gesammelte Dichtungen* (1913), *Klaus Groth's Briefe über Hoch- und Niederdeutsch* (1914), *Timm Kröger's Gedenkbuch* (1920) and *Zwischen zwei Meeren* (1921), and an anthology, *Dichter der Nordmark* (1921).

BODLEY, JOHN EDWARD COURTENAY (1853-). An English author (see VOL. III). He has written *An Introduction to the English Edition of the National History of France* (1916) and *The Romance of the Battle-line in France* (1918).

BOEHN, MAX VON (1860-). A German writer, born in Potsdam. He concerns himself with customs, fashions, and art. He is the author of *Spanische Reisebilder* (1905), *Menschen und Moden im Siebzehnten, Achtzehnten, und Neunzehnten Jahrhundert* (1906), biographies of Guidó Reni, Giorgione, Palma Vecchio, Lorenzo Bernini, and Karl Spitzweg (1907-09), *Biedermeier* (1911), *Miniaturen und Silhouetten* (1910), *Bekleidungskunst und Moderne* (1917), *Vom Kaiserreich zur Republik* (1917), *Modenspiegel* (1919), *Rokoko, Frankreich im*

Achtzehnten Jahrhundert (1919), *England im Achtzehnten Jahrhundert* (1920), and *Das Bühnenkostüm in Altertum, Mittelalter, und Neuzeit* (1921).

BOGARDUS, EMORY STEPHEN (1882-). An American sociologist, born near Belvidere, Ill., and educated at Northwestern and Chicago Universities. At the University of California he was assistant professor of sociology and economics (1911-13) and associate professor (1913-15), and in 1915 he became professor of sociology, and head of the department two years later. He became director of the Division of Social Work at the same institution in 1920 and in the same year editor of the *Journal of Applied Sociology*. He closely identified himself with social work in southern California and has published several works on the subject, among them *Introduction to Sociology* (1917); *Essentials of Americanization* (1919, 1920); and a *History of Social Thought*.

BOGART, ERNEST LUDLOW (1870-). An American economist and writer, born at Yonkers, N. Y., and educated at Princeton and the University of Halle. He held assistant professorships at educational institutions, including his alma mater, and in 1909 became professor of economics at the University of Illinois. He had charge of commodity studies for the research bureau of the War Trade Board in 1918 and in the next year was regional economist in the Foreign Trade Adviser's Office for the Department of State. Among his works are *Economic History of the United States* (1907), *Practical Economics* (1910), *Readings in the Economic History of the United States* (1915), *Centennial History of Illinois* (1918), *Direct and Indirect Cost of the Great World War* (1919), and *War Costs and Their Financing* (1921).

BOGERT, GEORGE GLEASON (1884-). An American lawyer and educator, born in Scotland, and was educated at Cornell University. After studying law he was admitted to the bar in 1908. For three years following, he practiced at Elmira, N. Y., and in 1911 was acting assistant professor of law at Cornell. He became assistant professor in 1912, and professor of law and dean of the College of Law in 1921. In 1920 he was commissioner on Uniform State Laws for New York. During the War he served in many important legal capacities. In 1919 he was appointed lieutenant-colonel and judge advocate in the General Corps. He was author of *The Sale of Goods in New York* (1912), *The Elements of the Law of Trusts* (1914), and *Hornbook on Trusts* (1921). He was for many years editor of the *Cornell Law Quarterly*.

BOGERT, LOTTA JEAN (1888-). An American chemist, born at Scotland, S. D., and was educated at Cornell and Yale Universities. She served as instructor at Simmons College during 1910-12 and at Mt. Holyoke during 1911-12. After further studies at Yale, she held teaching appointments there until 1919, when she became professor of food economy and nutrition at Kansas State Agricultural College. Her original investigations have included studies in human nutrition, blood volume, excretion of calcium and magnesium phosphate, and an important research concerning pellagra.

BOGERT, MARSTON (1868-). An American chemist (see VOL. III). During the War he was consultant of the Bureau of Mines and

held a number of important posts in the chemical and gas service of the United States government. He was honorably discharged on May 1, 1919.

BOHEMIA. See CZECHO-SLOVAKIA.

BOHM, MAX (1868-1923). An American artist, born at Cleveland, Ohio, in 1868, and educated at the Cleveland Art School. At 19 he went to Europe, where he was the pupil of Jean Paul Laurens, Lefebvre, and Benjamin Constant. Two years after his first visit to Europe he had a picture in the Paris Salon (1889). In 1898 he won prizes and the gold medal of the Paris Salon, and from that date his list of awards has been exceptionally long. Among them is a gold medal from the Panama-Pacific Exposition 1915. Bohm was elected an Associate of the National Academy in 1917 and a full member in 1920. His best known pictures are "The Family" and "Happy Hours" in the Luxembourg Museum. Bohm's work as a mural painter is well illustrated in the music room of Mrs. Mary Longyear's house in Brookline, Mass.

BOHR, NIELS HENDRICK DAVID (1885-). A Danish scientist, born at Copenhagen, and educated at the University of Copenhagen. When but little over 20, he decided to devote himself to the study of the atom. He became professor of mathematical physics at the University of Copenhagen in 1916 and director of its Institute of Theoretical Physics in 1920. In 1922 he won the Nobel Prize in Physics for his theory in respect to the electric structure of the atom (see CHEMISTRY: *Electronic Theory of the Atom*). In November of the following year he delivered a series of six lectures at Yale University, describing his theory as to how atoms are built up by the binding of one electron after another in an atomic nuclei. This theory has enabled other Danish scientists to discover a new element, hafnium. As a direct result of the Yale lectures, the Rockefeller International Education Board appropriated \$40,000 for the enlargement and extension of Dr. Bohr's laboratory at Copenhagen, in order that American students, as well as those of other countries, might work with him. In 1922 he published *Theory of Spectra and Atomic Constitution*. See PHYSICS.

BOILER, MERCURY. See QUICKSILVER.

BOILER CODE. See BOILERS.

BOILERS. With the pronounced tendency to construct steam power plants of increasing size and efficiency during the period from 1914-1924 considerable attention was paid to boilers, and as a result units of larger capacity were installed capable of working at constantly greater pressures, and also at higher conditions of superheat. Not only were units of greater size provided, but also with the increased costs of fuel and labor, it was found necessary to secure the most efficient installations possible, and to provide automatic stokers and similar devices which would ensure regular feeding of the furnaces. This increased economy was seen particularly at public utility power plants where in 1919 a ton of coal produced 625 kilowatt-hours of electricity. In 1923 it produced 835 kilowatt-hours. Of course the boiler installation was responsible for only a part of this efficiency.

Naturally the largest boiler installations were to be found at the great central stations of the electric light and power companies as under

modern conditions it was desirable to concentrate as much generating capacity as possible in large central stations favorably located for obtaining supplies of fuel and condensing water. For the larger central stations the tendency was to standardize the boiler installations with units of from 14,000 to 20,000 square feet of surface, and to provide for the more efficient burning of coal with the increased capacity and at the higher ratings.

A boiler with a record for large size was that built for the Cleveland Electric Illuminating Company with 30,600 square feet of surface. All of these large units, of course, were operated in connection with steam turbines which had become the approved practice in large central stations. Where powdered coal was employed the furnace volume was considerably increased, while with the larger furnace and higher temperatures more attention was being paid to the brick work and thicker, larger walls were employed. A large number of plants were being equipped for the use of oil fuel, and with this object a portion of the installation of the power station of the New York Central Railroad at Yonkers was changed, as well as that of the Singer Building at New York City.

At the Weymouth Station of the Edison Illuminating Company at Boston, and at the Calumet plant of the Commonwealth Edison Company of Chicago, in 1923, experiments were in progress with boilers designed for 1200 pounds pressure which were sufficiently large that they would operate on a commercial load. This type of boiler had an inclined heater and cross-drum with upper and lower decks of two inch tubes separated to accommodate a primary and secondary superheater, the latter being used to reheat the steam exhausted from an extra high pressure turbine before it was delivered into the main heater.

Experiments in Germany by Dr. Wilhelm Schmidt indicated that steam could be generated in boilers at pressures of 800 pounds and higher, to be used in an especially designed reciprocating engine with a gain of some 20 per cent in efficiency over the best turbine practice prevailing. In 1923 Schmidt had a high pressure boiler designed to generate 15,500 pounds at a gauge pressure of 850 pounds. In his reciprocating engine his exhaust had a pressure of 140 pounds passed to a heat accumulator supplying the steam hammers of the shop. The drums of the boilers were forged from a single piece of metal without welded or lifted joints, and were rendered more or less immune to internal stresses by being annealed after forging.

In Sweden about the same time, a boiler designed for 1500 pounds pressure was operating successfully at 900 pounds. Here steam was produced from centrifugally formed shells of water in rotary tubes, 12 inches in diameter. An interesting test plant was installed to test experimentally the Benson super-pressure boiler where steam was generated under critical conditions at 3200 pounds per square inch, and at a temperature of 706 degrees Fahrenheit. This would be utilized by throttling to 1500 pounds, and then after being superheated to 788 degrees Fahrenheit would be passed through a high pressure turbine exhausting 200 pounds pressure. This exhaust steam would then be reheated to 662 degrees Fahrenheit expanded in

a standard turbine and condensed to 29 inches vacuum.

Electric Boilers. An interesting development where coal or oil fuel was costly and water power cheap and abundant, as in the northern United States and Canada, was the use of electric boilers, where electricity was employed to produce steam at the plant of the Laurentide Company of Canada, where in 1923, largest boilers of this type were in service. Each unit had a capacity of absorbing 35,000 kilowatts of electricity and producing 100,000 pounds of steam per hour. Another electric steam boiler installed at Berlin, New Hampshire, employed three phase, 60-cycle current at 22,000 volts, and had a capacity of 18,000 kilowatts generating steam at 135 pounds pressure.

National Boiler Code. A committee of the American Society of Mechanical Engineers, appointed in 1911 to consider the subject of a comprehensive national code for the construction and installation of steam boilers, presented a preliminary draft of such a measure at the annual meeting of the society in 1914. This code was approved by the council of the Society in 1915, and straightway it was recommended as a basis for uniform state and municipal legislation. In preparing the draft the Massachusetts and Ohio state regulations were adopted as a basis, and all interested manufacturers, users and engineers were invited to make suggestions. The report and the accompanying code deal in detail with specifications for steam boilers and boiler tubes.

Uniform rules for safety valves, fire tube and water tube boilers, and steam and hot water heating boilers combined practice with theory so that the interests of all were protected and the safety of the public was insured. The American Uniform Boiler Law Society was formed to further the adoption of this code which secured the approval of a number of states and the enactment into statutes. In fact it received such general approval that the specification for boiler work on the Panama Canal provided that construction should be in accordance with the code with alternate bids on boilers not so constructed.

This code came into effect in 17 states, the District of Columbia, and the Panama Zone, and in 14 cities. The states adopting the code included the more important states such as New York, New Jersey, Pennsylvania, Ohio, California, Minnesota, Wisconsin, Michigan and Indiana.

Mercury Boiler. The period from 1914 to 1924 witnessed the culmination of some successful experiments by W. M. L. Emmet in the development of a mercury boiler and turbine, where mercury vapor took the place of steam. Inasmuch as mercury vapor has a vapor pressure lower than that of steam its expansive force under the action of heat would be correspondingly greater, and for the same expenditure of fuel more energy would be developed. It was this increased theoretical economy that interested engineers and between 1914 and 1924 Emmet was working on a practical solution of the problem. In 1923 after some 15 different experimental designs had been developed a working installation was built and placed in commercial service at the Dutch Point Station of the Hartford Electric Light Company. This equipment was designed to develop 1800 kilowatts from the mercury turbine gen-

erator, while in addition at least 28,000 pounds of water steam would be generated from the condensing mercury, though up to the end of 1923 the plant had not been operated to generate more than 15,000 kilowatts and 27,000 pounds of steam per hour. In this Hartford boiler which was oil fired, mercury was vaporized at 812 degrees Fahrenheit and 35 pounds pressure. The vapor then passed to a special turbine engine, where it was expanded to 29-inches vacuum and 414 degrees Fahrenheit. The temperature of condensation was used in a connected steam boiler to generate steam for an ordinary steam turbine, or for delivery to the main steam line. Theoretically there was a considerable margin of economy to be gained, and it was stated that for each pound of fuel consumed a mercury-steam plant would afford 52 per cent more electrical output than an ordinary efficient steam turbine installation operating at 100 pounds pressure, while if the mercury equipment were added to the same turbine installation for an increase in fuel of 18 per cent, there would be an additional output of some 80 per cent. The Hartford equipment held about 32,000 pounds of mercury, which was evaporated at a rate of 230,000 pounds of mercury per hour, or in other words all the mercury used in the system would be vaporized about eight times in an hour. It required about 8.5 pounds of mercury to make 1 pound of steam. It was believed that in future installations there could be a considerable reduction of the amount of mercury required by reducing the size of the mercury spaces in the mercury boiler and mercury economizer.

A new edition of *Steam Boiler Economy* by William Kent was published in 1915, discussing modern practice up to the time of its publication.

BOISSEVAIN, INEZ MILHOLLAND (1886-1916). An American suffrage leader and lawyer, born in New York. She was graduated from Vassar College in 1909, and being refused admittance to Oxford, Cambridge, and the Harvard Law School on account of her sex, she entered the New York University Law School. Inez Milholland, as she was known in suffrage circles even after her marriage to Eugene Boissevain, a Dutch electrical engineer, was prominent at college for her championship of radical social ideas. Part of her time was devoted to court probation work in Poughkeepsie. During a vacation she went to England, joined Mrs. Pankhurst's forces, and was arrested in a demonstration. In 1912 she aided the shirtwaist strikers in New York. Her methods were somewhat spectacular, but her enthusiasm and ability as a speaker and organizer made her invaluable to the Woman's party and the Congressional Union, with which she was identified. She died on Nov. 25, 1916, at Los Angeles, Cal., where she had been overtaken by illness during a speaking tour for the Woman's Party.

BOJER, JOHAN (1872-). A Norwegian novelist (see VOL. III). In 1916 he published *Sigurd Braa*, a drama. He is also the author of the following works, all of them translated into English: *The Great Hunger* (1916), *The Face of the World* (1917), *God and Woman* (1920), and *The Last of the Vikings* (1922). In 1923 he visited the United States. See SCANDINAVIAN LITERATURE, Norwegian.

BOX, EDWARD WILLIAM (1863-). An American editor and author (see VOL. III). In 1919 he resigned from the editorship of *The*

Ladies' Home Journal. He has written *Why I Believe in Poverty* (1915), *The Americanization of Edward Bok* (1920), *Two Persons: an Incident and an Epilogue* (1922), and *The Man from Maine* (1923). He was the originator of the American Peace Award, a prize of \$100,000 offered in 1923 for the most practicable plan for securing permanent world peace.

BOKHARA. Formerly a dependency of the Russian Empire with a crowned head, but since the Revolution, an independent republic. It is situated in Central Asia, has an area of 79,440 square miles, and an estimated population of 3,000,000. Bokhara, the capital, has a population of 75,000; Karshi, 25,000. Its civilization is typically Asiatic, the Occidental life pressing all about it having touched it not at all. The activities of the people still indicate the pastoral and handicrafts stages. Corn, fruit, silk, tobacco, cotton, and hemp are produced; goats, sheep, horses, and camels are bred. Green tea, to the amount of 1125 tons yearly, was imported from India, which, in turn, received almost all of Bokhara's raw silk.

In September, 1920, the reigning Amir, Mir Alim Khan, was deposed as the result of the return of the exiled Bokharan progressive intellectuals who received help in arms and troops from Soviet Russia. A Soviet government was set up and an attempt made to modernize the country by closing the theological schools and introducing secular education. But religious feeling was too deeply implanted and a revolt at once broke out, in which Enver Pasha took a prominent part, which dragged on through 1922, principally in the mountainous districts of Eastern Bokhara. A Soviet force defeated Enver's troops in July, 1922, and Enver was reported killed. It was ascertained that the rebels received material aid from Afghanistan. Like the other Russian Succession States, Bokhara was treated generously by Russia and its independence assured through military and political agreements. (A political treaty on Mar. 4, 1921, and an economic treaty on the same day, were signed.) See RUSSIA.

BOLIVIA. A South American republic, and the only country on the Western Hemisphere that has no direct access to the sea. It is situated west of Brazil and northeast of Chile. Its area is estimated at 560,000 square miles, certain territories still being in dispute; and its population is estimated at 2,820,000. La Paz, the largest city and the actual seat of government, has a population of 107,250. Other large and important cities are: Cochabamba, 30,818; Potosí, 29,795; and Sucre, 29,686.

Industry. Although mining was the principal factor of economic wealth in the country, agriculture continued to be the leading occupation of the people. Of the agricultural products, rubber was the most important. The rubber industry was centred in the departments of Beni and Santa Cruz. Rubber, in fact, was second in importance only to tin. The crude rubber production of Bolivia was only slightly inferior to that of Brazil, and many thousand acres of wild rubber trees were available. Bolivia was, however, the second tin-producing country in the world, ranking after the Malay Straits Settlements, and in 1923 it was reported that Bolivia had taken the lead in world production of this mineral. Besides this, Bolivia produced important quantities of wolfram, silver, lead, antimony, copper, and zinc. Con-

siderable prospecting and some drilling for oil was undertaken during the period, particularly in the eastern part of the country, but no large production was reported. In 1921, the last year for which statistics were available, mineral exports constituted over 81 per cent of the total export (54,604,131.51 bolivianos, out of a total of 66,919,445 bolivianos). Exportation of important minerals for 1921 was as follows: tin, 31,811,145 kilos for 42,909,303 bolivianos; silver, 16,719,027 kilos for 10,473,265; copper, 33,330,891 kilos for 5,970,680. (One kilo equals 2.2 pounds, and one boliviano equalled \$0.23 average for 1921.)

Commerce. The total commerce of Bolivia for the year 1921 was approximately 30 per cent greater than the total figures for 1914. Practically the entire increase was due to larger importations, however, which increased from 39,761,222 bolivianos in 1914 to 70,853,152 bolivianos in 1921. The year 1918 marked the high level of exports, the year's total trade figures passing the 217,000,000 bolivianos mark. The 1920 total trade, however, was the largest of any year in the period 1914-21 inclusive. Following are the trade figures for the more important years of this period (in bolivianos):

Year	Importations	Exportations	Total
1914	39,761,222	65,801,146	105,562,368
1916	31,098,215	101,484,800	132,583,015
1918	34,999,886	182,612,851	217,612,737
1920	65,339,505	156,018,745	221,358,250
1921	70,853,152	66,919,445	137,772,597

The chief articles of import were manufactured articles, foodstuffs and beverages, and textiles. The United States was the chief country to gain by Germany's disappearance from the competitive market. However, Great Britain also made rapid strides in obtaining the trade of Bolivia. In 1921, the United States supplied 28.40 per cent of Bolivia's imports, and took slightly over 37 per cent of her exports; the United Kingdom supplied 23.79 per cent and took 53 per cent. In 1919, the United States took 41 per cent of Bolivia's exports, and Great Britain 49 per cent.

Communications. In 1922, total length of railways in operation was 1100 miles including a new line, opened in July, 1917, from Oruro to Cochabamba. In addition 230 miles were under construction. A line was also projected to tap the oil lands in the east, but by 1924 no construction work was under way. In 1921, a line from Atocha to Villazón was commenced, to be completed early in 1925. The importance of this road lay in the fact that it would connect with the Argentine frontier and thus form another means of transcontinental transportation, via La Paz. Work was proceeding on this road in 1924, and considerable sums were being spent to push it to completion.

Finance. The cost of government steadily mounted, and large deficits were returned each year. The 1924 budget called for revenues of 23,038,533 bolivianos, and expenditures of 38,623,832 bolivianos, a deficit of 14,685,299 bolivianos. In 1912, revenues and expenses were almost equal at about 17,300,000 bolivianos. In 1922, the deficit was over 20,000,000 bolivianos. Annual charges for the foreign debt were estimated at 12,500,000 bolivianos; 2,500,000 for internal debt, and 5,000,000 to customs house warrants. On May 28, 1923, the

foreign debt of Bolivia was reported as 91,365,100 bolivianos; internal debt, 13,852,555 bolivianos, and floating debt 6,345,354 bolivianos. This would make a total in dollars of \$36,855,966, or approximately \$13 per capita. A refunding loan of \$24,000,000 was authorized in the United States in 1922, and a loan of 12,000,000 bolivianos was secured in 1923, to be applied to the deficit.

Education. An increasing interest was evinced in education in Bolivia. It was both free and obligatory. There were 504 national primary schools, about 650 municipal schools, and about 108 private schools, making a total of 1265 schools for lower education. Also, 16 higher-grade schools were established, besides the National School of Commerce at La Paz, and the University at Sucre, which bestowed degrees in law, medicine and theology. There were several specialized technical schools. The best secondary institutions were those schools endowed by American Methodists at La Paz and Cochabamba.

History. General Ismael Montes was once more elected president of the republic for the term 1913-17, to succeed President Villazón. During his administration the effects of the War were felt in the decline of exports, though purchases by the United States lightened the stringency considerably. As a result of Germany's submarine campaign, Bolivia broke off diplomatic relations in April, 1917, and thus became one of the signatories of the Peace Treaty in 1919 as well as an original member of the League of Nations. For the term 1917-21, Sr. José Guerra was elected, but he was compelled to resign and leave the country in 1920, as the result of a revolution caused by his friendliness toward Chile. In January, 1921, Sr. Bautista Saavedra, leader of the revolution, was elected president by the National Assembly; he was recognized by the United States in February.

Bolivia's boundary lines with her neighbors were amicably settled, the Bolivian-Peruvian frontier being fixed in 1915, the Bolivian-Brazilian in 1920, and the Bolivian-Argentine in 1913. The Bolivian-Paraguayan frontier, provided for by treaty in 1913, had not yet been delimited in 1924 because of the disputed Gran Chaco region. Bolivia, because of her desire for an outlet to the sea, was precipitated into the Tacna-Arica dispute (q.v.), and in spite of the advances made by Chile, aligned herself with Peru. Bolivia's claim for a corridor through Tacna was placed before the Peace Conference with no results. In 1920, in a protest to Chile on the matter of the treaty of 1904 which perpetually barred Bolivia from the Pacific, the Bolivian government called for a reopening of the question on the grounds of its international importance. Bolivia placed her claims before the United States government, which had been chosen mediator of the whole question, in 1923.

BOLL WEEVIL. See COTTON; AGRICULTURE.

BOLLWORM, PINK. See ENTOMOLOGY, ECONOMIC.

BOLO, RAUE (PASCHA) (?-1918). A French adventurer. By 1914, as a result of his shady financial operations, Bolo Pasha (a title gained from the Egyptian Khedive) was known in the demimonde of two continents. In 1917 he was arrested for treason; it was charged that he was in the hire of German agents. In particular,

he was accused of having traveled in the United States, in 1915-16, in the interest of Count von Bernstorff, German ambassador at Washington. He was tried in February, 1918, and shot at Vincennes, Apr. 17, 1918. An attempt was made two years later to link Caillaux's name with Bolo's.

BÖLSCHÉ, WILHELM (1861-). A German writer on science, born in Cologne. He studied philology but specialized in nature and literature and has written on scientific subjects in a peculiarly fascinating style. He is the author of *Naturwissenschaftliche Grundlagen der Poesie* (1887), *Entwicklungsgeschichte der Natur* (1893-96), *Darwin* (1898), *Liebesleben in der Natur* (1898-1902), *Vom Bazillus zum Affenschen* (1899), *Häckel* (1900), *Goethe* (1900), *Entwicklungslehre* (1900), *Hinter der Weltstadt* (1901), *Sonnen und Sonnenstübchen* (1902), *Die Eröberung der Menschheit* (1903), *Aus der Schnee-grube* (1904), *Die Abstammung der Menschheit* (1904), *Weltblick* (1904), *Naturgeheimniss* (1905), *Stammbaum der Tiere* (1905), *Sieg des Lebens* (1905), *Auf dem Menschenstern* (1909), *Stunden im All* (1909), *Was Ist die Natur* (1907), *Menschen der Vorzeit* (1909), *Komet und Weltuntergang* (1910), *Festland und Meere im Wechsel der Zeit* (1913), *Stirb und Werde* (1913), *Menschen der Zukunft* (1913), *Tierwanderung in der Urwelt* (1914), *Neue Welten* (1915), *Stammbaum der Menschheit* (1916), *Schutz und Trutzbündnisse in der Natur* (1917), *Eiszeit und Klimawechsel* (1919), etc. Bölsché has also written some fiction and has edited the works of Goethe, Hauff, Novalis, Uhland, Heine, and others.

BOLSHEVISM. Russian Bolshevism is merely an application of the well-known doctrine of Communism familiar to Europe since the publication of the *Communist Manifesto* in 1847. Its system includes these main precepts: the capture of the means of production and distribution by the proletariat, by force if necessary, and the continued dictatorship of society by this proletariat, even though it should constitute a minority. The word Bolshevism is derived from Bolshevik (Russian *Bolshevik*, plural *Bolsheviks*) the name applied to the members of the majority (Russian *bolshinstvo*) at the second Congress of the Russian Socialist party in 1903, as opposed to the *Mensheviks* or minority. This antagonism between the two wings of Russian socialism, centring mainly in the rejection, by the Bolsheviks, of democratic control, was continued up to the Russian Revolution (1917), and after. It served largely, too, to divide European and American socialism into two camps, the first of which was ready to accept the Bolshevik doctrine of the dictatorship of the proletariat, and the second to repudiate it. Of the latter group may be mentioned the Englishman MacDonald, the German Kautsky, the Americans Berger and Hillquit. In the United States, after 1917, the term Bolshevism was applied loosely to almost all movements that aimed at radical change in the existing system of private ownership, whether the means advocated were peaceful or violent. For the history of Russian Bolshevism, see RUSSIA. See also COMMUNISM for other developments in theory and practice.

BOLTON, GUY REGINALD (?-). A dramatic author, born in England. His first play, *The Drone*, written in collaboration with Douglas J. Wood, was produced in New York in

1911. After 1911 he wrote many plays, mostly in collaboration. Those on which he worked with P. G. Wodehouse included *Have a Heart* (1917); *Leave It to Jane* (1917); *Miss 1917* (1917); *Oh! Boy* (1917); *The Riviera Girl* (1917); *Ringtime* (1917); *Ask Dad* (1918); *The Girl Behind the Gun* (1918); *See You Later* (1918); and *The Rose of China* (1919). With George Middleton he wrote *Polly with a Past* (1917); *Adam and Eva* (1919); *The Light of the World* (1920), and *The Cave Girl* (1920). In association with Wodehouse and the composer, Jerome Kern, he produced musical comedies of a novel elegance and refinement which were presented at the Princess Theatre (New York).

BOLTON, THADDEUS LINCOLN (1865-). An American psychologist, born at Sonora, Ill., and educated at Michigan and Clark Universities. After teaching in secondary schools, he became successively professor at the University of Washington (1897-98), University of Nebraska (1899-1910), and University of Montana (1912-17). In 1917 he became professor of psychology at Temple University (Philadelphia), and in 1919, lecturer at the Philadelphia School of Occupational Therapy. His experimental researches include papers on rhythm, growth of memory, fatigue, motor power and intelligence, efficacy of consciousness, and inheritance of special traits.

BOLTWOOD, BERTRAM BORDEN (1870-). An American chemist, born at Amherst, Mass., and educated at Yale University and abroad, chiefly in Munich. In 1894 he became an assistant in the chemical laboratory of the Sheffield Scientific School, and two years later an instructor in physical chemistry at Yale. During 1900-06 he devoted his attention to research, chiefly in radium and radio-activity. He returned to Yale in 1906 and was made assistant professor of physics but spent the years 1909-10 at the University of Manchester, where he held a John Harding fellowship. In 1910 he resumed his teaching at Yale as professor of radio-chemistry and in 1918 became director of the Kent Chemical Laboratory. His published papers have been devoted for the most part to his specialty, radium, and its activities. On this subject he is perhaps the foremost authority in the United States.

BOMB, AIRCRAFT. See BOMBING OF VESSELS, BY AIRCRAFT.

BOMB, DEPTH. A portable submarine mine carried by vessels in the Allies' anti-submarine service during the War, and by some others', for use against submarines which were submerged. The bombs were of two types: stick bombs for projection by bomb-throwers, and plain cylindrical bombs for dropping or ejection from chutes. The bomb case was cylindrical, of sheet steel, and had a ring in each end for handling and securing. In stick bombs, the stick was secured in the cylinder like the handle of a hammer. In using either a single barrel or a Y gun bomb-thrower, the stick of the bomb was inserted in the muzzle. The firing mechanism of the bomb could be set to cause explosion at any desired depth, and the safety key was connected with the depth control. The charge was from 50 to 300 pounds of light explosive depending on the size of the bomb. When a destroyer or patrol boat passed over the supposed position of a submarine, bombs were slid overboard from the chutes astern or projected

from the bomb-throwers, which could throw them about 40 yards. The depth bomb was the most important weapon used against submarines in the War, and according to British reports, it destroyed 34 of them. The explosion of a 300-pound depth bomb was always fatal at distances of 25 feet or less and even at more than 30 feet if the explosion took place below the plane of the submarine and not too near the surface. At moderate distances beyond the fatal range, the violence of the explosion caused serious leaks and often put out of action much of the operating mechanism thereby forcing the boat to the surface or to the bottom, while the effect on the nerves of the crew was severe. See BOMBING OF VESSELS; MINE, SUBMARINE; NAVIES OF THE WORLD; SUBMARINES AND THEIR WAR ACTIVITIES.

BOMBING OF VESSELS, BY AIRCRAFT. The use of bombs by aircraft in the attack of vessels was, during the War, chiefly directed against submarines. The bombs were small and of the type employed against troops, fortifications, arms factories, railways, and the like, in the attack of which numbers were usually more important than great size. Although large bombing planes and large bombs were developed during hostilities, their use was exceptional. Since the close of the War, and particularly since 1920, the large bombing plane designed to attack naval vessels of the best protected and most powerful type has received much attention and is being steadily improved. The first extensive tests in the United States were made in July, 1921. The ex-German battleship *Ostfriesland*, the cruiser *Frankfurt*, the destroyer *G-102*, and the submarine *U-117* were the vessels attacked. Both army and navy planes joined in the operations. The vessels withstood attack remarkably well. Bombs of 600 pounds and less which landed on the deck of the *Ostfriesland* produced local damage only. She was finally sunk by 2000-pound bombs which exploded under water close alongside.

Still more interesting tests were carried out in the summer of 1923. The old battleships *New Jersey* and *Virginia* were the targets. The ships were anchored. The weather was mild and so clear that approaching planes were visible 15 miles away. In fact, all conditions were abnormally in favor of the attacking force. The first attack was made on the *New Jersey* from a height of 11,000 feet by five Martin bombers, each carrying four 600-pound bombs and one 100-pound sighting bomb. The planes moved in column, half a mile apart, in a large circle, and each dropped one bomb every time it passed over the target. Three hits were made, but the bombs exploded above decks and damaged only upper deck plating and fittings. The next attack was made by seven bombers at a height of 6000 feet, with each plane carrying one 2000-pound bomb. No hits were made, but one bomb exploded close alongside. The ship took a slight list, and it was thought she would sink; consequently, the next attack was made on the *Virginia* by seven bombers at 3000 feet, each carrying two 1100-pound bombs. One bomb struck the ship, and breaking through one or more decks, exploded below with enormous effect; the masts, smokepipes, upper deck, and upper works were demolished. Thirty minutes later, the vessel turned over and sank. Four hours after the attack with 2000-pound bombs, as the *New Jersey* was still afloat with only a

slight list and no serious injury to masts, turrets, guns, or anything except light plating which was perforated and torn by the explosions and fragments of the 600-pound bombs, she was assailed by seven bombers, each carrying two 1100-pound bombs and flying at 3000 feet. No hits were made, though apparently one bomb fell near enough to increase the ship's list slightly. Two more bombers then appeared and dropped three 1100-pound bombs; one of these made a direct hit, and one fell close alongside. The bomb which hit broke its way through one or more decks and burst below, opening up the side or bottom plating so that the ship turned over and sank in five minutes.

If, in these tests, the vessels had been under-way and steering zigzag courses at varying speeds, no hits would have been made except by accident. Had the upper decks been lightly armored, no explosions would have taken place below decks and the resulting injuries would have been no greater and perhaps less than the hit of a single 16-inch shell. Had the vessels been fitted with cellular anti-torpedo belts, the bombs which fell close alongside would have caused no serious damage except a slight reduction in speed. If in addition the vessels had been equipped with anti-aircraft batteries, smoke shells, and smoke-producing apparatus, and if they had been accompanied by an aircraft carrier with a squadron of combat planes designed for attacking bombers, then the attacking force would have been in much greater danger than the ships. In the present state of bomber development the vessels which have most to fear from them are light cruisers and auxiliary vessels, especially fuel and supply ships and transports. These ought not to approach within 200 miles of a shore bomber station without adequate protection by aircraft, by swift patrol vessels carrying numerous anti-aircraft guns and other defensive apparatus, or by both. See BOMB, DEPTH; GUNNERY, NAVAL; ORDNANCE.

BONE, MUIRHEAD (1876-). A British painter and etcher, born at Glasgow, and educated at the Glasgow Evening School of Art. In 1897 and the following years he produced excellent work in black and white for the *Scots Pictorial*. He established himself in London in 1891 and there quickly made a reputation by his etchings. He assisted prominently in founding the Society of Twelve and he was elected a member of the New English Art Club. The National Art Collections Fund in 1906 bought his etching, "The Great Gantry, Charing Cross," and presented it to the British Museum. He was appointed official artist on the western front and with the fleet by the British War Office from 1916 to 1918, and some of his drawings were subsequently reproduced in volume form. They include every phase of activity on the western front, military operations, hospital scenes, and camp and trench life. Chalk line and wash are successfully used to give rhythm, form, and atmospheric effect; in others of these sketches, charcoal is the medium. Mr. Bone has also done numerous individual portraits.

BONE, SCOTT CARDELL (1860-). An American editor and governor born in Shelly County, Ind., and educated in the public schools. He wrote for the Indianapolis newspapers and later identified himself with the *Washington (D. C.) Post* for 17 years, first as news editor and later as managing editor. He owned and edited the *Washington Herald* (1906-11), and

in 1911-18 he was editor-in-chief of the *Seattle Post-Intelligencer*. In 1914-15, he was chairman of the Alaska Bureau of the Seattle Chamber of Commerce, and in 1921 was appointed Governor of Alaska, having held in the interim several positions of a political nature.

BONNER, GERALDINE (1870-). An American author (see VOL. III). Her later work includes *The Girl at Central* (1914), *The Black Eagle Mystery* (1916), *Treasure and Trouble Therewith* (1917), and *Miss Maitland, Private Secretary* (1919).

BONNET, JOSEPH (1884-). A famous French organist, born at Bordeaux. Under his father's instruction his progress was so rapid that at the age of 14 he was appointed regular organist at St. Nicolas and, a little later, at St. Michel, where his recitals attracted attention. He then entered the Paris Conservatoire, where he studied with Guilman and carried off the first prize. In 1906 he won in competition the coveted post of St. Eustache, Paris; all competitors were first-prize winners of the Conservatoire. This position he has filled since then but has been allowed frequent leave of absence for extended concert tours all over Europe. In 1917 he made his first tour of the United States and met with such success that he has repeated his visit annually. He aroused special enthusiasm with his series of five historical recitals, as well as with his extraordinary improvisations. In 1922 he organized in Rochester, N. Y., after the model of that of the Paris Conservatoire, a fully equipped organ department at the Eastman Conservatory. His original compositions for the organ are held in high esteem.

BONNEY, THOMAS GEORGE (1833-1923). An English geologist (see VOL. III). Among his later publications are *The Present Relations of Science and Religion* (1913); the text to *Anderson's Volcanic Studies* (1917), and *Memoirs of a Long Life* (1922).

BONSAL, STEPHEN (1865-). An American newspaper correspondent (see VOL. III). In 1914 he was Commissioner of Public Utilities in the Philippine Islands. He was sent on a special mission to Mexico in 1915 and was also with Hindenburg's army on the eastern front in the same year. In 1916 he was advisor at the American-Mexican Conference. In the following year he was commissioned major in the national army and was on duty in the War College in Washington. He went to France with the American Expeditionary Force in 1918 and was American representative at the Congress of Oppressed Nationalities. He was appointed lieutenant-colonel of infantry, attached to the American mission to the Peace Conference

after the Armistice, and in 1919 was American member of the inter-Allied mission to Austria-Hungary under General Smuts and of the special mission to Germany and Bohemia.

BOOTH, EVANGELINE CORY (?-). A commander of the Salvation Army and daughter of William Booth, founder of the Salvation Army. She was born in England and educated in London, later commanding field operations of the Salvation Army in Great Britain, Canada, and the Klondike, and in 1904, in the United States, with approximately 3000 officers and cadets and over 1200 corps and institutions under her. During the War she did noteworthy work, for which the United States government awarded her the Distinguished Service Medal (1919).

BOOTS AND SHOES. In the production of boots and shoes the United States in 1924 ranked first, followed by Great Britain and Germany, and in addition to its own domestic consumption it had a considerable export business. Naturally the manufacture of boots and shoes was seriously interfered with by the War and subsequent readjustment period as it affected the production, price of leather and the normal distribution. In 1921, according to the Bureau of the Census, boot and shoe manufacturing ranked fourteenth among the industries of the United States, with a product valued at \$867,476,000 though in the previous census of 1919 its value was \$1,155,041,000.

According to the census of manufactures of 1919 New England was the centre of the boot and shoe industry and produced more than 49 per cent of the total value of the country's output. Of the different states Massachusetts ranked first with a production of 116,944,018 pairs produced by 492 establishments, followed by New York with 62,246,321 pairs produced in 342 establishments; New Hampshire with 22,700,694 pairs produced in 52 establishments; Pennsylvania with 23,617,362 pairs from 123 establishments; Missouri with 26,362,367 pairs from 54 establishments, and Ohio 17,870,140 pairs from 60 establishments. The five leading cities in the production of boots in the United States are Brockton, Massachusetts, New York City, Lynn, Massachusetts, St. Louis, Missouri, and Haverhill, Massachusetts.

The condition of the industry in the interval from 1914 is shown in the accompanying tabulation from statistics published by the Bureau of the Census. Whereas in 1922 the total production of boots and shoes, exclusive of rubber footwear, was 323,876,458 pairs, or an increase of almost 11 per cent from 1914, the production in 1923 was 351,114,273 pairs, marking a record for the industry.

PRODUCTION OF BOOTS AND SHOES IN THE UNITED STATES

Kinds	1914	1919	1921	1922
	Pairs	Pairs	Pairs	Pairs
Total boots and shoes	292,666,468	331,224,628	286,771,101	323,876,458
High and low cut (leather) (total)	265,642,260	291,540,408	241,838,226	280,366,192
Men's	98,031,144	95,017,356	69,457,535	89,984,065
Boys' and youths'	22,895,719	26,503,432	18,462,032	21,631,905
Women's	80,916,239	104,812,505	101,473,985	105,367,667
Misses' and children's	48,322,395	48,538,203	35,065,527	39,443,554
Infants'	15,476,763	16,668,912	17,379,147	23,939,001
Athletic and sporting (leather)	(*)	585,710	5,546,898	8,448,308
Canvas and other textiles	(*)	11,056,363	8,601,582	6,739,339
All other (slippers and miscellaneous footwear)	27,024,208	28,042,147	30,784,395	28,322,619

* Not reported separately.

The principal types of shoes manufactured in the United States may be divided as follows: Goodyear welted, McKay sewn, screw or metallic fastened, stitched down and turned. In 1919, 38 per cent of the shoes manufactured were of the Goodyear type, 36 per cent were McKay sewn, 19 per cent were turned and 4 per cent were standard screw or metallic fastened. In the United States the prices for shoes increased from 1913, during the War reaching a peak in 1920, as indicated by the accompanying table.

AVERAGE WHOLESALE PRICE PER PAIR OF LEATHER BOOTS AND SHOES IN THE UNITED STATES

From data published by the United States Department of Labor

Year	Men's		Women's		
	Black calf Good-year welt blucher	Black calf Good-year welt bal	Black vici kid Good-year welt	Black kid lace Good-year welt	Patent-leather pump, McKay sewn
1913	\$3.11	\$3.16	\$2.86	\$3.00	\$1.37
1914	3.17	3.28	2.98	3.00	1.45
1915	3.25	3.35	3.10	3.00	1.50
1916	3.71	3.88	3.50	3.44	1.90
1917	4.75	5.14	5.06	4.49	2.75
1918	5.62	5.31	5.44	4.37	2.93
1919	7.60	7.10	7.24	6.59	4.07
1920	8.95	7.50	8.33	7.66	4.86
1921	7.00	4.80	6.39	5.06	4.00
1922	6.50	4.61	5.83	4.33	3.60

From that time there was a recession tending towards more suitable prices but not reaching those prevailing before the War. In the American shoe industry there was a tendency towards consolidation and larger factories, so that

LEATHER BOOT, SHOE, AND SLIPPER EXPORT TRADE OF THE UNITED STATES

Division of Statistics, Bureau of Foreign and Domestic Commerce. Figures for 1913 are for fiscal year; all others are for calendar years.

Year	Total	Men's shoes	Women's shoes	Children's shoes	Slippers
	Pairs	Pairs	Pairs	Pairs	Pairs
1913	10,650,160	5,260,531	3,217,544	1,826,719	345,366
1919	21,682,751	11,928,156	5,891,753	3,534,670	328,172
1920	17,069,254	7,711,310	5,064,472	4,065,810	227,662
1921	9,019,263	5,173,776	1,767,880	2,016,041	61,566
1922	5,532,938	1,878,259	2,280,065	1,246,338	128,271

the number of establishments decreased during the decade.

Also, the industry suffered from the variations due to fashion, some of which were of long life and led to considerable margin of profit by the retailer on sales actually made, while others were but temporary in their vogue. There was a tendency to decrease the number of styles and to standardize the production, but it was felt that fashion played an important part in the industry as at times there would be a vogue of low shoes in preference to those higher cut, and various temporary fashions more or less short lived.

In addition the shoe industry suffered due to the increased use of motor cars and taxicabs, and it was estimated in 1923 that the average life of a pair of shoes was 25 per cent more than a few years previously before the motor car was so universally used in the rural districts, and in urban communities such means of transportation as motor busses and taxicabs had developed.

In 1923 the exports of shoes from the United States were as follows:

EXPORTS OF SHOES IN 1923

Men's and Boys'	3,187,623 pairs, valued at \$10,029,918
Women's	2,292,961 " " " 5,302,641
Children's	1,861,413 " " " 2,183,780
Slippers	239,042 " " " 295,390

In 1923 there were imported into the United States 398,929 pairs of all leather boots and shoes, valued at \$1,246,176; 653,964 pairs of slippers valued at \$280,015, and 884,862 pairs valued at \$357,810. In 1921 the exports included 2,600,000 pairs of men's shoes sent to Russia.

The accompanying table will show the extent of the boot and shoe export trade of the United States which developed extraordinarily in the years immediately following the War when the European markets were larger consumers of American shoes. Ordinarily Cuba, Mexico, Jamaica, Panama, the Dominican Republic, Newfoundland and Labrador and the United Kingdom and Canada are the most important export markets for the United States, though Australia, British South Africa and some South American, Asiatic and European countries take a quota. See also LEATHER.

BORAH, WILLIAM EDGAR (1865-). An American politician (see VOL. III). He was again elected to the Senate in 1919. During the War he took an active part in all matters relating to war measures, while opposing the League to Enforce Peace, and violently advising against the policy of President Wilson, especially in regard to the League of Nations. As delegate-at-large from Illinois, he spoke successfully against the League at the Republican national convention of 1920. He also opposed

the Four-Power Treaty, believing that the United States should stand aloof.

BORCHARD, EDWIN MONTEFIORE (1884-). An American lawyer and educator, born in New York City. He attended the College of the City of New York and afterward studied at New York Law School and the Columbia University Law School. In 1910 he was expert on international law of the American agency of the North Atlantic coast fisheries arbitration at The Hague. In the same year he traveled through Europe for the Library of Congress and investigated and collected literature on continental law. He was law librarian of Congress from 1911-16. In 1915 he accumulated commercial law material for the Department of Commerce. In 1917 he was appointed professor of law at the Yale University Law School. His published writings include *Guide to the Law and Legal Literature of Germany* (1911); *The Diplomatic Protection of Citizens Abroad* (1916); *The Declaratory Judgment* (1918), and *Latin-American Commercial Law*, with T. E. Obregon (1920).

BORDEAUX, HENRI (1870-). A French

novelist and critic, born at Thonon, Haute-Savoie, and educated at the Collège de Thonon, the Collège Stanislas (Paris), the Sorbonne, and the Faculty of Law (Paris). In 1889 he was admitted to the bar at Thonon and spent two years in his father's law office. He then went to Paris as counsel for the Paris-Lyons-Méditerranée Railroad. His father died in 1896, and he was obliged to return to Thonon and go on with his father's practice. After five years, however, he was able to go back to Paris and devote the rest of his life to letters. In the War he began his service on Aug. 1, 1914, as captain of infantry, was then transferred to the General Staff of the 1st Army in Lorraine, then to the 2d Army at Verdun, and finally to General Headquarters. He was sent on a mission to Verdun in 1917, and received two citations and the rank of Chief of Battalion for his work. In 1920 he was received in the French Academy, taking the place of Jules Lemaitre. His first book, *La Course à la Vie* (1893), was a volume of poems, but he soon turned to the novel and critical essay. His writings show him to be a moralist and psychologist rather than a stylist. Yet he does not write *romans à thèse* or belong to the naturalist school. He is a realist, but his realism consists in the depicting of the cultured classes. He pleads the cause of society against the individual and upholds tradition, especially that of the family. Some of his more important works are *Jeanne Michelin*, his first attempt at a novel (1895); *Le Pays Natal* (1900); *La Voie sans Retour* (1901); *La Peur de Vivre*, crowned by the French Academy (1902); *L'Amour en Fuite* (1903); *La Petite Mademoiselle* (1905); *Les Yeux Qui s'Ouvrent* (1908); *La Croisée des Chemins* (1909); *La Robe de Laine*, considered one of his best novels (1910); *La Neige sur les Pas* (1911); *La Maison* (1913); and *La Maison Morte* (1922). Among his works of a critical nature are *Vies Intimes* (1904); *Portraits de Femmes et d'Enfants* (1909); *La Vie au Théâtre*, 4 vols. (1910-21); *Quelques Portraits d'Hommes* (1914); *Jules Lemaitre* (1920), and *La Jeunesse d'Octave Feuillet, 1821-90* (1922). Inspired by the War were *La Jeunesse Nouvelle* (1915); *Trois Tombes* (1916); *Les Derniers Jours du Fort de Vaux*; *Les Captifs Délivrés*; *La Chanson de Vaux-Douammont* (1917); *La Vie Héroïque de Guynémer* (1918); *Sur le Rhin* (1919); *Le Plessis-de-Roye* (1920), and *La Resurrection de la Chair* (1920).

BORDEN, RT. HON. SIR ROBERT LAIRD (1854-). A Canadian statesman (see VOL. III). In 1914 he was created Grand Commander of the Order of St. Michael and St. George, in 1915 he received the Grand Cross of the Legion of Honor, and in 1916 the Grand Cordon of the Order of Leopold. He was honored with the freedom of the city of various British municipalities. In 1917 he formed a Union Government and was appointed Secretary of State for External Affairs. He was a member of the Imperial War Cabinet, the Imperial War Conference held in London, 1917-18, and was present at the Paris Peace Conference in 1919 as a representative of Canada. It was he who presented the Peace Treaty to the Canadian Parliament in the same year. In July, 1920, he tendered his resignation as Premier. In the following year he was elected President of the League of Nations Society of Canada and was

Marfleet Foundation Lecturer at the University of Toronto. In 1921-22, he represented Canada at the Washington Conference and signed many treaties in this capacity, among them, the treaty on limiting naval armaments, the four-power treaty relating to insular possessions and dominions in the Pacific Ocean, the treaty relating to the use of submarines and noxious gases in warfare, and treaties in regard to China.

BORDET, JULES (1870-). A Belgian pathologist and bacteriologist, born at Soignes. He graduated from the University of Brussels in 1892 and later became professor of bacteriology, parasitology, and epidemiology and president of the medical faculty there. In 1901 he was appointed head of the Brussels Pasteur Institute. He published two works on immunity, *Études sur l'Immunité* (1909) and *Traité de l'Immunité dans les Maladies Infectieuses* (1920). In 1919 he was awarded the Nobel Prize in medicine. Bordet has much to his credit, for in 1900-01 he discovered complement-fixation, with Gengou; bacterial hemolysis in 1898, and the bacillus of whooping-cough in 1906. His theory of immunization is far simpler than that of Ehrlich, and many regard him as the leading figure in serodiagnosis and immunization.

BORGLUM, GUTZON (JOHN GUTZON DE LA MONTHE) (1867-). An American sculptor (see VOL. III). His best known achievement was the planning and execution of the Stone Mountain (Ga.) memorial to the Confederacy. This is a gigantic bas-relief depicting in heroic proportions a group of Southern leaders (Lee, Davis, Stonewall Jackson, Johnston, Forrest and Stuart), in the midst of marching troops, cut out of the mountain, and being a quarter of a mile in length. The distance from the knee of Lee's horse to the General's hat is 120 feet. The site of the memorial was dedicated in May, 1919, but the work was not begun till 1922. General Lee's head was unveiled Jan. 18, 1924. A part of the plan is a memorial hall, cut into the mountain below the sculpture, 320 feet long, 40 feet high, and 78 feet deep. An important service to national art was the founding of the American School of Sculpture for practical instruction.

BORGLUM, SOLON (1868-1922). An American sculptor (see VOL. III). He made the equestrian statue, "The Pioneer," at the San Francisco Exposition (1915) and executed colossal portrait busts of generals of the Civil War (for the Vicksburg, Miss., National Park). He received the Croix de Guerre for services with the French army in the War and was active in educational work in the American Expeditionary Force in France. His most recent achievements include a group of 42 heroic figures in bronze, "Wars of America," for Newark, N. J.; a colossal bronze equestrian statue of General Sheridan for Chicago, and a monument to Governor Aycock, Raleigh, N. C.

BORI, LUCREZIA (1888-). A Spanish lyric soprano, born at Valencia. After six years of study under Vidal, in Paris, she completed her education in Milan and Rome. Her very successful début in Rome as Carmen (Oct. 31, 1908) led to engagements in Paris, Milan, Naples, and Buenos Aires. Her American début took place at the Metropolitan Opera House as the heroine in Puccini's *Manon Lescaut* (Nov. 11, 1912); she immediately established herself in favor. Her brilliant career really be-

gan after her overwhelming success as Fiora in the American première of Montemezzi's *Amore dei Tre Rè* (Jan. 2, 1914). In the next year she was stricken with an affection of the throat which necessitated a serious operation and for some time it was feared that her career had been ended. Fortunately she not only recovered entirely, but after her illness her voice even gained in volume. She returned to the Metropolitan Opera House in 1921, where she continued as a regular member.

BORING, EDWIN GARRIGUES (1886-). An American experimental psychologist, born in Philadelphia. Originally destined for an engineering career, he took the degree of M.E. at Cornell University in 1908. Shortly afterward he became interested in the study of psychology. He was a member for more than 10 years of Professor Titchener's laboratory in which he served first as assistant and then as instructor (1913-18). From 1919 to 1922 he was professor of experimental psychology and director of the psychological laboratory at Clark University. In 1922 he became associate professor of psychology at Harvard University. Professor Boring's most important contribution has been in the field of cutaneous and organic sensations. He carried through the Head experiment in cutaneous nerve division and was able to challenge Head's theoretical conclusions as to the existence of two systems of nerve sensibility. In his systematic outlook Professor Boring followed the general introspective position of the Titchener school but was more favorably disposed toward the newer doctrines. See *PSYCHOLOGY, EXPERIMENTAL*.

BORIS III (1894-). The King of Bulgaria. He succeeded his father, King Ferdinand, on the latter's abdication, Oct. 4, 1918. King Boris was born at Sofia, the eldest son of King Ferdinand and Marie Louise de Bourbon. He was educated in Bulgaria by tutors and at the Cadet and Officers' School. Subsequently he was aide-de-camp to the King and several generals of the Bulgarian Army.

BORNEO. One of the largest islands in the world, situated in the East Indian Archipelago. It has an area of 283,900 square miles. Politically it is divided into: (1) British Borneo which is made up of the divisions, North Borneo, Brunei, and Sarawak, covering the northern portion of the island (total area, 77,100 square miles; total population, 832,637), and which is administered from the Straits Settlements (q.v.); (2) Dutch Borneo, covering the rest of the island, which is made up of the divisions, West Coast Borneo, and South and East Districts of Borneo (total area, 206,810 square miles; total population, 1,626,000), and which is administered from the Dutch East Indies (q.v.).

BORNSCHEIN, FRANZ CARL (1879-). An American violinist and composer, born at Baltimore. From 1895 to 1902 he studied at the Peabody Conservatory there with J. Van Hueterijn (violin) and O. B. Boise (composition). In 1905 he became violin instructor at that institution and director of the junior orchestra. In 1913 he was appointed conductor of the orchestra of the Baltimore Music School Settlement. From 1910 to 1913 he was music critic of the *Baltimore Evening Sun* and at various times was connected with other publications. He wrote three symphonic poems for orchestra, *The Sea-god's Daughter*, *A Hero's Espousal*,

The Rime of the Ancient Mariner; a suite, *The Phantom Canoe*; a ballad for baritone and orchestra, *The Djinns*; a violin concerto in G minor; a cantata for chorus and orchestra, *Onowa*; and some chamber music.

BOROWSKI, FELIX (1872-). An American composer, born at Burton, England. He began his musical education with his father, continued in London under A. Pollitzer (violin) and C. W. Pearce (composition), and in 1888 entered the Cologne Conservatory, where he was a pupil of G. Jensen (composition), E. Hauser (piano), and G. Japha (violin). Having taught for some time at Aberdeen, he settled in 1894 in London and devoted himself to composition. In 1897 he became professor of theory and composition at the Chicago Musical College and in 1916 was elected its director. From 1906 to 1909 he was critic of the *Chicago Evening Post*, and from 1909 to 1918 he filled a similar position on the *Record-Herald*. After 1908 he wrote the programme-books for the Chicago Symphony Orchestra. His compositions include a ballet-pantomime, *Boudour* (Chicago, 1919); three symphonic poems, *Eugen Oniegin*, *Printemps Passionné*, *Youth* (North Shore Festival prize, 1923); *Valse Pathétique*, *Marche Triomphale*, *Ecce Homo*, *Élégie Symphonique*, *Trois Peintures*, for orchestra; a piano concerto in D minor; *Crépuscule* and *Serenade* for string orchestra; *Allegro de Concert* for organ and orchestra; a string quartet in A minor; a suite and two sonatas for organ; and pieces for violin and piano and for piano solo (*Sonata russe*, etc.).

BOSANQUET, BERNARD (1848-1923). A British philosopher. His death in February, 1923, came at the height of his creative activity. His last book, left unfinished, has been published posthumously by his widow, under the title *Three Chapters on the Nature of Mind* (1923). The works written since the War belong to the third period of his work, when he was defending the conception of the absolute. These include *The Meeting of Extremes in Contemporary Philosophy* (1921), *Implication and Linear Inference* (1920), *Life and the Individual* (Processes of the Aristotelian Society, 1918), and *Some Suggestions as to Ethics* (1918). Taken together with the Gifford Lectures of 1911-12 (*The Value and Destiny of the Individual*), they may be regarded as constituting a bulwark against the tide of easy-going philosophies of sentiment to which the modern mind is peculiarly inclined. In *Contemporary Philosophy* he pointed out how Italian neo-idealism (Gentile and Croce) and British neo-realism (Alexander) converge at one focus after starting from diametrically opposite directions.

"You cannot," he wrote, "cut down the universe to the creative work of constructive thinking on the one hand, nor to the real world of the context of our waking bodies on the other. The narrowness and recognitions of neo-idealists and of neo-realists balance one another and amplify our conception of the whole." See *ÆSTHETICS*.

BOSHER, KATE LANGLEY ("KATE CAIRNS") (1865-). An American author (see VOL. III). She wrote *How It Happened* (1914), *People Like That* (1915), *Kitty Canary* (1917), and *His Friend, Miss McFarlane* (1918).

BOSNIA-HERZEGOVINA. Up to November, 1918, this land continued a territory of

Austria-Hungary and was administered from the Dual Monarchy's Ministry of Finance. (It has an area of 19,768 square miles, and a population, in 1920, of 1,889,929, as compared with the 1910 population of 1,895,044.) On Nov. 1, 1918, the Diet constituted itself a national government and took over the administration of the territory; the formation of Jugo-Slavia found Bosnia-Herzegovina a constituent province.

BOSPORUS STRAITS. See DARDANELLES AND BOSPORUS STRAITS.

BOSS, BENJAMIN (1880-). An American astronomer, born at Albany, N. Y. He was graduated at Harvard in 1901 and at once became an assistant at the Dudley Observatory in Albany. In 1905 he became connected with the United States Naval Observatory in Washington, and during 1906-08 he was in charge of the Naval Observatory at Tutuila in Samoa, where he made important observations of Newcomb's fundamental stars. On his return to the United States in 1908 he became secretary of the department of Meridian Astronomy of the Carnegie Institution, of which work he became director in 1915. In that year he returned to Albany, where he was called to the directorship of the Dudley Observatory, in succession to his father. His scientific work has had to do principally with the determination of the star positions and motions. He was a member of the total eclipse expedition to Flint Island in 1908 and became editor of the *Astronomical Journal* in the same year.

BOSSANGE, EDWARD RAYMOND (1871-). An American architect, born at Enghein in France. He was brought to the United States when nine years old and was educated at Columbia University and at studios in New York and Rome. He was connected at various times with Ernest Flagg, Carrere and Hastings, and Warren and Whitmore; he was also a member of the firm of Bossange and Newton. From 1913 to 1915 he was professor of architecture in Cornell University and in the latter year became a member of the faculty of the Carnegie Institute of Technology, where he was director of the College of Fine Arts (1918-).

BOSTON. The capital of Massachusetts and the commercial metropolis of New England. The population rose from 686,092 in 1910 to 748,060 in 1920 and to 776,683 by estimate of the Bureau of the Census for 1924. The metropolitan district, including territory within 10 miles of the city boundaries, had a population of 1,772,254 in 1920. During the War, Boston shipping and port facilities expanded rapidly. Extensive plans for terminal and dock warehouses were made in 1918, and in 1919 a drydock, the largest in the United States, which had been begun by the State of Massachusetts before the War, was purchased by the United States Navy Department and completed. It was 1176 feet long and 149 feet wide and cost over \$3,000,000. In 1922 the Boston airport was established. The Legislature made an appropriation for the airport and leased the land in East Boston for use as a landing field for \$1 a year. Additional money was raised by private subscriptions to complete the construction and equipment of the field. It was leased by the United States army for military purposes, on condition that commercial flyers were to be allowed full use of the field. Two new subways begun in 1912 were opened during the

decade. The East Boston extension opened in 1916 was .41 miles long and cost \$2,287,000 to construct; the Dorchester tunnel completed in 1918 at a cost of \$10,582,000 was 2.26 miles in length. A second section of the Museum of Fine Arts was opened in 1915 and the State House was enlarged by the addition of east and west wings in 1919, at a cost of approximately \$3,000,000. In 1922-3 the State Legislature authorized a new two-mile northern gateway to give the towns to the north and east of Boston better access to the city. Downtown traffic was to be given more elbow room by the widening of Kneeland and Tremont Streets; by widening Cambridge and Court Streets, a new direct thoroughfare was to be provided in and out of the congested district.

Within the city itself, the most notable development of the decade in the park system was the cutting through of the Strandway in South Boston and Dorchester, along the shore of Dorchester Bay. This great improvement ran perhaps six miles almost from City Point to Neponset. Between the park roadway and the water was a continuous beach varying in width from about 50 to 500 feet. Along this, various public conveniences including bath and boat houses and playgrounds, baseball fields, athletic fields, etc., were arranged. Under the will of George E. White, something over \$7,000,000 was left as a fund almost without restrictions for the general public welfare of the city. It was administered by a board of five trustees, including three city officials, so that the use of the fund is such as to make it practically a part of the municipal finances of the community. The Board of Trustees up to 1924 devoted the income from the fund almost entirely to public health work, including the establishment of health centres in congested districts. In 1919 the Metropolitan Parks Board, the Metropolitan Sewer Board and the Metropolitan Water Board were consolidated under the Metropolitan District Commission, and in 1923 the Legislature created a division of metropolitan planning, which began immediately to coördinate the activities of all the planning boards in the 39 cities and towns of the metropolitan district. The zoning law of the city itself was amended.

The exports of the city increased from \$71,963,879 in 1914 to \$221,728,343 in 1918, and to \$349,620,484 in 1923; imports rose from \$163,013,099 in 1914 to \$295,907,047 in 1918. After 1918 imports through the port of Boston did not continue to increase, owing in part to the fact that the ports to the south of New York had lower rates from the interior of the country. The imports that did come through Boston were very largely for the immediate use of the manufacturers in New England itself. Bank clearings increased from \$7,866,664,000 in 1914 to \$19,068,369,000 in 1923. Postal receipts in the Boston Postal District, one of the largest of the country in area, increased from \$8,209,414 in 1914 to \$13,817,716 in 1923. Manufacturing establishments in Boston in 1922 turned out a product valued at \$496,982,035 as against \$284,802,479 in 1914.

The police force of the city went on strike in 1919 to compel recognition by the city administration of the organization of their union and their right to affiliate with the American Federation of Labor. Order was restored and maintained by the State guard, and Calvin Coolidge,

then Governor of Massachusetts, also requested Federal aid in case of necessity, but no further disturbances occurred. On the third day the strikers offered to return to duty, but the city, declining to receive them, recruited a new police force at an increased wage scale.

BOSTON SYMPHONY ORCHESTRA. See Music, *Orchestras*.

BOSTON UNIVERSITY. A nonsectarian institution at Boston, Mass., founded in 1869. The student enrollment increased from 1827 in 1914 to 10,008, including evening and Saturday courses, in 1923-24, and 1082 in the summer session of 1923; the faculty was increased from 170 to 382 members; and the number of volumes in the library from approximately 43,000 to 92,134 volumes. The endowment was increased during the same period from \$2,367,820 to \$4,179,984, of which \$965,000 came by bequest in 1918 from Mrs. C. C. Corbin. In 1922, a campaign for \$4,500,000, called the Fiftieth Endowment Fund, was launched, of which approximately \$2,000,000 was pledged by June, 1923. President, Lemuel Herbert Murlin, D.D., LL.D.

BOSTWICK, ARTHUR ELMORE (1860-). An American librarian (see Vol. III). He was president of the Missouri Library Association in 1917 and of the publication board of the American Library Association, 1918-21. He is the author of *Earmarks of Literature* (1914), *The Making of an American's Library* (1915), *Library Essays* (1920), and *A Librarian's Open Shelf* (1920). He edited *Classics of American Librarianship*, 3 vols. (1915-21).

BOSWORTH, EDWARD INCREASE (1861-). An American theologian, born at Dundee, Ill., and educated at Oberlin College, Yale University, and the University of Leipzig. After a year as pastor of a congregational church in Mount Vernon, O., he joined the faculty of the Oberlin Graduate School of Theology, of which he became dean in 1892. He was acting president of Oberlin College, 1918-19. His works include *Studies in the Acts and Epistles* (1898); *Studies in the Life of Jesus Christ* (1904); *New Studies in Acts* (1908); *Commentary of Romans* (1919); and *What It Means to Be a Christian* (1923).

BOTANY. Investigators in all fields of botanical science were active in the period between 1914 and 1924, and the amount of literature turned out was very large. Without disparaging in any way investigations in other fields, only the more recent discoveries in a few lines can be noted here.

General. The address of Dr. William Bateson, "Evolutionary Faith and Modern Doubt," delivered before the American Association for the Advancement of Science at Toronto, Canada, in December, 1921, was seized upon by the foes of the theory of evolution as a repudiation of that doctrine. Later Dr. Bateson attempted to correct this impression by stating, "Though no one doubts the truth of evolution, we have as yet no satisfactory account of that particular part of the theory that is concerned with the origin of species in the strict sense." He was apparently considering the processes of variation and not the survival of variants after they have appeared. He did not consider with favor DeVries' Mutation Theory as an explanation of discontinuous variation.

A. L. and A. C. Hagedoorn offer an explanation of the origin of species based on the modern conception of the crossing and inbreeding of

species. According to their hypothesis the somatic characters possessed by any group of individuals capable of crossing are determined by the genes of the zygotes which produce them, and variation arises from the blending of genes that are not common to all the members of a group. This implies the influence of environment and Tansley thinks it is conceivable that genes may be altered or new ones created by the long continued influence of environment. Bonnier reports the changed character of mountain species when grown on lowlands and vice versa, and Rawson claims to have produced a double strain of poppy by change of environment. Anthony has produced definite strains of violets by constant asexual propagation. A review of the present day aspect of this subject was given by A. G. Tansley in an address before the botanical section of the British Association for the Advancement of Science, September, 1923.

The principles of serum diagnosis, so successfully applied for the recognition of certain diseases of man and domestic animals, have been applied to plants by a number of botanists to determine the relationship of families of plants, and Lange presented a phylogeny of the Ranales based on serum diagnosis and morphological studies. Similar work was in progress in which Nelson and Dworak were making use of globulins from plants to determine resistance to certain diseases, and no antibodies were formed when globulins from resistant plants were injected into experimental animals. Lipman and Taylor reported experiments indicating that wheat plants grown in culture solutions could assimilate nitrogen from the air. Several experimenters reported that certain green algae could utilize free nitrogen if they were furnished sufficient carbohydrates. These experiments appear to confirm the claim that the power of plants to assimilate free nitrogen from the air is not limited to leguminous plants. Bristol and Page, however, questioned the ability of green algae to assimilate free atmospheric nitrogen and claimed that when grown under control conditions no fixation of nitrogen took place with the species investigated, and the question was raised of a possible symbiosis between algae and nitrogen-fixing bacteria.

Loeb, MacDougal and others have devoted much study to colloids, gels, artificial cells, etc., in an attempt to determine the fundamental principles underlying certain plant activities. MacDougal has succeeded in producing an artificial cell that exhibits some of the physical activities of the living cell, and with it he has measured the swelling of biocolloids, and the reaction of certain colloids in the external layers of the cell to the surrounding medium was ascertained. The bearing of some of these studies is noted elsewhere.

Physiological studies. Among the studies of plant activity, photosynthesis, or the transformation of carbon dioxide and water vapor into carbohydrates under the influence of light, is one of the most attractive, as it is the connecting link between inorganic matter and organized life. Willstätter has shown that the green coloring matter in leaves is composed of two pigments, chlorophyll *a* and chlorophyll *b*, which are normally present in about the proportion of 72 per cent of the former and 28 per cent of the latter, and the greatest synthetic activity of the plant takes place when these proportions are maintained. Wlodek found that

chlorophyll *b* increases in leaves during the day and chlorophyll *a* during the night. Certain fertilizer constituents were also found to influence the ratio between the two forms of chlorophyll. A deficiency of potassium results in a decrease of *b* and an increase of *a*, while if the nitrogen balance is not maintained the opposite effect is produced on the chlorophylls. A deficiency of phosphorus reduces the normal fluctuation in the chlorophyll components. This shows conclusively the necessity of a proper balance of the nutrients available to a plant if normal vegetative activity is maintained.

It is generally asserted that photosynthesis is carried on by the chlorophyll in the chloroplasts, but this appears to be true in part only. Investigations of Irving, confirmed by Briggs, indicated that some other agency than chlorophyll takes part in photosynthesis. Willstätter and Stoll thought an enzymic factor was involved, and Spoehr claimed that the colorless components of the protoplasm of the chloroplasts exerted an important part in photosynthesis. Weinberg suggested that chlorophyll initiated the process of carbohydrate synthesis but that an enzyme was necessary to complete the transformation of the first product of photosynthesis. While carbon dioxide is generally obtained from the air, Pollacci showed that green plants deprived of supplies of carbon dioxide, except through their roots, were able to sustain growth for a considerable time. See CHEMISTRY, ORGANIC.

The commonly accepted theory of photosynthesis is that starch is the first visible product of such activity, but that formaldehyde is the first step in its synthesis. This appears to be confirmed by the chemical reaction of an aqueous solution of carbon dioxide when subjected to the action of ultra-violet light or in ordinary light in the presence of malachite green. Baly, Heilbron, and others demonstrated the formation of formaldehyde in this manner, and Heilbron claimed that photosynthesis was mainly the chemistry of the formation of formaldehyde and the synthesis of other products from it. On the other hand, neither Mazé, Maquenne, nor Molisch was able to find any trace of formaldehyde in living green leaves. Thunberg from chemical evidence deduced the hypothesis that in the assimilation of carbon dioxide by plants, sunlight decomposed water with the formation of hydrogen and hydrogen peroxide. The carbon dioxide reacts with the hydrogen and hydrogen peroxide to form methylene glycol which in turn is transformed into formaldehyde through the loss of a molecule of water. Weigert, discussing the above, believed that at a certain wave-length, radiant energy was transformed into chemical energy. Warburg considered heavy metals in the cells of plants acted as catalysts for the production of formaldehyde from carbon dioxide, and McHargue claimed this as one function for manganese in plants.

The theory of Bayer that formaldehyde is the first product of photosynthesis and that carbohydrates are derived by its condensation was rather generally accepted, but there was much doubt as to how the other products were formed. MacDougal did not believe that sugar can be formed by the simple condensation of formaldehyde. Hexoses were considered by Dixon and Mason the first sugars formed, while Davis believed saccharose was the first sugar produced in the process of photosynthesis, and that it was transformed into hexoses for transportation to

other parts of the plant. Siegfried claimed that carbon dioxide must combine with some amino acid and that carbamino acid enters into the photosynthetic process. This theory received support, but Spoehr and Locke subjected salts of carbamino acids to the light of quartz mercury lamps without observing a trace of formaldehyde, ammonia, or hydrogen peroxide. Priestly gave an account of the metabolism of fat which was inseparable from the growth of plants. He claimed fat was present not only in storage organs but also in all rapidly growing parts of plants as well as in assimilating tissues, and from its early appearance he concluded that fatty substances were synthesized in the light and were derived from carbohydrates. Illumination, temperature and carbon dioxide content of the air influence photosynthesis, and this led to the theory of Blackman on limiting factors. He claimed that a single factor determined the physiological activities of plants and where a number of factors were involved, the slowest acting one would determine the result. Harder rejected this claim and held that where two or more factors were involved the rate of assimilation would depend on the combined value of all the factors.

In 1920, Garner and Allard contributed a notable account of the action of light on plants, and they supplemented their report with additional data. By controlling the daily periods of illumination they were able to accelerate or retard growth and reproduction of a number of species of plants almost at will. Autumn-flowering plants were brought into flower in summer, biennials behaved as annuals, and annuals were retarded in their fructification. Some plants were forced out of their normal life cycle by reducing the period of daily illumination, others by increasing it. To this response of plants to the length of day the name *photoperiodism* has been given, that is, the length of day required to bring about fructification. Each species of plant is assumed to have an optimum light period for its growth and reproduction. As an indication of the effect of varying the period of illumination on plant development, tobacco plants that required from 152 to 162 days for flowering with 12 hours' illumination required but 55 to 61 days when the period was reduced to seven hours daily. It was also thought that diminishing the length of day had an influence in preparing perennial plants to enter into the condition preliminary to winter dormancy. It was believed that photoperiodism not only controlled the photosynthesis of plants but it in some way influenced the acidity relations, the form of carbohydrate in the plant, and also the water content of the tissues. Confirmative evidence of this hypothesis was found by McClelland in Porto Rico, where variation in the length of the day is not great, and by Wanser at Lind, Wash., where the difference between length of day and night is quite marked. Wanser claimed that by properly adjusting the daily illumination of wheat it was possible to cause heading irrespective of the time of year. On the other hand, Harvey reported having grown an extensive list of plants from germination to seed-bearing, the plants having been subjected to continual illumination of strong electric light throughout the entire period of growth. Setchell found eelgrass required a rather definite range of temperature for growth and reproduction, and that with this

plant there was no evidence of photoperiodism.

The reaction of the living cell to its surrounding medium was the subject of many investigations. Loeb gave much attention to a study of the conductivity of the cell, and he found that difference of potentiality within and without the cell was influenced by the reaction of the surrounding medium. He made a special study of proteins and found their relations to electrolytes had an important bearing on cell permeability. Osterhout claimed that the electrical resistance of the protoplasm could be taken as a measure of the permeability of the cell. He also believed that there was some mechanism within the cell that protected the contents against too great concentration of solutes within the cell. Boas thought it was the cell colloids that protected against injury due to concentrations of injurious substances.

Several investigators considered that an electrical stimulus changed the hydrogen-ion concentration within the cell, rendering the plasma membrane permeable. Nernst claimed that the excitation produced by the passage of an electric current through living tissues was due to changes in salt concentration produced at the surface of the plasma membrane, and that changes which influenced the hydrogen-ion concentration would also increase or diminish permeability. Narcotics generally reduce permeability through their reduction of the hydrogen-ion concentration. Applying the principles of colloidal chemistry to the study of his artificial cell, MacDougal claimed it was possible to measure accurately the osmotic action of cell contents, the amount of exosmosis, and the loss of electrolytes from the immersion liquid.

The cause of the movement of water through the stems of plants continued undetermined, but additional evidence was offered to explain that phenomenon. It was repeatedly shown that living cells were not necessary for the upward movement of water in vegetable tissues. Renner, Steinbrinck, and others affirmed that the cohesion hypothesis was adequate to explain water conduction. Other investigators claimed there was a suction force exerted from above, and in partial support of this hypothesis Harris, Gortner, and Lawrence found there was an increased osmotic concentration in the leaf sap from lower to higher levels in trees and other tall growing plants. They also claimed there was a correlation between the habit of growth, environment, and osmotic pressure in plants. Ursprung and Blum considered that external conditions influenced the osmotic pressure in plants and that there was a daily as well as an annual periodicity in osmotic movement. In a later paper they claimed there was a suction pressure that draws water into the cells. Bose developed an instrument of great delicacy that was said to show the movement of sap, and from his experiments he developed the idea that there were pulsating cells throughout the length of the plant and that their pulsation gave rise to the conduction of sap even in the absence of root pressure and transpiration. Dixon, in an address before the Botanical Section of the British Association for the Advancement of Science in 1922, claimed that the transportation of organic substances to the growing points of plants takes place in the tracheæ. The dissolved substances fill the tracheæ and are moved by the forces set up by transpiration, the expansion of growing cells and root pressure.

The principles underlying plant growth received the attention of plant physiologists. Mitscherlich applied a formula to plant growth that was based on the increase in dry weight under the influence of a number of variable factors. Blackman claimed that the growth of annual plants proceeded, in the early stages, at a compound interest rate, but his formula was challenged by a number of investigators. Loeb was responsible for what is called the inhibition hypothesis of plant growth. From his studies of *Bryophyllum* he claimed that apical growth in stems is accelerated and lateral growth retarded by the production of inhibitory substances in the stems. By the action of these substances the dominant buds are forced into growth and others are retarded. This idea received the support of Reed, Barker, Lees, and others, but the hypothesis was vigorously attacked by a number of investigators. Jones was reported to have found from his study of cuttings of plants that only a limited portion of the stem toward the root apex would produce roots. The opposite end tends to produce stems. It was impossible to change the area of root growth appreciably, but stem growth apparently is possessed by an extensive portion of the cutting. Short root cuttings were said to produce shoots from each end, but roots from one end only. In one of his last contributions on regeneration and growth, Loeb claimed that polarity in plant growth was determined by differences in the tissues which were reached by ascending and descending sap, and this determined shoot and root growth. Kraus and Kraybill in 1918 found a very definite correlation between the proportion of carbohydrates and nitrogen available to plants and their growth and fruitfulness. Reid, from a recent study of the regeneration of tomato cuttings, confirmed their conclusions. He claimed that when carbohydrate reserves were high, and available nitrogen, either within or without the plant, was low, there would be vigorous root development. When the relative percentage of nitrogen was increased, shoot growth was abundant.

Ecology. This comparatively new branch of botany had become by 1924 one of great activity. To provide an outlet for publications in this specialized field two journals were established, *Journal of Ecology* and *Ecology*. The field of ecology had not been definitely limited, but broadly it included the relation of the plant to its environment, plant associations, and plant distribution. The relation of the plant, or association of plants, to environment was the subject of many investigations, and numerous studies were published on the ecology of more or less restricted areas. It was generally recognized that vegetation usually reflects the character of the soil, moisture, temperature, etc., and correlations were established between plant associations and soil types that were useful in determining the agricultural value of large areas of land. This led to studies of soil acidity as influencing the occurrence and distribution of plants. Wherry brought together a mass of information which is considered to show that the peculiar floras of bogs, salt marshes, sand barrens, etc., were due to soil acidity, and he believed that soil acidity was of fundamental importance in controlling the distribution of native plants. As a convenient method for determining the soil reaction, the hydrogen-ion concentration of the soil solution

had come into common use, and many investigators reported on its value as an index to the dominant features of the vegetation of a soil type. Laboratory studies showed that a certain physiological balance of salts in solution was necessary for the normal growth of plants. Attempts to apply this same principle to plants growing in soils did not always give satisfactory results. Enough had been done in this respect to indicate that the hydrogen-ion concentration of a soil might be an important factor in plant growth. Truog considered it had an important bearing on the feeding power of plants and the relation of plant growth to soil acidity and alkalinity.

Olsen, from a study of the meadow and woodland plants of Denmark, concluded that the occurrence and distribution of plants under natural conditions varied with the reaction of the soil as expressed by their hydrogen-ion concentration. Kelley also claimed that soil acidity determined the flora of a soil type, and Atkins found many plants were restricted in their range by the hydrogen-ion concentration of their habitats. Similar claims were made by many other investigators. Experiments showed, however, that the plant itself might exert an influence on the medium in which it was grown. Rudolfs, Pantanelli, and many others demonstrated the reaction of plants to the medium, and the work of Hartzell, Pickering, and others showed the influence of one set of plants on the growth of a succeeding one. This may be due to the development of toxic substances in soils or by changing their chemical reaction. The question of soil acidity as an ecological factor was considered very complex by Tansley. Comber believed that soil acidity was due to the relation of calcium to weak bases such as aluminum and not to its ratio to potassium, sodium, and other metals. Salisbury considered the ratio of calcium to potassium and sodium as inadequate in determining the distribution of plants. Pearson and Priestly offered evidence regarding the basic ratio and plant distribution. Kurtz reasoned, from the occurrence of many species of plants in soils of widely differing reaction, that soil acidity could hardly be a dominant factor in plant distribution.

Possibly on account of the inherent difficulty associated with their study, there had not been as many contributions to the phenomena of root growth as in other lines. Coupin claimed that the root tip was the most important region of absorption and the root hairs played a minor rôle. Knudson found that root caps separated from their roots could retain their vitality for several months. Robbins was able to grow excised root tips of maize, peas, cotton, etc., in nutrient media for more than three months. Weaver believed that with few exceptions most plants were able to conform their roots to their habitat and that soil moisture is the determining factor in root distribution. Waterman considered nutrition, rather than physical factors of the soil, responsible for the behavior of roots in their substrata. Hatton claimed that plants had as distinctive types of roots as of aerial parts, and Barker and Spink worked out a classification of apple stocks based on root characters. Merkle found that many desert plants were provided with surface roots, which were designated as absorptive roots, and deeper ones, which are considered to function mainly as anchor roots. Cannon, Free, Livingston, and

others paid especial attention to the question of root aëration. Increasing the carbon dioxide in the soil beyond certain limits was said to have an injurious effect which was due not to the toxic effect of the carbon dioxide but to the lack of oxygen. Noyes found the injurious effect of treating soils with carbon dioxide was apparent for more than nine months. Cannon believed that a deficiency of oxygen in the soil is a limiting factor in the rate of root growth.

A subject of considerable importance in explaining the distribution of plants was the hypothesis of Willis, known as the age and area hypothesis. It was claimed that "the area occupied at any given time, in any given country, by any group of allied species depends upon the ages of the species of the group in that country." Willis considered plant distribution in the present era with respect to its broader outlines was governed, mainly, by the time factor, while the detailed distribution in the area was mainly dependent upon ecological factors. Ridley disagreed with this hypothesis and cited many widely distributed species, the distribution of which appeared not to be explained by the theory of their antiquity. Numerous local floras were studied by various authors and their conclusions in many instances were at variance with the age and area theory.

Plant breeding. There was great activity in theoretical and practical plant breeding during the past ten years. To provide an outlet for the numerous papers which give the results of investigations in plant and animal breeding, a number of special journals were established, among them *Hereditas*, *Genetica*, *Genetics*, *Journal of Genetics*, and *Journal of Heredity*. These and other publications contain many articles which are intended to interpret Mendel's Law and De Vries' Mutation Theory. Many types of inheritance were recognized that did not conform to the simple Mendelian formula, and Yves Delage predicted the downfall of Mendelism through the weight of the many accessory hypotheses that have been offered for certain cases of inheritance. There was much speculation regarding the cell constituents that carried the factors of inheritance. Mottier and others believed that the chondriosomes, granular rod-shaped bodies in the cytoplasm that multiply by division and are permanent organs in the cell, are concerned in the transmission of inherited characters. The more recent theory of Morgan that the chromosomes carry the factors of inheritance was more generally accepted. Each chromosome is considered as carrying a large number of genes, or unit factors, which are brought together by crossing with the production of new combinations, through which new varieties are secured.

In economic plant breeding work the question of sterility of hybrids is of great importance. Certain structural characters, as well as physiological incompatibilities, are recognized as having a bearing upon sterility, but the sterility of the hybrids is of such common occurrence that their frequent presence is expected by plant breeders. Sterility in plant hybrids may be due to impotent pollen, abortive ovules, or the failure of the germ cells to unite and fuse together. The latter appears to be frequently the cause of sterility in plant hybrids. Horticulturists have known for many years that certain varieties of apples, pears, plums, cherries, grapes, etc., are self-sterile, and that a compat-

ible variety should be introduced among the plantings if increased fruitfulness is desired. These observations have been repeatedly confirmed by carefully controlled experiments with many species of plants. Sterility in plant hybrids is generally attributed to lethal factors occurring among the genes, and a study of the combination of these and other factors has an important bearing on plant genetics. When one variety of plant is sterile, reciprocal crosses with it will behave alike and the factors for sterility are inherited according to Mendel's Law. Some of our most highly prized varieties of fruit are notoriously shy bearers, due to various causes, sterility among them. By the study of the several factors involved it is possible to lay a basis for proper interplanting of varieties to secure greater fruit production.

Another line of plant breeding investigation was that of producing varieties or strains of important crop plants immune or resistant to plant diseases. Unlike some diseases of man and animals, immunity to subsequent attack does not appear to be conferred on plants through the incidence of disease. While little is known as to what causes resistance to disease on the part of plants, it has been quite definitely established that in plant breeding resistance is dominant to susceptibility and the tendency of resistance can be inherited and probably increased by repeated crossing. There are now well established varieties of wheat that are resistant, or immune, to rust and smut; tobacco, to root rot; potatoes to black wart; sugar cane, to mosaic; cotton, to wilt; cowpeas, to nematodes; beans, to anthracnose; cabbage, to yellows; tomatoes, to wilt; etc. In connection with breeding experiments for resistance to disease the interesting discovery was made that of many of the fungi which cause disease there are strains that cannot be differentiated except by biologic tests, and many of the resistant varieties of crop plants may be susceptible to some strains of the fungus while highly resistant or even immune to other strains. More than thirty biologic strains of wheat rust have been described. Fortunately, as a rule, only a few of the strains occur in a given locality and some are limited by climatic and other factors that reduce the liability of their introduction, and the plant breeder must consider the strains that are prevalent in his locality when undertaking the production of resistant varieties.

Bud selection, as a means for increasing the productivity of plants propagated vegetatively, has received considerable attention. Shamel and others worked with citrus species, sugar cane, etc., and they claimed that increased productivity has been secured through the propagation of buds from selected, high-yielding parent plants. Emerson considered bud variation due to aberrant chromosomes, somatic mutation or vegetative segregation of plastids. A number of investigators attempted to duplicate the results reported with citrus, but Rawes claims that the bearing capacity of apple trees was not transmitted vegetatively, and Sax and Gowan found no evidence to support the hypothesis of variation in yield being transmitted through vegetative propagation.

Necrology. Among botanists of international repute who died during the decade 1914-24 were: F. Nobbe, L. Hiltner, P. Soraauer, W. Pfeffer, and S. Schwendener, in Germany; G. Cribari and P. A. Saccardo, in Italy; L. Matruchot, E.

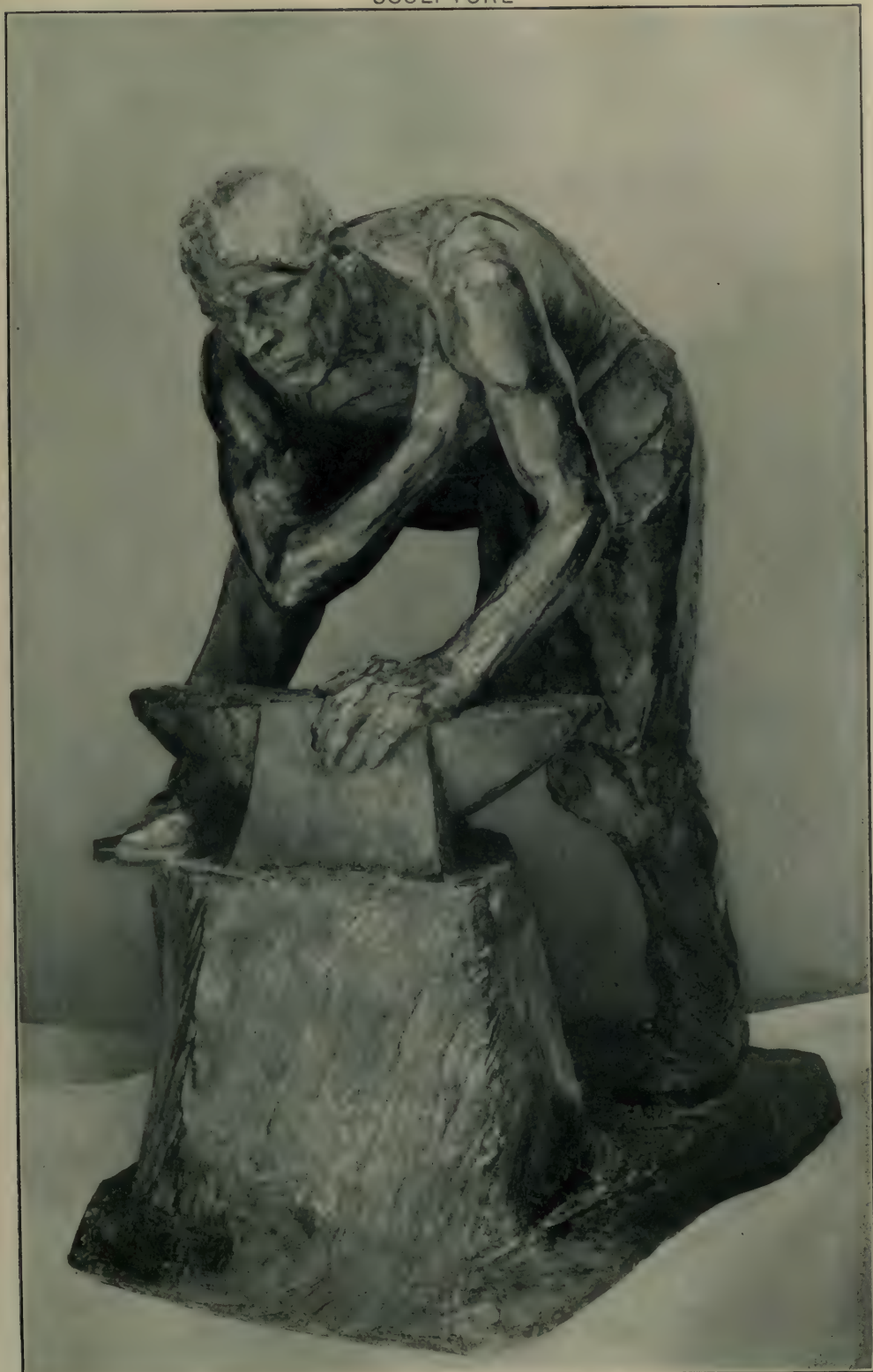
Prillieux, and G. Bonnier, in France; A. and C. DeCandolle, in Switzerland; J. Bayley Balfour, G. Massee, M. C. Cooke, and I. G. Baker, in England; V. I. Palladin in Russia; and J. T. Burrill, W. G. Farlow, G. L. Goodale, B. D. Halstead and G. F. Atkinson, in the United States.

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BOTHA, LOUIS (1862-1919). A South African general and statesman (see VOL. III). With General Smuts, Botha worked heroically, at the outbreak of the War, in the interests of the British Empire. In spite of the fact that he was Premier, he took the field first against the de Wet rebels, whom he crushed, and then in the campaign against German Southwest Africa. He remained at the head of the government until his death, Aug. 28, 1919.

BOTTOMLEY, HORATIO WILLIAM (1860-). An English journalist. He was of humble parentage and had little education, but by dint of hard labor and a sedulous cultivation of the tastes of the popular majority, he made himself one of the most feared of Englishmen. He first engaged in stock promotions and thus grew interested in journalism, so that the year 1922 saw him one of the four or five leading English newspaper publishers. His periodical *John Bull* was sensational and violent, with an enormous following. During the War, he fanned hatred against Germans; in the years following the Armistice he singled out the United States for vilifications. In 1922 his career was cut short

SCULPTURE



COURTESY OF THE METROPOLITAN MUSEUM OF ART

HENRI BOUCHARD

"BLACKSMITH IN REPOSE"

In the Metropolitan Museum of Art, New York City

to the infinite relief of intelligent Englishmen, when he was found guilty of misusing the great funds subscribed to his private patriotic organizations. He was sentenced to penal servitude for seven years. He had been an M.P., 1906-12 and 1918-22.

BOTULISM, or BOTULINISM. Within the interval 1914-24, our knowledge of this affection progressed to an extent hardly credible in comparison with the period when it was first associated with sausage poisoning. Nearly the entire range of preserved food products has been under review and much is still obscure, especially in regard to the manner in which the bacillus gains access to the preserved foods. It has been found that home preserved food is much more likely to contain it than the factory product. The high heat of the canneries is ordinarily a guarantee of the purity of their products, but the expulsion of the air as a result of the heat, regarded as the cornerstone of successful food preservation, is no safeguard against the bacillus but rather a menace, since it thrives in the absence of air. Since the spores can resist a high degree of heat, there is the fear that they may not be entirely destroyed and comparative studies show that the bacillus in some articles like spinach is more resistant than in other media. The safeguard then must consist in a high and sustained application of heat more than sufficient to destroy all spores.

On the other hand, a certain concentration of sugar or salt in water is sufficient to render the bacillus helpless and no fear need be entertained of eating foods preserved in these media if the concentration is guaranteed. Numerous cases of botulism from preserved olives were found to be due to a concentration of less than 6 per cent of brine. The products of any of the great food-preserving factories may be regarded as safe enough, while some of the small, obscure canneries lack the requisite technical knowledge and equipment, thereby resembling the home kitchen. Of interest in connection with the treatment is the use of the aeroplane for transporting the botulus antitoxin from the source, when the poisoning occurs in an out-of-the-way locality. See also **VETERINARY MEDICINE.**

BOUCHARD, HENRI (1875-). A French sculptor, born at Dijon, the son of a joiner and woodcarver, who presided over his earliest artistic education. He studied at Dijon and at the Ecole des Beaux Arts in Paris, where he won the Prix de Rome in 1891. He was influenced by Rodin and early evinced a preference for labor subjects, such as the "Laborer in Repose" (1907), "Plowing in Burgundy" (Champs de Mars, Paris), "Accident to a Quarryman," "Man with Hoe," the bronze "Blacksmith" (Metropolitan Museum, New York City), "The Stevedore" (Luxembourg Museum, Paris), and "The Fishermen." His historical subjects, all Gothic, Charles the Bold (Brussels), "The Master Workman," and Claix Sluter (Dijon), are no less powerful and characteristic. In a very different vein is his light and charming bronze "Girl with a Gazelle" (Metropolitan Museum, New York City). His most famous achievement, done in collaboration with Paul Landowski, is the international monument to the Calvinist reformation, austere and sublime, built into the old wall of Geneva. The four great central figures, Farel, Calvin, Knox, and Beza, are by both artists, and those of the six

lay heroes, Oliver Cromwell, the Great Elector of Brandenburg, and Roger Williams are by Bouchard. He is a realist of great power but in no sense a literalist. His art is synthesized, architectonic, and adapted to the material used; it excels especially in rhythm.

BOUHÉLIER, SAINT-GEORGES DE (1876-). A French author, born at Reuil, Seine-et-Oise. His works constitute a satire on society. The best of his productions is *Le Carnaval des Enfants*, a three-act play, published in 1911. In most of his writings he shows a lack of a sense of propriety and often becomes vulgar and even sacrilegious. His works include *Discours sur la Mort de Narcisse, ou l'Impérieuse Métamorphose: Théorie de l'Amour* (1895); *L'Affaire Dreyfus; la Révolution en Marche* (1898); *La Route Noire* (1900); *La Tragédie du Nouveau Christ* (1901); *Histoire de Lucie, Fille Perdue et Criminelle* (1902); *Des Passions de l'Amour* (1904); *La Tragédie Royale* (1909); *La Romance de l'Homme*, poems (1912); and *La Vie d'une femme; Edipe; La Tragédie de Tristan et Yseult* (1922-3).

BOULOGNE CONFERENCE. See **REPARATIONS.**

BOURDELLE, ANTOINE (1861-). A French sculptor, the foremost successor of Rodin, born at Montauban. Dominated by Gothic traditions, he studied chiefly at Paris, with Rodin, who esteemed him the most important of his followers. His art, however, differs widely from Rodin's, which is essentially pictorial, while Bourdelle's is architectural, essentially sculptural, and dependent on the material. Archaic Greek and Gothic sculpture are the chief influences in his art. His early works include charming studies of girls and young women. More recent productions are a monument to the defenders of Montauban (1902); "The Archer Heracles" (1909; replica in The Metropolitan Museum of New York City); the remarkable reliefs on the Théâtre des Elysées, Paris; monument to the Polish poet Mickiewicz (1917), apostle of Polish independence; monument to General Alvear in Buenos Aires (1915-17), with colossal equestrian statues and allegorical figures, two of which, "Force" and "Victory," have been pronounced the finest sculptures the War brought forth. His most recent productions are a superb madonna and child (1922), in the Gothic spirit, and a monument to the miners of Monceaux who fell in the War. His powerful portraits include busts of Beethoven (Luxembourg Museum), Rodin, Ingres, Anatole France (1919), and M. Simu (Bucharest), and figures of Carpeaux and Rodin at work.

BOURGEOIS, LÉON VICTOR AUGUSTE (1851-). A French politician (see **VOL. III**). He was elected president of the Senate in 1918. In 1919 he became the French member of the League of Nations Commission and did important work in the drafting of the Covenant. On Oct. 14, 1919, he was named first French representative on the League Council. In January, 1923, he was reelected president of the Senate, but resigned shortly afterward to devote the remainder of his life to the advocacy of the League idea. This phase of his career resembled those of the English Lord Robert Cecil and the American ex-Supreme Court Justice John H. Clarke.

BOURGET, PAUL (1852-). A French novelist and critic (see **VOL. III**). His works

published after 1914 include *Le sens de la Mort* (1915), *Lazarine* (1917), *Némésis* (1918), *Anomalies* (1920), *Laurence Albain* (1920), *L'Écuyère* (1921), all novels; and a travel sketch, *Le Démon du Midi* (1914).

BOURNE, RANDOLPH (SILLIMAN) (1886-1918). An American author, born at Bloomfield, N. J., and graduated at Columbia University in 1913, where he obtained a traveling scholarship. He studied in London and Paris (1913-14). Essays which had appeared in the *Atlantic Monthly* and other papers were collected in *Youth and Life* (1913). He was a well known contributor to the leading American magazines and was a member of the staff of the *New Republic* at its inception in 1914; later he wrote for *The Seven Arts* (1917) and the *Dial*, with which he was connected at the time of his death. His point of view was radical and always expressed with pointed style. His bitter opposition to the War, due rather to a high valuation of personality and freedom than to doctrinaire pacifism, was the core of the posthumous *Untimely Papers*, edited by James Oppenheim. Of more general interest was the still later *History of a Literary Radical*, compiled by Van Wyck Brooks. Bourne's other volumes were *The Gary Schools* (1916) and *Education and Living* (1917). A somewhat sentimentalized picture of him is presented in Paul Rosenfeld's *Port of New York*.

BOUTROUX, ETIENNE EMILE MARIE (1845-1921). A French philosopher (see VOL. III), who, although much advanced in years when the War came, served the cause of his country by public addresses which combined patriotism with enlightened internationalism. These addresses, published in book or pamphlet form, include *Certitude et Vérité* (1915), *Philosophy and War* (1916), *The Relation between Thought and Action* (1918), and *L'Amérique dans la Guerre Mondiale* (1918).

BOVINE TUBERCULOSIS. See VETERINARY MEDICINE.

BOWDOIN COLLEGE. An institution for men at Brunswick, Me., founded in 1794. The student enrollment increased from 394 in 1914 to 497 in 1923-24 and the faculty from 29 to 34 members. The library was increased from 110,000 to 130,000 volumes and the productive endowment from \$2,312,552 to \$3,563,950. In 1920, the college offered new courses in philosophy, government, and the fine arts, and in 1921 discontinued the medical school. In the same year it reported a marked decrease in the number of students in the more humanistic studies, and an increase in the number of those specializing in chemistry and economics. William De Witt Hyde, D.D., died in 1917 and was succeeded in the presidency by Kenneth C. M. Sills, LL.D.

BOWIE, WILLIAM (1872-). An American engineer born at Annapolis Junction, Md., and educated at St. John's College, Trinity, and Lehigh. In 1895 he entered the United States Coast and Geodetic Survey, serving at first in the field, both in the United States and its colonial possessions, but in 1900 he became chief of the division of geodesy. During the War he served in the Corps of Engineers with the rank of major. He has represented the United States at various international geodetic conferences and congresses and was president of the section of geodesy of the Geodetic and Geophysical Union in 1919. His scientific researches have

had to do with the theory of isostasy and its applications to dynamic and structural geology.

BOWLES, FRANCIS TIFFANY (1858-). An American naval constructor (see VOL. III). He was assistant general manager of the United States Shipping Board from 1917 to 1919.

BOWLEY, ALBERT JESSE (1875-). An American army officer, born in Westminster, Cal. He graduated from the United States Military Academy in 1897 and was commissioned 2d lieutenant. He took part in the Spanish-American War and in campaigns in the Philippines. From 1901 to 1905 he was a professor in the United States Military Academy. He served again in the Philippines in 1910-11 and in the latter year was appointed military attaché to China. From 1915 to 1917 he did duty on the Mexican border. In the latter year he organized the 17th Field Artillery, and commanding it in France, participated in nearly all the important actions in which the American Army took part. In 1918 he was appointed commander of the 2d Field Artillery Brigade, 2d Division, and in the same year became Chief of Artillery, 6th Corps. From 1919 to 1920 he was on duty at the General Staff College. He was promoted to be brigadier-general in the national army in 1918 and in the regular army in 1921.

BOWMAN, ISATAH (1878-). An American geographer (see VOL. III). In 1915 he became director of the American Geographical Society of New York, and later (1917) received the Bonaparte-Wyse gold medal of the Geographic Society of Paris, for his explorations and publications of South America. In 1918-19 he was chief territorial specialist of the American Commission to Negotiate Peace and became a member of the geographic committee of the National Research Council in 1920. He is author of *South America* (1915), *The Andes of Southern Peru* (1916), and *The New World—Problems in Political Geography* (1921). He was associate editor of the *Journal of Geography* in 1918-19 and editor in 1919-20. In 1916 he became associate editor of the *Geographical Review*.

BOXING. Professional boxing established itself as perhaps the most popular branch of commercialized sport during the period from 1914 to 1924. The craze for fistie combats, particularly of the heavyweight variety, became worldwide with the United States setting the pace in the number of important bouts held, in the huge crowds of spectators attracted and in the size of the purses paid the contestants. Great Britain, France, Ireland, Italy, the Argentine, Chile, Peru and even the nations of the Orient all witnessed an amazing advance in interest shown both in local boxing events and in the many international matches which took place.

Several world championship titles changed hands. In the heavyweight division Jack Johnson, the negro, was deposed by Jess Willard, who in turn bowed to the prowess of Jack Dempsey (q.v.). Dempsey successfully defended his honors on four different occasions between 1920 and 1923, his opponents being Bill Brennan, Georges Carpentier (q.v.), Tom Gibbons and Luis Firpo. The battle between Dempsey and Carpentier which was held at Jersey City, July 2, 1921, attracted a throng of more than 80,000 persons who paid \$1,626,580 for admissions. All former records both for crowds and gate receipts were broken. The Dempsey-Firpo bout at the

Polo Grounds, New York City, Sept. 14, 1923, drew a "gate" of \$1,188,822.

Another sensational boxer to make his appearance was Benny Leonard, world champion of the lightweight division. Leonard won his title in 1917 from Freddie Welsh, of England and successfully defended it against several challengers up to the beginning of 1924.

The holders of world championship titles in the classes other than the heavyweight and the lightweight are: middleweight, Harry Greb; welterweight, Mickey Walker; light heavyweight, Mike McTigue; featherweight, Johnny Dundee; bantamweight, Abe Goldstein; flyweight, Pancho Villa.

Boxing among amateurs and in the colleges thrived along with the professional "game" during 1915-1924. The Amateur Athletic Union of the United States and the various European amateur federations conducted their usual tournaments.

An intercollegiate boxing league was organized in the United States, comprising several of the institutions of the Eastern States, and there also were held a large number of dual boxing meets between college teams. In England the universities of Cambridge and Oxford took up the sport with much success.

BOYD, ERNEST (?-). An American critic and journalist, born in Ireland. He was educated in France, Germany, and Switzerland for the British Consular Service, which he entered in 1913. He soon after came to the United States, where his efforts in familiarizing Americans with modern movements in Irish and European literature gave him at once a place of prominence among the younger critics. His writings in the *American Mercury* and the *Bookman* on American literary types and his causeries, first in the *New York Evening Post* and then in the *New York Tribune* on Continental literary tendencies, were welcome contributions in the work of building up American critical standards. His writings include *Ireland's Literary Renaissance*, *The Contemporary Drama of Ireland*, and *Appreciations and Deprecations*.

BOYD, JAMES OSCAR (1874-). An American theologian, born at Rahway, N. J., and educated at New York University, the University of Erlangen, and Princeton. From 1907 to 1915 he was assistant professor of Oriental and Old Testament Literature in the Princeton Theological Seminary, and from then until 1921 pastor of the Presbyterian Church of the Redeemer in Paterson, N. J. In 1921 he was named secretary for Arabia for the American Bible Society. His works include *Ezekiel and the Modern Dating of the Pentateuch* (1908), and *Sin and Grace in the Koran* (1912). He edited the *Octateuch in Ethiopic* (1909) and *A Brief Bible History* (1922).

BOYLE, HUGH CHARLES (1873-). An American bishop, born at Johnstown, Pa., and educated at Saint Vincent's, Beatty, Pa. He was ordained to the Roman Catholic priesthood in 1898, and acted as assistant in Saint Aloysius' Church, Wilmerding, Pa., and later in Saint Paul's Cathedral, Pittsburgh. From 1916-21 he was pastor of Saint Mary Magdalene's Church, Homestead, Pa. In the latter year he was consecrated bishop of Pittsburgh.

BOYLE, JOHN J. (1851-1917). An American sculptor, born in New York City, and educated at the Pennsylvania Academy of Fine

Arts in Philadelphia and at the Ecole des Beaux Arts, Paris. He was particularly successful as a sculptor of Indian figures and is chiefly known for his group portraits of them. "The Stone Age in North America," one of his best works, is in Fairmount Park, Philadelphia. Two other groups by Boyle are "The Alarm," exhibited in Lincoln Park, Chicago, and "The Savage Age" at the Panama-Pacific International Exposition. His work also included the seated "Franklin" in Philadelphia and the figures of "Bacon" and "Plato" in the Congressional Library at Washington, D. C. The ability of Boyle as a sculptor was recognized in his election as Associate to the National Academy in 1910 and to the executive council of the National Sculptors' Society.

BOYLESVE, RENÉ-MARIE-AUGUSTE (1867-). A French novelist, born at La Haye-Descartes, and educated at Poitiers, Tours, and the University of Paris, where he attended courses in a wide variety of subjects. In his early youth he had the ambition to become a poet, but the symbolist movement, which was then at its height, did not suit his bent, and he turned to novel-writing as his profession. He was received in the French Academy in 1919. That he is a careful observer of provincial life is shown in *La Bequécé*, one of his best novels (1901). His work has striking diversity. He is realistic, poetical, ironic, humorous, tragic. His works include *Le Médecin des Dames de Néans* (1896), *Sainte-Marie-des-Fleurs* (1897), *Le Parfum des Iles Borromées* (1898), *Mademoiselle Cloque* (1899), *L'Enfant à la Balustrade* (1903), *Le Bel-Avenir* (1905), *Mon Amour* (1908), *Le Meilleur Ami* (1909), *La Jeune Fille bien Élevée* (1912), *Madeleine Jeune Femme* (1912), *Tu n'Es plus Rien* (1917); *Nymphes Dansants avec des Satyres*, short stories (1920); *La Dangereux Jeune Homme* (1921), and *Elise* (1921). He has used the pseudonym "René Jardiveau."

BOYNTON, HENRY WALCOTT (1869-). An American author (see VOL. III). He was appointed a member of the *Bookman* staff in 1915, and from 1919 to 1921 was on the staff of the *Review*. In 1921 he identified himself with the *Independent* and the *Weekly Review*. He published an edition of Carlyle's *Essay on Burns* in 1922.

BOY SCOUTS OF AMERICA. A movement for character building and citizenship training in boys through a programme of work and play; organized in February, 1910, and incorporated by Act of Congress in June, 1918. The number of scouts increased from about 300,000 in 1910 to 445,700 in 1923 and the number of leaders from 11,500 to 141,878 in 1923. During the War the scouts did notable service selling 1,867,047 subscriptions amounting to \$278,744,650 in the Liberty Loan campaigns, and \$42,751,031 worth of War Savings Stamps. They also operated thousands of War gardens; worked on farms and in orchards; spread food conservation propaganda; located and reported to the Forestry Service nearly 21,000,000 board feet of standing black walnut timber; collected, at the request of the War Department, and under the Chemical Warfare Service, several tons of carbon material; performed confidential service for the Third Naval District; and co-operated with the Red Cross, the War Camp Community Service, the American Library As-

sociation, the Salvation Army, etc. After the War their activities in community service included coöperating with forestry departments in fighting and preventing forest fires, helping to conserve wild life, working on the national highways, planting trees, conducting clean-up and safety first campaigns, acting as traffic aids and fireman's aids, guarding dangerous crossings, etc. In 1920, the decennial of the movement in America, over 360 picked scouts and their leaders took part in the first International Boy Scouts' Jamboree held at Olympia, England, in which representatives of the organization in 23 nations came together. In 1924 a troop of 48 boys and leaders represented the Boy Scouts of America at the second International Jamboree held at Copenhagen. An international conference of scout leaders was also held in London in 1920 which was attended by the officials of the American organization. A second International Conference in Paris in 1922, and third in Copenhagen in 1924. The director of the department of education, and a group of former scouts, then students in Yale University, at the request of the American Committee for Devastated France, conducted a Boy Scout Camp at Compiègne, France, during the summers of 1920-1922 to give French scouts the benefit of the American programme, system, and equipment, and to help them to organize their own camps. Biennial conferences of scout executives were held in 1920, 1922 and 1924. *Boys' Life*, the official magazine of the organization, adopted a widely extended programme in 1923 on receipt of a gift of \$100,000 from the Laura Spellman Rockefeller Foundation Fund. Through this gift the editors were enabled to raise the magazine to a standard hitherto impossible. They announced that they would seek to combat the objectionable type of story by giving the boys the sort of reading they wanted with objectionable matter left out. A total of 33 gold, 140 silver, and 423 bronze medals, and 336 Certificates for Heroism were awarded to scouts for conspicuous acts of courage and efficiency in saving life.

The number of merit badge pamphlets was increased to 70, providing vocational and general training by experts at a low cost. Thirty editions of the *Handbook for Boys*, totaling over 2,200,000 copies were issued, and in 1924 the *Handbook for Scoutmasters* was in its 5th imprint. Great progress was made in training scout leaders. A home study course was conducted in coöperation with Columbia University. In 1923, 350 local councils gave training courses which were attended by more than 8000 men. About 100 colleges, normal schools and theological seminaries included courses in scout leadership in their curriculum. Courses for scout executives were conducted at Columbia, Yale and other universities and in connection with regional conferences, to the number of 12. A bureau of church relations was established to promote coöperation with the churches.

In 1923, there were 2700 fully organized and equipped scout camps; during the summer 225,000 scouts spent one to three weeks in camp at an average cost to each boy of \$6.87 a week. Minimum standards of safety and sanitation were adopted and a certificate is issued to each camp.

New Seascout requirements were adopted,

and a revision of the Seascout manual undertaken. See also LONE SCOUTS.

BRADFORD, GAMALIEL (1863-). An American author (see VOL. III). He has written *Confederate Portraits* (1914), *Union Portraits* (1916), *Portraits of Women* (1916), *A Naturalist of Souls* (1917), *Portraits of American Women* (1919); *A Prophet of Joy*, poem (1920); *Shadow Verses*, poems; *American Portraits, 1875-1900* (1921), *Damaged Souls* (1923), and *The Love of Samuel Pepys* (1924).

BRADLEY, FRANCIS HERBERT (1846-). A British philosopher, born at Glasbury, and educated at academies Cheltenham and Marlborough before going to Oxford in the late 1860's, just when the idealistic reaction had set in against the materialistic empiricism of Mill and Spencer. Mr. Bradley identified himself with the Oxford school of Neo-Hegelians, which in the 1870's counted such teachers as T. H. Green and John Caird. He developed a philosophy of monistic absolutism and for more than 40 years he served as a rallying centre for those who sought in philosophy something more than an echoing of the scientific commonplaces of the day.

An invalid for the greater part of his life, Mr. Bradley has published his few works in the spells between "intervals of compulsory idleness." *Presuppositions of Critical History* (1874) and *Ethical Studies* (1876) exhibit the earlier Bradley, whose idealism is not completely emancipated from a certain empiricism. The *Principles of Logic* (1883) was an epoch-making work; it was reprinted with a commentary and terminal essays after a lapse of 40 years (1922). Without doubt Mr. Bradley's greatest book is *Appearance and Reality* (1893; 2d ed., rev., 1902). Its thesis reflects that single intuition, the perception of which, in the words of Bergson, marks the greatness of a philosopher. That the Absolute is and is One, that it is over and above the qualification of personality, that finite existents have their degrees of reality and truth only by relation to the Absolute, and that the more anything is spiritual, so much the more is it veritably real—such a thesis involves the fusion of science and religion, and it is calculated therefore to shock the advocates both of modern science and traditional religion. Nevertheless the work of Mr. Bradley stood up under the attacks of the Anglo-American pragmatists, and after 30 years its influence was distinctly visible in the realistic system of Prof. Samuel Alexander.

The *Essays on Truth and Reality* (1924) constituted a somewhat unsuccessful effort to extend the criterion of the degrees of truth to the world of scientific fact and prediction. The great difficulty is that this notion is essentially mystical and religious, and that science, in its own sphere at least, has wanted to treat all facts with democratic equality.

BRADLEY, HAROLD CORNELIUS (1878-). An American chemist, born at Oakland, Cal. and educated at the Universities of California and Yale, where he was instructor of physiological chemistry in 1904-06 in the medical school. In 1906 he was called to Wisconsin, where in 1917 he attained full professional rank. In 1910 he became research director of the Woods Hole Marine Biological Laboratory. His original investigations have had to do with such subjects as the physiological chemistry of the

mollusks and the presence of various metals, such as copper and zinc, in marine mollusca, and manganese in fresh water mussels. He has also studied the chemistry of the human pancreatic juice and the specific nature of hæmoglobins.

BRADY, ALICE (?-). An American actress and singer, daughter of William A. Brady (q.v.). She graduated from the Boston Conservatory of Music, where she was a pupil of Theodora Irvine, and made her professional début under an assumed name in *The Balkan Princess* in 1911. Later she sang in Gilbert and Sullivan productions. She played Meg in *Little Women* with much success and appeared with John Barrymore in *A Thief for a Night*. During 1914 her best parts were in *Sylvia Runs Away* and *What Is Love?* She began to act for the motion pictures as well as the legitimate stage in 1914 and has appeared in many pictures. Her legitimate successes after 1918 include her playing in *Forever After*, in *Anna Ascends* (1920), *Drifting*, and *Zander the Great* (1923).

BRADY, WILLIAM A. (1863-). An American theatrical manager, born at San Francisco. He made his first stage appearance in that city in *The White Slave* in 1882. Six years later he started a repertory company which proved very successful. In 1896 he took over the management of the Manhattan Theatre and in 1911 built and opened the Playhouse with *Sauce for the Goose*. The most notable productions under his management were *Pretty Peggy*, *Foxy Grandpa*, *The Pit*, *The Law and the Man*, *Baby Mine*, *The Boss*, *Bunt Pulls the Strings*, *Clothes*, and *The Man and the Hour*. He has presented Grace George (Mrs. Brady), Robert Mantell, Holbrook Blinn, Cyril Scott and others. In 1917 he was appointed by President Wilson chairman of a commission to organize the motion picture industry to coöperate with the Committee on Public Information.

BRAGA, THEOPHILO (1850-1924). A Portuguese philologist and president of Portugal (see VOL. III). He edited and wrote the preface of *Portugal: an Anthology* by George Young (1916).

BRAGDON, CLAUDE (1866-). An American architect, born at Oberlin, Ohio, who has written many books and essays on architectural subjects and was interested in the theatre. He produced *Hamlet*, *Macbeth*, and *Cyrano de Bergerac* for Walter Hampden. His recent books include *A Primer of Higher Space (The Fourth Dimension)*; *Projective Ornament: Four-Dimensional Vistas* (1916); *Architecture and Democracy* (1918); *Oracle* (1921), etc.

BRAGG, SIR WILLIAM HENRY (1862-). A British physicist, educated at Cambridge. In Australia from 1886-1908 he was professor of physics in the University of Adelaide. He moved to England on his appointment as Cavendish professor of physics at the University of Leeds, 1909-15. Jointly with his son, William John Bragg (q.v.), he received the Nobel Prize in physics for 1915. Both shared in other honors for their pioneer work in the study of crystal structure by röntgen rays. In 1915 he took the chair of physics in the University of London. His chief writings are *Studies in Radioactivity* (1912), and *X-rays and Crystal Structure* (1915) written in conjunction with his son. He was knighted in 1920.

BRAGG, WILLIAM JOHN (1890-). A

British physicist, born in Adelaide, Australia, and educated at Cambridge. He was lecturer on natural sciences at Cambridge, 1914-19, but resigned to become professor of physics at the Victoria University, Manchester, in 1919. He was associated with his father in the authorship of *X-Rays and Crystal Structure* 1915, and shared the Nobel Prize for physics with him in the same year.

BRAILSFORD, HENRY NOEL (1873-). A British author and journalist, born at Mirfield, Yorks, England. He was educated at Glasgow University and taught there for a time; later he wrote for the *Manchester Guardian* and other newspapers. In 1897 he volunteered for service with the Greek Foreign Legion. He was editor of *The New Leader*, the British Socialist organ, and published *The Broom of the War-God*; *Macedonia* (1906); *Adventures in Prose*, essays; *The War of Steel and Gold* (1914); *A League of Nations* (1917); *Across the Blockade* (1919); *After the Peace* (1920), and *The Russian Workers' Republic* (1921).

BRAINARD, DAVID LEGGE (1856-). An American explorer and army officer (see VOL. III). In 1917 he became brigadier-general of the National Army, and the following year brigadier-general of the United States Army. He was retired in 1918.

BRAISTED, WILLIAM CLARENCE (1864-). An American naval surgeon, born at Toledo, Ohio, and educated at Michigan and Columbia Universities. After four years of hospital and private practice, he entered the United States navy as assistant surgeon and after successive promotions was retired in 1920 with the rank of rear admiral; he served as surgeon-general during 1914-20. Conspicuous in his career were service as medical representative of the United States navy department during the Russo-Japanese War and service as fleet surgeon of the Atlantic Squadron during 1912-14. While surgeon-general, he was a director of the Columbia Hospital for Women and a visitor of the Government Hospital for the Insane; also he was a member of the central committee and war relief board of the Red Cross. In September, 1921, he was called to the presidency of the Philadelphia College of Pharmacy and Science. He has received decorations for his services from Japan and Venezuela, while from his own government he received the Distinguished Service Medal for his work during the War. He is a member of many scientific societies, including the Association of Military Surgeons, of which he was president in 1912-13, and the American Medical Association, which he served as president in 1919-20. He was made a Fellow of the Royal College of Surgeons by the University of Edinburgh in 1919.

BRAND, CHARLES JOHN (1879-). An American agriculturalist and economist, born in Lac Qui Parie County, Minn. He graduated from the University of Minnesota in 1902 and in the year following was assistant curator of botany at the Field Museum of Chicago. From 1903 to 1919 he was in the service of the United States Department of Agriculture, in charge of investigation of grasses and cotton. He was chief of the Bureau of Markets from 1913 to 1919 and in the latter year became vice-president and general manager of the American Fruit Growers, Inc. He was a delegate to several scientific and agricultural conferences and

served on several important commissions during the War, besides being a member of the wool section of the War Industries Board. He wrote numerous bulletins, addresses, and papers on agriculture, and cooperative production, marketing, and distribution.

BRANDEGEE, FRANK BOSWORTH (1864-). An American politician (see VOL. III). He was reelected to the United States Senate in 1914 and again in 1920.

BRANDEIS, LOUIS DEMBITZ (1856-). An American jurist (see VOL. III) and Associate Justice of the Supreme Court of the United States, appointed in 1916. Prior to his elevation to the Federal bench Mr. Brandeis was prominent as a lawyer and reformer and took an active part in the Zionist movement and other matters relating to the Jews. He has written many articles on naval problems, railroads, trusts, and Zionism.

BRANDENBURG, ERICH (1868-). A German author, born in Stralsund. He studied law, then history, at the universities of Leipzig, Berlin, Göttingen, and Heidelberg, and became professor at Leipzig. From 1919 to 1920 he was rector of the Leipzig University. He is the author of *König Sigismund und Kurfürst Friedrich I von Brandenburg* (1891), *Die Gefangennahme Heinrichs von Braunschweig durch den Schmalkaldenbund* (1894), *Herzog Heinrich von Sachsen und die Religiösen Parteien im Reiche* (1896), *Martin Luthers Auffassung vom Staate und der Gesellschaft* (1900), *Die Parlamentarische Obstruktion* (1904), *König Friedrich Wilhelms IV Briefwechsel mit Ludolf Camphausen 1848-51* (1905), *Die Entstehung des Weltstaatensystems* (1907), *Der Eintritt der Südstaaten in den Norddeutschen Bund* (1910), *Die Deutsche Revolution von 1848* (1911), *Deutsche Kriegsziele* (1911), *Martin Luther als Vorkämpfer Deutschen Geistes* (1917), *Wie Gestalten Wir Unsere Reichsverfassung* (1919), *Die Naturalistische Geschichtsauffassung: Ihr Wesen und Ihre Wandlungen* (1920), etc.

BRANDENBURG, HANS (1885-). A German author and playwright, born in Barmen. He has written verse and fiction and is a student of modern drama and the dance. His books include, in poetry, *In Jugend und Sonne* (1904), *Einamkeiten* (1906), *Gesang über den Saaten* (1912), *Italianische Elegien* (1914), *Die Ewigen Stimmen* (1921); the novels, *Erich Westenkott* (1896), *Ohloe, oder die Liebenden* (1909), *Das Zimmer der Jugend* (1920); and a volume of sketches, *Der Moderne Tanz*. He has also written *Das Theater und das Neue Deutschland* (1919).

BRANDES, GEORG (MORRIS COHEN) (1842-). A Danish critic (see VOL. III). One of the greatest sympathetic critics of literature whose chief concern is with the "wide currents of European thought" rather than with "any national achievement or question of formal aesthetics and technique." His most recent work is *Wolfgang Goethe*, 2 vols., translated by Allen W. Porterfield (1924). It is the assembling of many years' notes on the famous German and outlines the development of the famous man "from cell up."

BRANOWYN, FRANK (1867-). A British painter and etcher (see VOL. III). His eight superb mural paintings for the Court of the Ages at the Panama-Pacific Exposition at San Francisco (1915) were masterpieces of

color and composition, which brought him also the important commission for the mural decoration of the Missouri State Capitol.

BRANSON, EDWIN BAYER (1877-). An American geologist, born at Belleville, Kan., and educated at the University of Kansas. He won a fellowship at the University of Chicago. In 1905 he became an instructor in geology at Oberlin and four years later was advanced to full professorship. He went to the University of Missouri as professor and head of the geological department in 1910. He devoted much attention to Devonian, Mississippian, and Pennsylvanian stratigraphy as well as to the geology of Missouri, and is an accepted authority on palæozoic fishes and Triassic amphibians.

BRANTING, HJALMAR (1860-). A Swedish statesman who first studied astronomy, devoting himself for a time to scientific work in the observatory of Stockholm. He then entered politics as a member of a small group of Social Democrats in Sweden. By his control of the weekly journal *Socialdemokraten* (1886), he spread his social doctrines, and for his articles in that publication he was imprisoned in 1888. In 1896 he was a member of the Second Chamber of the Riksdag. By his oratorical ability and as a leader of an increasingly powerful party, Branting rose to a position of national influence. In 1917 he became finance minister of the Eden government, and when that ministry fell in 1920 he was the head of a Social Democratic administration which, however, resigned in the same year. During the War and afterward, Branting took keen interest in all Social Democratic activities. He was representative of Swedish Social Democracy at the First International Congress. In 1917 he was chairman of the Dutch-Scandinavian delegation at Stockholm, and two years later, chairman of the International Social Democratic Conference in Berne. In addition he was a member of the executive committee of the Second International. In 1920 he was the member who introduced the question of "democracy and dictatorship" which terminated in a solid majority vote disapproving the Bolsheviks and their régime.

At the Council of the League of Nations in September, 1922, and at Geneva in July, 1921, as Sweden's leading delegate, he took up the cause of the inhabitants of the Åland Islands. In December, 1920, he was Sweden's leading delegate at the meeting of the League of Nations at Geneva and was on the sixth commission to settle questions of disarmament, etc.

BRAUN, HEINRICH (1854-). A German Social Democratic politician and writer on social questions. He edited the important socialist publications, *Neue Zeit*, *Archiv für Soziale Gesetzgebung und Verwaltung*, *Die Neue Gesellschaft*, and *Annalen für Sozialpolitik und Gesetzgebung*. He was minister for agriculture in the Prussian government under the presidency of Hirsch (1919). His wife, a famous writer and pamphleteer on feminism and socialism, was the daughter of General von Kretschman, an East Prussian Junker. See BRAUN, LILY.

BRAUN, LILY (1865-1916). A German writer, a feminist and socialist, who kept aloof from party activities. She was born in Halberstadt. Her grandmother was Jenny von Gustedt, an illegitimate daughter of Jerome Bonaparte and a prominent figure in old Weimar.

Her father was General von Kretschmann, whose *Kriegsbriege*, 1870-71, she edited. She married Prof. Georg von Gizycki, a leader in the Ethical Culture movement of Germany, and after his death Dr. Heinrich Braun, a sociologist and editor of the *Neue Gesellschaft*, a magazine of great merit but short life. Among her works are *Die Frauenfrage* (1901); *Im Schatten der Titanen*, a novel based on the life of Jenny von Gustedt (1908); *Memoiren einer Sozialistin*, two volumes of autobiography (1909-11); *Die Liebesbriefe der Marquise* (1912); *Mutter Maria*, a tragedy (1913); *Lebenssucher*, a novel (1914); and *Die Frauen und der Krieg* (1915). She died at Berlin in 1916.

BRAUN, OTTO (1897-1918). A German writer whose one posthumous volume gave him a place in literature. He was the son of Dr. Heinrich Braun and Lily Braun (q. v.) and received his education mainly from private tutors. Although only 16 at the outbreak of the War, he enlisted and served first on the eastern, then on the western front, where he fell in April, 1918. The diary, begun at the age of 10 and containing letters and poems, among them *Eros and Psyche*, and five scenes on motives from Apuleius, was published by a friend of his mother, Julie von Vogelstein, under the title *Aus den Nachgelassenen Schriften eines Frühvollendeten* (1920), and appeared in an English translation as *The Diary of Otto Braun* (1924).

BRAUNFELS, WALTER (1882-). A German composer, born at Frankfort, where he studied with I. Kwast and then with Leschetizky and Navratil in Vienna. After further study with L. Thuille in Munich he settled there in 1903, devoting himself entirely to composition. His works show decidedly futuristic tendencies. He wrote the operas *Prinzessin Brambilla* (Stuttgart, 1909), *Uhlenspiegel* (1913), and *Die Vögel* (Munich, 1920); *Ariels Gesang und Serenade* for small orchestra; *Phantastische Erscheinung eines Themas von H. Berlioz* for full orchestra; *Revelation*, for tenor solo, chorus, and orchestra; songs for baritone and orchestra; a piano concerto, and piano pieces and songs.

BRAWLEY, BENJAMIN GRIFFITH (1882-). An American clergyman and author, born at Columbia, S. C., and educated at the Atlanta Baptist College, the University of Chicago, and Harvard University. He taught English in the Atlanta Baptist College (Morehouse College) and in Howard University, 1902-20. In 1921 he became pastor of the Messiah Baptist Church of Brockton, Mass. Among his publications are *A Short History of the American Negro* (1913; rev. ed., 1919); *The Negro in Literature and Art* (1918); *Women of Achievement* (1919); *A Social History of the American Negro* (1921); *A Short History of the English Drama* (1921); and *Early Effort for Industrial Education*, a brochure (1923).

BRAY, FRANK CHAPIN (1866-). An American editor (see Vol. III). He was associate editor of *Current Opinion* from 1914 to 1916. In 1919 he was editorial secretary of the World's Court League and editor of the *League of Nations Magazine*, and became in the next year a member on the editorial staff of the *Literary Digest*.

BRAY, WILLIAM CROWELL (1879-). An American chemist, born at Wingham, Ont. He

was graduated in 1902 at Toronto, where he became an Exhibition Scholar, and then studied chemistry in Leipzig. Returning to the United States, he became a research associate in physical chemistry at the Massachusetts Institute of Technology and in 1910 was made an assistant professor. In 1912 he was called to California, where in 1918 he became full professor of chemistry. During the War he served with the Chemical Warfare Service in Washington (1918) and as associate director (1919) of the fixed nitrogen research laboratory. His original investigations have had to do with qualitative analysis, ionization, and the halogens, on which subjects he has published papers in the *Journal of the American Chemical Society*.

BRAZIL. The largest country on the continent of South America, with an area of 3,275,358 square miles, and a population (census of 1920) of 30,635,605. This was a gain of 13,317,049 over the last official census year (1900), or an average annual increase of 3.84 per cent. The average annual increase for the period 1890-1900 had been 2.12 per cent. The density of population increased from 5.2 in 1900 to 9.3 in 1920. The populations of the largest cities were: Rio de Janeiro, 1,157,873; São Paulo, 579,033; Bahia, 283,422; Pernambuco, 238,843; Pará, 236,402; Porto Alegre, 179,263. The steady flow of immigration, which with 1911 began to assume increasing proportions, was checked by the War, but with 1920 once more took on importance. Between 1820 and 1920, 3,647,301 immigrants entered the country, of which 30 per cent entered during the years 1908-20 alone. The greatest single year was that of 1913, when 192,683 reached Brazilian ports. In 1923, there were 86,767 immigrants distributed by nationalities as follows: Portuguese, 31,866; Italians, 15,839; Spaniards, 10,141; Germans 8254. With the conclusion of hostilities, the government applied itself once more to the stimulation of immigration and offered agricultural laborers every facility to induce settlement in the federal colonies. In 1922, it was reported that these federal colonies had a population of 44,459. Japanese laborers were admitted into São Paulo at the rate of 5000 a year.

Agriculture. Only a small fraction of Brazil's soil has yet been brought under cultivation. In 1921, this area was 23,938 square miles distributed among the following states: São Paulo, 8277 square miles; Rio Grande do Sul, 4513; Minas, 4248; rest, 6900. There were 650,000 proprietors of land by the census of 1920. Coffee continued the leading crop, the annual average production remaining 12,000,000 bags (1 bag=132 pounds) because of regulations and restrictions. In 1923, the yield was 1,140,735 metric tons of which 882,426 were exported (724,818 in 1912). The 1922 sugar crop, raised chiefly in Rio de Janeiro and Pernambuco, was 826,400 tons of which 252,111 tons were exported (4772 in 1912). Cotton, grown chiefly in São Paulo, Ceará, Rio Grande do Norte, Parahyba, Pernambuco, Maranhao, and Sergipe, in 1923 amounted to 107,256,800 kilograms of which 19,169,584 kilograms were exported. Tobacco, cultivated in Bahia and Rio Grande do Sul, netted in 1923, 70,896 tons of which 36,536 tons were exported (24,706 in 1912). Cacao (cocoa) cultivated in Espírito Santo and Bahia, yielded in 1923, 65,329 tons and 51,963 tons were exported (30,492 in 1912).

Other important products with quantity exported for 1912 and 1923 were: maté (tea) 62,880 and 87,580 tons; rubber, 42,286 and 17,995 tons; hides, 36,255 and 57,798 tons. The packing industry, which was non-existent before the War, under the stimulation of American capital took on important proportions immediately, the export of frozen and chilled meats in 1923 being 76,829 tons. The exportation of pine, too, became an important factor in Brazilian commerce in recent years. Areas devoted to various purposes in 1923 were:

Products	Area Hectares	Per cent of total	Number of estab- lishments
Coffee and mining ..	45,657,927	26.0	243,304
Cattle and cereal ...	71,887,492	41.1	209,803
Sugar, cacao, cotton	33,075,521	18.9	155,349
Rubber and nuts	24,483,735	14.0	39,697

Mining. Gold and diamond industries were steadily languishing, while the industrial ores, under spur of foreign capital, made considerable strides. Manganese ore, mica, and monazite sand showed the greatest improvements. Of the first, 154,870 tons were exported in 1912, and 235,831 tons in 1923. The mineral exports in 1913 were valued at \$3,412,950, while in 1923 they were worth only \$4,578,000. Coal, heretofore a negligible factor, began by 1920 to play a serious part so that in 1923 it was estimated that domestic coal (about 400,000 tons in 1923) was supplying one-third of the local needs.

Manufacturing. Cotton mills continued to occupy the leading place in Brazilian home industries, the mills increasing from 194 with 761,816 spindles in 1910 to 357 mills with 1,700,000 spindles in 1923. This native industry supplied about three-fourths of the local textile needs. Other indigenous industries showing gains were the tobacco, sugar-refining, and shoe manufactures. During the period, iron and steel manufacturing grew steadily so that by 1923, 70,000 metric tons were being produced annually. Pig iron was being turned out in Minas Geraes, and steel bars in São Paulo. By the census of 1920 there were 11,335 factories employing 151,841 hands, with an investment of 665,676,000 milreis and an output valued annually at 741,536,000 milreis. Under the stimulation of a high protective tariff such artificial industries as brewing, flour milling, tanning, etc., were being developed.

Commerce. The end of the War saw Brazil's foreign trade steadily mounting, the 1920 total value of exports and imports being \$845,469,578 as compared with \$539,285,040 in 1910. The adverse conditions following 1920 brought the 1923 total down to \$565,585,666. The exports for almost every year during the decade showed a favorable balance for Brazil, that for 1919 being the largest in its history (\$211,115,204). In 1923, it was \$103,326,092. However, the factors of invisible exchange offsetting this were considerable. These included the country's external indebtedness, the earnings of foreign capital invested in the country (British investments, \$500,000,000; French, \$100,000,000; American, \$10,000,000), personal remittances of foreign residents, particularly Italians and Portuguese, expenditures abroad of Brazilian tourists and students so that there existed for the year 1923 an adverse balance of foreign payments of nearly \$35,000,000. The United States during

the War stepped to the forefront as the leading factor in Brazilian foreign commerce and thus for the first time dislodged Great Britain from its commanding position, only to lose it again, however, in 1922. In 1923 and 1917, the United States sent 16 and 47.25 per cent of the Brazilian imports and received 33 and 44.68 per cent of her exports. In 1920 and 1923, these figures were: imports, 42.1 and 20 per cent; exports, 41.38 and 43 per cent. In 1923, Great Britain took 11 per cent of Brazil's exports and sent 24 per cent of the imports. Other countries participating were Argentina, France, Portugal, Italy, India, Uruguay, Germany. Leading imports were iron and steel products, wheat and wheat flour, machinery, petroleum, hardware, automobiles, chemicals, codfish, coal. From a merchant navy of 238 steamers of 130,582 tons in 1911, ships flying Brazilian flags increased to 1419 steamers of 598,261 tons in 1919. The Brazilian Lloyd Company, formed of German vessels seized by the government on its declaration of war, established a regular service between Rio de Janeiro and New York and also with Liverpool and Portugal. In 1922, 25,264 vessels of 27,459,975 tons entered Brazilian ports as compared with 17,072 vessels of 12,927,000 tons in 1905.

Communications. In 1923, 18,554 miles of railway were open for traffic as compared with 13,848 miles in 1911. The individual states possessing the greatest mileage were São Paulo, 4160 miles; Minas Geraes, 4139 miles; Rio de Janeiro and Federal District, 2657 miles; Rio Grande do Sul, 1708 miles; Pernambuco, 1300 miles. During the period construction went on in the interior, a line in 1916 being completed from Itapura to Porto Esperança (State of Matto Grosso). In 1921, a third line into Matto Grosso was projected for the purpose of eventually tapping the rich Madeira country. It was planned to run it from Agua Clara to Cuyaba. Another plan called for a railway from Paraguay to São Paulo to divert the former's traffic from Buenos Aires. In 1919, there were 54,526 miles of telegraph line; 252,318 miles of telephone wires; in 1920, 3696 post-offices.

Finance. The national budget continued to show deficits in spite of heroic measures on the part of the government. The 1921 account showed a deficit of 56,011,364 paper milreis; for 1922, the deficit was 84,446,437 paper milreis; and the deficit in 1923 amounted to \$21,578,000. For 1923, the expenditures were 92,000,000 gold milreis and 997,000,000 paper milreis (59,248,045 gold and 443,952,452 paper in 1912); the revenues, 99,000,000 milreis gold and 743,000,000 paper (92,195,610 gold and 312,627,500 paper in 1912). On Dec. 31, 1923, the consolidated foreign debt was \$677,134,899. This total included £102,729,434, \$68,996,500, and 322,249,500 francs. The internal debt on Dec. 31, 1923, amounted to 1,514,481,300 paper milreis, and the floating debt on the same date amounted to 957,267 gold and 372,928,685 paper milreis. The total paper money in circulation on the above date was 2,643,192,867 milreis. The total public debt amounts to \$856,707,899. Average 1923 value of paper milreis was \$0.102 (normal value \$0.327).

Education. The advance in educational facilities was inconsiderable since attendance was not compulsory. There were, according to the latest reports, about 14,000 primary schools, 11 agricultural, and 9 commercial schools.

Courses in law, medicine, and engineering were given by 29 colleges. In 1920, the University of Rio de Janeiro was founded.

Defense. The total peace strength, based on compulsory military service, was, in 1921, 54,000; the complete mobilization force was placed at 120,000 men. The military expense was steadily cut, it being estimated that in 1922 the figure had become 45 per cent lower than that of 1913. No new dreadnoughts were laid down after 1907 but the government decided in 1921 to reorganize completely the navy under the supervision of American naval officers. A mission, headed by Commander Vogelgesang, was attached in an expert capacity to the Brazilian naval department. Dry docks at Rio de Janeiro and five naval stations on the coast were provided for in 1922. The *Rio de Janeiro*, dreadnought of 27,500 tons laid down in 1911, which Brazil failed to purchase and which saw service in the War under the British flag, was reported as sold to Brazil in 1921. This decision to continue the naval programme of 1906 was received with misgivings by Brazil's South American neighbors, Chile in particular protesting against steps that could end only in an armament-building race. See NAVIES OF THE WORLD.

Explorations. In 1914, Theodore Roosevelt, accompanied by a Brazilian party, made an exploring expedition down the River of Doubt, a tributary of the Madeira, which succeeded in confirming the existence of the hitherto questioned river. It was established that the river was 940 miles long. In honor of the explorer, Brazil named the body the Rio Roosevelt.

History. Brazil's internal history did not show the settled condition of her important neighbors and revolts continued to trouble her governments and distract attention from more important concerns. A rebellion that broke out in February, 1914, among the rubber collectors of Ceará reached alarming proportions and necessitated the intervention of the central government. Again, late in 1922, a revolt in the state of Rio Grande do Sul led to protracted fighting and it was not until June, 1923, that regular troops had the situation under control as a result of the capture of Alegrete, the stronghold of the revolutionists. There was a similar local uprising in São Paulo in July, 1924, which did not, however, attain serious proportions but which necessitated the intervention of Federal troops. The outbreak of the War affected Brazil's commercial stability seriously because of the country's dependence upon the European purchasing and money markets. The temporary falling off of imports and exports with an accompanying decline in customs receipts, the government's mainstay, led to the establishment of a moratorium for the redemption of foreign securities. Like other South American countries, Brazil naturally gravitated toward the United States, as the figures above given indicate, with the result that the trade record steadily mounted. Brazil, like the United States, was forced into the arms of the Allies by the German submarine campaign and the sinking of three Brazilian steamers. In May, 1917, Congress authorized the President to declare war at his pleasure and seize German interned vessels (about 45 in number). On Oct. 26, 1917, a state of war was declared and Brazil gave much material aid. Late in 1917, a new military act was promulgated providing for a draft army but this move came too late to

give any assistance on the battle fronts. As an ally Brazil was represented at the Peace Conference, took her place in the League of Nations and was elected a member of the Council. The "A. B. C." Entente of Argentina, Brazil, and Chile was cemented in May, 1915, by the signing of a treaty providing arbitral machinery in case of disputes. Discord did not appear until 1923, when Chile, aroused by Brazil's increased naval programme, brought up pointedly the question of disarmament. A meeting of the A. B. C. powers, preliminary to the annual Pan-American Conference, was held at Valparaiso in January, 1923; but here and at the Conference itself nothing was accomplished. The administration of Dr. Wenceslão Braz (1914-18) succeeded to some extent in cutting the national deficit though that factor always rose to trouble administrators. The success of his administration was due mostly to the great prosperity of the War period when Brazilian products were much in demand. He was followed for the next term by the former president, Sr. Alves, who died in 1919 without assuming office. In the special election following, Dr. Epitácio de Silva Pessoa, then head of the Brazilian peace delegation at Versailles, was chosen to fill out the term, 1918-22. For the presidential term 1922-26, Dr. Arturo da Silva Bernardes was elected. Brazil's centennial anniversary was celebrated by an exposition held in Rio de Janeiro, beginning Sept. 7, 1922. Secretary of State Hughes attended as official delegate of the United States. The cordiality displayed in Secretary Hughes' reception received material confirmation in the most-favored nation agreement reached between Brazil and the United States in October, 1923.

Throughout the period reviewed Brazil's leading preoccupation was her industrial development. Possessing vast economic resources of timber, coal, iron, and water power, it was only a question of years when Brazil would become a nation of great wealth and economic independence. To this end the government's policy was plainly paternalistic. An irrigation programme was announced in 1915 and was rapidly being pushed; local coal mines and the sources of hydroelectric power were being tapped; a loan of \$25,000,000 was being applied to the electrification of the central Brazil Railways; protective tariffs on the imports of textiles and the like were being formulated for the encouragement of native industries. To cope with the social problems to which the country's industrialization was giving form, a national labor council was erected in 1923 with an ambitious programme for research. This was to include the study of labor disputes, work days, women and children in industry, social insurance, rural credit banks, etc. Another evidence of the new orientation was the presence, up to 1924, of foreign missions in the country: an American mission to advise on naval matters, a French on military affairs, and a British on finances. See also PAN-AMERICAN CONFERENCES.

BREASTED, JAMES HENRY (1865-). An American historian (see VOL. III). He became head of the Department of Oriental Languages in the University of Chicago in 1915, Earl Lecturer at the Pacific School of Religion and the University of California (1918), Hale Foundation Lecturer at the American Academy of Science in Washington, D. C. (1919), and

president of the American Oriental Society in 1918. In 1919 he was appointed director of the Oriental Institute of Chicago, and in the year following he had charge of the archaeological survey for the Institute, in Mesopotamia. He is author of *Outlines of European History, I*, with J. H. Robinson (1914); *A Short Ancient History* (1914-15), *Ancient Times, A History of the Early World* (1916), *Survey of the Ancient World* (1919); *History of Europe, Ancient and Mediaeval*, with J. H. Robinson (1920); *Ancient History Atlas* (1920); *General History of Europe*, with Robinson and Smith (1921); and *The Oriental Institute of the University of Chicago, a Beginning and a Program* (1922).

BRECK, JOSEPH (1885-). An American art director, born at Allston, Mass. He was graduated from Harvard, studied art in Europe for a year, and did graduate work in art at Harvard, 1908-09. He was appointed Assistant Curator in the Department of Decorative Arts at the Metropolitan Museum in 1909 and director of the Minneapolis Society of Fine Arts, 1914. In 1917 he returned to the Metropolitan Museum. His works in art scholarship include: catalogues of the Romanesque, Gothic, and Renaissance sculptures in the Metropolitan Museum. He is a member of the American Association of Museums, the American Federation of Arts, and the Association of Art Museum Directors.

BRENNERT, HANS (1870-). A German author and poet, born in Berlin. He studied political economy and history, but turned to literature, and has written two volumes of verse, *Landsturm* (1914) and *Frühlingsküsse* (1918); three books of short stories, *Jungfern und Junggesellen: Lieblose Geschichten* (1906), *Lumpel* (1916), and *Der Erdbeersüsse Mund* (1919); and the comedies, *Die Hasenpöte* (1901), *Die Indische Amme* (1901), *Der Kaiserjäger* (1905), *Blau und Rot* (1916), *Von Fünf bis Sieben* (1918), and *Bumerang* (1920), besides numerous adaptations of plays from the Danish and French, alone or in collaboration with Erich Urban and others.

BRENT, CHARLES HENRY (1862-). An American bishop (see Vol. III). He was elected bishop of New Jersey in 1914 but declined. In 1919 he accepted the bishopric of western New York. In 1921 he was Duff Lecturer at the Universities of Edinburgh, Aberdeen, and Glasgow, and a member of the board of overseers of Harvard University. For his services as chaplain at the General Headquarters of the American Expeditionary Forces in France in 1918-19, he received the Distinguished Service Medal and other honors. He is author of *Presence* (1914), *Prisoners of Hope* (1915), *Inspirations of Responsibility and Other Papers* (1915), *The Revelation of Discovery* (1915), *A Masterbuilder* (1916), *The Conquest of Trouble and the Peace of God: Musings* (1916), *The Mount of Vision* (1918); *The Commonwealth of Mankind*, a sermon (1918), and *Soldiers of the Wooden Cross*, an address (1919).

BRENTANO, FRANZ (1838-1917). An Austrian philosopher (see Vol. III). He died in March, 1917, and left behind a large number of unpublished scientific writings. Their general content was made known to the scientific world through the biography published in 1919 by Oscar Kraus, with reminiscences by Carl Stumpf and Edmund Husserl. The papers deal largely with logical theory, including the theory of ob-

jectives as developed by the so-called Austrian school, the notion of substance, and the scientific utility of that conception. One of the most interesting articles is on the Lorenz-Einstein problem. In it Brentano has pointed out the assistance which might be obtained from the consideration that physics and chemistry deal merely with the relations and transformations of the accidents of an immutable substance.

BRENTANO, LUJO (1844-). A German economist (see Vol. III), descendant of the Brentano family prominent in the romantic period of German literature. He has a great number of works on economic and philosophic subjects to his credit; within the decade 1914-24 he published *Die Anfänge des Modernen Kapitalismus* (1916); *Die Byzantinische Volkswirtschaft* (1917); *Arbeitslohn und Arbeitszeit nach dem Kriege* (1918); *Der Weltkrieg nach E. D. Morel* (1921); and *Clemens Brentano's Liebesleben* (1921).

BRENTANO, THEODORE (1854-). An American jurist and public official, born at Kalamazoo, Mich., and educated in the public schools of that city and in Germany and Switzerland. In 1882 he was admitted to the bar by the Supreme Court of the District of Columbia. He acted as attorney in the office of the corporation counsel of Chicago in 1887 and in the following year was assistant city attorney. From 1890 to 1921 he was judge of the Supreme Court of Cook County, Ill., serving also as chief justice. He was appointed Minister to Hungary by President Harding, in 1922.

BRERETON, LEWIS H. (1890-). An air attaché of the American Embassy in Paris, born in Allegheny, Pa., and educated at St. John's College and the United States Naval Academy. In 1919 he was rated military aviator, for distinguished service against the enemy in action at the front.

BREST-LITOVSK, TREATY OF. See AUSTRIA-HUNGARY; RUSSIA, *History*; WAR, DIPLOMACY OF THE.

BRETHREN, CHURCH OF THE. The largest of the five branches of the denomination known as the German Baptist "Dunkers," organized in 1708 at Schwarzenau, Germany, and in this country in 1719. The number of communicants increased from 95,000 in 1914 to 115,241 in 1923, the number of congregations from 1000 to 1024, and the ministers from 3060 to 3264. In 1923 there were 1302 Sunday schools with 149,528 pupils. Mission work was carried on throughout the decade in India, China, Sweden, and Denmark, and was begun in Africa in 1923. Subsidies were made to 10 colleges. The Five-Year Movement in the church was carried on, from 1920 to 1924 inclusive, for the purpose of general expansion in membership, missionary, and educational fields. *The Gospel Messenger* and *The Missionary Visitor* were the official publications of the denomination during the decade.

BRETON, ANDRÉ (?-). A French poet, one of the most important representatives of the Dadaist school in France. He published an exposé of the doctrine of Dada in the *Nouvelle Revue Française* (August, 1920). Besides this he is author of *Rieuse*, *La Forêt Noire*, influenced by Rimbaud and Mallarmé, and *Olé de Sol*.

BRETT, GEORGE SIDNEY (1870-). A Canadian professor of philosophy. He was educated at Christ Church, Oxford, and after his

graduation entered the Indian Educational Service. He was called to the University of Toronto in 1908, where he occupied first the position of lecturer and then that of professor of philosophy (1916-). His works include *The Philosophy of Gassendi* (1908) and a standard *History of Psychology*, 3 vol. (1912-21).

BREWER, DANIEL CHAUNCEY (1861-). An American lawyer, born at Boston, and educated at Williams College and the law department of Boston University. In 1887 he took graduate courses at Princeton, and was admitted to the bar the next year, and from that time practiced in Boston. He was trustee, director, or officer for many public service, religious, and educational corporations. He was president of the North America Civil League for Immigrants; a member of the Immigration Committee of the National Civic Federation, the Massachusetts Committee of Public Safety, and the Massachusetts Constabulary Commission; and in 1917-18, was chief of the Foreign-Speaking Soldier Section of the General Staff, United States Army. He was the author of *Rights and Duties of Neutrals* (1916) and wrote on international law in various reviews.

BREWSTER, BENJAMIN (1860-). An American bishop, born at New Haven, Conn., educated at Yale University and at the General Theological Seminary, New York City. In 1886-1906 he was minister or rector of churches in New York City, South Orange, N. J., and Colorado Springs, Colo. He was dean of Saint Mark's Cathedral, Salt Lake City, Utah, 1906-09, and from the latter year until 1916 he was missionary bishop of western Colorado. In 1916 he became bishop of Maine.

BRIAN, DONALD (1877-). An actor and singer born at St. Johns, Newfoundland. After his first stage appearance at Lawrence, Mass., in 1896 as Hardie Grant in *Shannon of the Sixth*, he appeared continuously in American theatres; later successes included characterizations of Sandy Blair in *The Girl from Utah* (1914), the Grand Duke in *Sybil* (1916), André de Courcy in *Her Regiment* (1917), Robert de Lambrissac in *The Girl Behind the Gun* (1918), and Sunny in *Buddies* (1919). This last rôle made him known all over the United States when he toured with the production, 1920-21.

BRIAND, ARISTIDE (1862-). A French statesman (see VOL. III). It was during the War that M. Briand especially distinguished himself. He was Minister of Justice from Aug. 26, 1914, to Oct. 29, 1915, and in the latter year he succeeded Viviani as premier, continuing in this office until Mar. 20, 1917, when Clémenceau came into power. His ambition was to equalize military efficiency of the Allies, and he succeeded in taking the first steps toward this end, in spite of the opposition of the French Parliament, who wanted more than their share in the conduct of the War. He also came into conflict with the British in regard to the Saloniki expedition. Later, when he was Minister of Foreign Affairs, he succeeded in bringing Rumania into the War under the Allies. On Jan. 6, 1921, he became prime minister for the seventh time. He was faced with the difficult task of protecting France in the enforcement of the Peace Treaty. In November, 1921, he attended the Disarmament Conference at Washington and pleaded his country's cause very eloquently.

BRICK. See ROADS AND PAVEMENTS.

BRIDGE. A card game which bears considerable resemblance to whist, four players taking part. Following the opening lead, the partner of the dealer places his cards upon the table exposed. These cards are played by the dealer in the fashion of "dummy" whist. The trump suit is named by the dealer or his partner, the former having first say. "No trumps" also may be declared. The value of the tricks and honors varies with the suit named as trumps, honors not counting toward the winning of the rubber but being added afterwards to the trick score to fix the value of the rubber.

According to the latest revision of the rules for the game each trick above six counts two points with spades as trump, four with clubs, six with diamonds, eight with hearts and twelve with no trumps. Thirty points constitute a game, the rubber ending when either of the contesting sides has captured two games, the winners being permitted to add one hundred points to their score.

The honors comprise ace, king, queen, jack, ten of the declared suit. If one side holds three honors it counts twice the value of a trick; four honors, four times the value; five honors, five times. In a no-trump declaration the side holding three aces scores thirty for honors; four aces forty and if four aces are in one hand one hundred is tallied for honors.

A recent development of the game is called auction bridge which has more of the gambling flavor, so to speak, than the original game. The dealer after inspecting his hand must assert his ability to win by at least one "odd" trick and then each player in turn starting at the dealer's left has the right to outbid the dealer by doubling, redoubling or overcalling until all the players are content. The actual playing of the combined hands rests finally with the partners making the highest bid.

Consult: R. F. Foster, *Bridge Tactics and Laws and Principles of Bridge*.

BRIDGE, FRANK (1879-). A British composer, born at Brighton, and educated at the Royal College of Music in London. He has the reputation of being one of the finest viola players in England. In 1910-11 he was conductor of the Brama opera season at the Savoy Theatre, and in 1913 assistant to Beecham at Covent Garden. As a composer he shows a decided predilection for chamber music. His works include a string quartet in E minor; three *Idylls*, three *Noveletten* and a *Phantasy* for string quartet; a string sextet in E, performed at the Berkshire Chamber Music Festival (1923); a piano trio; and for orchestra, a symphonic poem, *Isabella*, a *Dance Rhapsody*; a suite, *The Sea*, and a *Dance Poem*.

BRIDGEPORT. A city and port of entry of Connecticut, on Long Island Sound. The population increased from 102,054 in 1910 to 143,555 in 1920 and in 1924 was locally estimated at 155,000. During the War a large proportion of the ammunition used by the United States and the Allies was made in this city. The Remington U. M. C. Company built several large factories employing 20,000 men night and day in eight-hour shifts. Two or three other munition factories were opened and practically every metal-working concern in the city was employed on sub-contracts. To meet the housing problem raised by continued increase in population, some of the factories and a specially-organized housing company erected several thousand new dwellings.

BRIDGES. Bridge construction throughout the world naturally suffered during the War, and for a while in the period of readjustment subsequent to the close of hostilities. In Europe naturally in the war period there was demolition of bridges rather than construction, except of a most temporary character. After the Armistice, however, it was of course essential to carry on a vast amount of reconstruction in such countries as France, Poland and Austria, where the destruction of the railways had been ruthless and in places complete. For a while the simplest and even temporary repairs were made, but gradually permanent construction was developed as funds were made available. It was the general lack of funds for such important expenditures that restricted bridge building, not only in Europe but also in the United States, for a period of economy and retrenchment was enforced on the railways, as well as the governments, and while some important bridges were built it was not for a considerable while that many large structures were planned.

By 1924 it was realized that structural work had reached a point, so far as design and materials were concerned, where the size of a bridge depended upon financial conditions making possible its development, rather than upon what could be designed and fabricated. Naturally the cost of iron and steel subsequent to 1914 increased along with coal, so that on this score alone it would appear probable that the limits of large bridge construction might be reached within the twentieth century. For example, in the interval 1914-1924 the prices of iron and coal had more than doubled, while a timber truss bridge, once inexpensive and common in the United States, by 1924 would involve greater expense than the equivalent in either a steel or concrete bridge.

Likewise the masonry and stone arch was no longer economically feasible, and the last and largest stone arch to be built was the arcaded railway bridge of 282-foot span, erected in 1905 over the Isonzo River in Istria, Italy. Erection of this structure was facilitated by the fact that this region not only produced suitable materials but also developed highly skilled stone masons who were in demand for construction work all over Europe. This bridge was destroyed in 1916 in the course of military operations.

On the other hand while the use of wood, masonry and steel tended to become more restricted it was found possible to employ concrete and reinforced concrete for various types from small bridges to such a concrete arch as that spanning the Seine between the towns of St. Pierre-du-Vauvray and Ande (about 16 miles from Rouen) which had a clear span of 131.8 meters (432.44 feet). Concrete construction lent itself readily to bridge building, not only on account of the moderate cost of material, but also as it produced a bridge which required a minimum of maintenance and naturally reduced outlay for inspection, painting and other care. As additional experience was gained in the design of concrete structures; it was found possible to increase the length of span and capacity, and the bridge engineer often was able to construct structures of armored or reinforced concrete far superior to those of steel.

With their additional durability and decreased cost of maintenance, in many cases it was pos-

sible also to secure a pleasing architectural appearance, so that such structures with the addition of suitable embellishments, were built in many cases as memorials. Reinforced concrete bridges came to be constructed in a variety of types ranging from small highway bridges to spans of over 600 feet, and high viaducts, such as the Tunkhannock viaduct on the Delaware Lackawanna and Western Railroad, were possible.

In the various undertakings proposed bridge engineers were in no way daunted at designing bridges of great capacity and extreme length of span. This was well demonstrated in the two-deck suspension bridge designed to cross the Hudson River at New York City with a river span of 3240 feet and two shore spans each of 1650 feet making with the approaches a total length of bridge of 7340 feet. This project involving as it did a large capacity bridge supporting wide roadways and multiple tracks, on its engineering side, at least, received the approval of bridge and other engineers of eminence who expressed no doubt as to the feasibility of such an enormous undertaking. In connection with bridges of large capacity and long span such as were built or projected from 1914 on, it must be realized that such structures were largely possible only by the use of alloy steels, such as nickel steel, chromenickel steel, and silicon steel which had considerably greater strength than carbon steel, so that it became possible to secure adequate strength with less weight of material. The substitution of nickel steel for the older structural steel might afford a saving of 10 to 15 per cent in the cost of a chain or stiffening truss.

The leading types of bridges where considerable length of span was involved and steel construction must be employed, were the arch, the cantilever and the suspension. During the period under review the architectural feature of such bridge construction as well as those built of masonry or concrete was receiving more attention. It was found in the larger and monumental designs that often it was possible to secure grace and beauty. In fact the appearance of the water front of New York City is materially enhanced by the large structures crossing the East River, and for many years the Firth of Forth bridge has stood as a design of pronounced beauty. Of these types the cantilever principle was the least adaptable to artistic treatment, but even here a long span can be made attractive, as is demonstrated in the Firth of Forth bridge just mentioned.

An arch bridge without question can be made beautiful in appearance. Such a bridge as the Hell Gate bridge of the New York Connecting Railways, standing out in bold relief, is typical, not only of strength but of graceful design which was to be repeated in large measure in the New Sydney, Australia, bridge. The suspension bridge, which may be said to be purely American in its development, also lends itself to architectural treatment, not only in the graceful curves of its suspending cables, but also in the towers employed. Apparently no limit of length had been reached for such bridges, and in addition to those about New York City, and the Philadelphia-Camden bridge under construction in 1924, long span suspension bridges were proposed for Detroit, and Nagasaki, Japan.

Highway development in the United States,

due to the increased use of motor vehicles, was responsible for a large number of bridges of varying sizes and designs. Furthermore with the increased weights of motor vehicles it was found necessary to replace many of the country highway bridges, while to obtain through routes wide rivers had to be bridged or crossed. Usually these bridges were erected by public authority and for the most part were free, but where toll bridges were provided the increase in traffic made them in many ways remunerative.

Highway bridges were required across the Hudson as at Bear Mountain and Poughkeepsie, and across the Willamette in the vicinity of Portland, Ore., of which the 350-foot steel arch at Oregon City built in 1922 was a conspicuous example. Several bridges were proposed for San Francisco Bay of which that over Carquinez Straits at San Mateo was under construction in 1924. In the previous year the United States War Department had granted permission for the construction of two vehicular bridges across the lower end of San Francisco Bay. One of these was to have its western end at Little Coyote Point about 24 miles by highway south of San Francisco, while the other involved a bridge at Dumbarton near the site of the railroad bridge of the Southern Pacific. The first of these projects involved a 6-mile bridge across the south end of San Francisco Bay from San Mateo. Inasmuch as there was navigable water with a depth of 40 feet for a distance of 1 mile this was to be bridged by a 200-foot lift span and arches of 250-foot span. Shorter concrete arches were to be employed for 2 half-mile approaches and the remaining 4 miles was to consist of trestle or fill. The roadway was to be 60 feet wide.

Suspension Bridges. This type of bridge construction not only was developed in America but was employed there for the longest spans and for the heaviest loads. In Europe, on the other hand, no wire suspension bridges of any size had been built, and but few where the cables were made of eye-bars, or of plates and angles. The Elizabethan bridge at Budapest, built in 1903 with a span of 951 feet, a bridge across the Oder at Breslau, built in 1911 with a span of 415 feet, and the only suspension bridge across the Rhine at Cologne, completed in 1917, with a span of 605 feet, are outstanding examples. In the case of the Cologne bridge the cables are formed of plates and angles which are rivetted into tension members. The horizontal thrust at the ends is taken up by box stiffened girders extending from end to end so that at the anchorage only vertical forces must be resisted. The steel towers of this bridge are plain and without decorative features, so that the structure as a whole in its architectural design does not compare favorably with American work of the same character.

In most of the more notable American suspension bridges wire cables were employed, and this type of construction was employed in the Delaware River bridge under construction in 1924 where parallel wires were united in cables aggregating 30 inches in diameter. These cables were the largest to be used and the employment of parallel wire construction for such large members received some criticism, as it was argued that eye-bar cables would be preferable.

Proposed Hudson River Bridge at New

York. The longest span and heaviest bridge yet to be proposed was the design of Gustav Lindenthal to cross the Hudson River at New York City with a span of 3240 feet to which reference has been made. Elaborate plans for this structure were developed and its feasibility was accepted by engineering experts called in to pass upon the project, but it was doubtful, however, that such a structure in the form designed ever would be built, notwithstanding it provided for a vast capacity of tracks and roadways, and involved comprehensive transportation schemes with extensive approach and terminal arrangements. Nevertheless, it must be considered as a bold and interesting engineering conception, though from an economic standpoint it was questionable whether it could successfully compete with a system of tunnels.

Philadelphia-Camden Bridge. In 1921 an interstate bridge commission of Pennsylvania and New Jersey approved the plans for the erection of a suspension bridge across the Delaware River between Philadelphia and Camden prepared by a board of engineers consisting of Ralph Modjeski, George S. Webster and Laurence A. Ball. The design involved a suspension bridge with a central span of 1750 feet, which exceeded by 150 feet the Williamsburgh Bridge across the East River at New York, previously the longest suspension bridge. The Delaware River bridge was 3536 feet long from anchorage to anchorage with a total length of bridge structure, including approaches, of 8126 feet. The selection of the suspension type with wound wire cables was interesting in view of the fact that this form of bridge was decided on after a consideration of both the cantilever and the arch types. The suspension bridge was much lighter, involving 33,000 tons of steel, as compared with 47,000 tons for the cantilever, and was believed to afford less risk in construction, as well as being adapted more readily to the subdivision of the contracts. Furthermore, the foundations and the anchorages for such a bridge were less extensive and it could be constructed much more quickly.

This bridge was for vehicular traffic only, and with a total width of 57 feet between curves provided six vehicular lanes, each 9½ feet, and outside of the 57 feet roadway there were two car tracks in each direction, and two 10-foot pedestrian ways, the latter being placed above on the upper lateral bracings.

The two towers were solid built steel posts bearing the cables firmly attached to their saddles, following the practice in the Manhattan Bridge across the East River at New York City. The cross-section of each post increases from 7 x 12 feet at the top to 7 x 40 feet at the base. The two 30-inch cables are spaced 89 feet from each other, and while these cables were the largest ever to be formed of parallel wires, being made up of 16,500 parallel wires, each being 0.192 inches in diameter, they were selected in preference to four cables. This feature of the design was criticized by some bridge engineers as the largest cables with parallel wires hitherto employed were the 20.5 inch cables of the Manhattan Bridge at New York City.

From the cables the suspended hangers were spaced about 20 feet, and each consisted of four 2½ inch galvanized wire ropes attached to a cast steel saddle. A short channel length was considered desirable for the stiffening trusses, 20.5 feet for the main span and 20.5 feet for the

side span. These trusses were of simple triangular web system continuous across the span, and were supported at the towers by stiffening hangers.

Local conditions required that the anchorages must be placed a considerable distance back of the towers so that suspended side spans were adapted whose length was slightly less than the main span. The cables have a sag of 200 feet. For the main part of the structure high strength alloy steel was selected and high carbon steel wire for the cables and hangers. A unit stress of 72,000 pounds per square inch was in the cable wires and was considered permissible in the emergency live loading, and 60,000 pounds under normal full loading. The two river piers measured 70 x 143 feet at the base, and required for both some 62,000 cubic yards of masonry. They were granite faced down to the point below water level, and were built by sinking pneumatic caissons to the rock. See FOUNDATIONS.

Bear Mountain-Hudson River Suspension Bridge. In 1924 a large suspension bridge across the Hudson River above Peekskill and between Bear Mountain on the west and Anthony's Nose on the east bank was reaching completion. Here the opposite shores of the river approach within 1600 feet of each other, making possible an advantageous location of a bridge with a reasonable short span where there was ground suitable for foundations for towers near the shore line. This bridge affords accommodation for vehicular traffic between New York and New England, as well as the more adjacent regions on both sides of the river, and was the only bridge across the Hudson so far to be constructed below Poughkeepsie, where there was a railroad bridge, although plans had been prepared for a state vehicular bridge at Poughkeepsie for which authority was granted by the state legislature in 1924.

The Bear Mountain bridge design involved a suspension bridge with straight (unloaded) backstays. It was of 1632 feet main span, and had steel towers 355 feet above high water foundations, resting on concrete piers and supporting two steel wire cables 18 inches in diameter, each containing 7452 wires of 0.192 inches in diameter. These cables are placed 61 feet, 4 inches centre to centre, and carry double suspender steel wire ropes, 2½ inches in diameter to which are attached transverse suspender beams supporting stiffening trusses 30 feet deep and 55 feet centre to centre. On the east there is an approach span 220 feet long, crossing the New York Central Railroad tracks, while on the west bank there is a truss span of 220 feet length also, and a 100-foot truss of two 50-foot plate girder spans.

The total length of the Bear Mountain bridge between abutments is 2238 feet. The bridge floor is 48 feet wide between railings, affording a 38-foot roadway and two 5-foot sidewalks. The cable wires and the suspender ropes are of 220,000 pounds ultimate strength, being made of carbon steel, as are the other parts of the bridge excepting the stiffening trusses which are of silicon steel. At either end inclined tunnels for anchor pits were carried into the bank about 100 feet deep, and here were placed cast steel bases to which the anchorage eyebars forming the terminals of the cables were connected.

Brazilian Suspension Bridge at Florian-

opolis. A notable eye-bar suspension bridge with a 1114-foot span was completed in 1924 at Florianopolis in the province of Santa Catharina, Brazil, being a combined highway and railway bridge connecting the island on which the city is located with the mainland. Not only was this one of the world's largest suspension bridges, but it was the first application of modern eye-bar chain construction to such a bridge, although this type of design frequently had been proposed for structures of this class. In connection with the use of eye-bars for the chain and the unloaded backstays, there was involved also an unusual stiffening truss which developed considerable rigidity and economy.

The eye-bar type of chain was adopted inasmuch as heat treated eye-bars of 75,000 pounds per square inch minimum elastic limit could be fabricated, making possible a working stress of 50,000 pounds per square inch in an eye-bar chain, rendering this type more economical than a wire cable suspension bridge. The eye-bar chains are carried by towers formed of two-column steel bents with battered legs rising to a height of 225 feet above the base on the pier. The stiffening trusses have curved top chords so arranged as to afford maximum depth at the quarter-points, for the top chord in the middle section is formed by the suspension chain itself. The truss spacing is at 33½ feet which gives a 28-foot clear width of roadway. The backstays support no load but are carried back down directly to masonry anchorages, one of which is on rock, while the other is carried by a pile foundation.

The approaches to the suspension span are steel viaducts, the spans directly adjacent to the towers being each of 185 feet. The two chains were formed each of four eye-bars 12 inches wide from anchorage to anchorage. Their thickness varied from 2 inches for the backstays to from 2 inches to 1¾ inches for those on the main span. The suspenders from the chains are of two parts, being formed of 1½ inch galvanized wire steel rope socketed to clevis attachments of the top chords of the trusses. The total dead weight allowed for was 4370 pounds per lineal foot of span with a live load of 2000 pounds.

Continuous Truss Bridges. One of the most important types to be developed in American bridge practice was the continuous type which found favor for railway bridges. In this type not only was strength and economy of material secured but also ease of erection so that it was extensively used by American railways. Thus the Sciotoville bridge over the Ohio River, which was completed in 1917, had two spans each of 775 feet, thus making a record for span length of this type of construction. In the following year the Allegheny River bridge was built, near Pittsburgh, with three continuous spans of 272, 520 and 347 feet, followed by three continuous spans of 347, 350 and 272 feet. In the same year the Hudson Bay railway bridge was built over the Nelson River at Kettle Rapids, and consisted of three continuous spans of 300, 400 and 300 feet.

Arch Bridges. The arch type of bridge was selected over the cantilever for the Sydney Harbor bridge in Australia, for which a contract was awarded early in 1924. This bridge with a span of 1650 feet essentially reproduced the Hell Gate, New York, arch bridge, which was designed for but one half of its live load. The

Australian bridge which was to be 170 feet above high water, was designed to carry four lines of railway tracks and 80 feet of roads and footways. A notable arch bridge, but of shorter span, construction on which was begun in 1923, is a single steel arch of 640 feet across the Niagara Gorge at Niagara Falls built for the Michigan Central Railroad to replace a cantilever bridge constructed in 1883. Notwithstanding strengthening in 1900 the older structure had become inadequate and obsolete. The new bridge, which has a single deck carrying a double track was designed as a two-truss, two-hinged spandrel braced type with the lower chords in the form of a parabolic curve and with the top chords horizontal. It has a rise of 105 feet.

Reinforced Concrete Bridges. The construction of reinforced concrete bridges had developed to a stage in 1923 where a design was presented for the bridge to cross the Elorn River in Brittany, between Brest and Plouegastet, a tidal estuary. This bridge had an extreme length of 2300 feet in addition to approach viaducts at either end of 425 feet in length. There are three spans of 613.36 feet, 639.6 feet and 672.4 feet in each case from centre to centre of the piers, making, of course, the clear span somewhat less. There is provided a free navigable channel 230 feet wide with a height from the water surface to the arch crown of the principal span of 118 feet, the arches in each case being identical in construction, of a radius of 459.2 feet. They are built up of parallel hollow ribs of a rectangular section, the width of each rib being 8.7 feet.

This bridge has a double deck 26.24 feet in width to the outside of the sidewalks with a roadway of 19.68 feet in width. The overall width, however, is increased at the crown of the arch to 30.5 feet. The railway level is 17.29 feet below the under side of the highway deck, for the bridge carries the tracks of the Chemin de Fer de l'Ouest-Etat. The roadway or upper platform was so designed as to receive the third classification in order of importance among French government roads, being styled as a Chemin de Grande Communication.

The two river piers are built upon pile foundations sunk to granite bed rock. The design which was prepared by M. Freyssinet was selected in competition with eight other bids, three of which were for a metallic structure and five for one of concrete construction. The plans chosen provide for the longest arches yet attempted, and the work was to be put under way as soon as government funds were available.

The longest concrete arch to be built up to 1924 was in northern France where a single span bridge of 131.8 meters (432.44 feet), was built across the Seine between the towns of St. Pierre-du-Vauvray and Ande, replacing an old iron bridge which had been damaged by passing vessels during high flood. In this bridge there is a single arch composed of two hollow ribs of large section to which are attached concrete encased steel bands supporting the floor system. Only at the arch ends were the ribs tied together, and the difference between the axes of the two ribs is 8.9 meters. The rise from the spring to the crown of the arch is 25 meters, and the exterior width of each arch is 2.5 meters or (7.2 feet), with a depth varying from 4.1 meters at the springing to 2.5

meters at the crown. The floor system has a total width of 8.80 meters (28.87 feet) of which 8 meters is the usable width, providing a roadway 3.5 meters in width and 2 sidewalks of 1.345 meters each.

Hangers made of steel bands encased in concrete carry a floor system on reinforced concrete lattice girders spaced 5.2 meters centre to centre. Each hanger consists of 40 spans of steel cable, each 10 millimeters in diameter, and treated with a rich mixture of cement so as to form a band of reinforced concrete 14 centimeters (0.46 feet) square in section, the concrete serving merely against the disintegration of the metal.

Naturally for such a construction the arch centre was most important and two groups of dolphins in the river bed and two others near each bank of the river supported the centring by a system of trusses. The reinforcement of the arch ribs composed of round steel bars of small diameter distributed uniformly in the arch ribs and in the side walls was relatively unimportant, the amount of metal varying from one part of the rib to another, and ranging from 10 bars of 14 millimeters in diameter towards the key to 10 of 7 millimeters in diameter for each of the horizontal faces to 11 bars 7 millimeters in diameter for each of the side walls.

A large reinforced concrete bridge for which a contract at \$1,870,000 was let in the spring of 1924, was to span the Minnesota River connecting Fort Snelling and Mendota, Minnesota. This bridge is 4119 feet in length, and contains twelve 304-foot spans, carried on foundations made by sinking cylindrical reinforced concrete caissons, four to each pier. The superstructure is of ribbed arch construction, two ribs to each span, and the deck was supported from ribs on columns and consisted of flat slab designs with depressions over the columns. The deck carries a 45-foot roadway with a 6-foot sidewalk on each side. There is a hand railing of paneled concrete 4 feet 3 inches high, with paneled steel railing 3 feet 6 inches high between posts. The roadway carried double track street car lines. The bridge reaches a maximum height of 120 feet above the river.

An important large municipal American war memorial in the form of an arch highway bridge was completed over the Vermillion River at Danville, Illinois, in 1924, forming the northern terminus of the Danville, Marshall and St. Louis Railway. This bridge was a reinforced concrete structure 1037 feet in length, and consisted of six arches and seven short approach spans. The longest arch, forming the river span, was 195 feet, and the shortest was 107. The bridge is 75 feet high at the river, and its deck contained a 30-foot roadway and two 7-foot walks, flanked on either side by ornamental reinforced concrete open hand rails of the Greek cross design.

Cantilever Bridge. A notable cantilever bridge, the third largest to be constructed was building in 1924 across San Francisco Bay. In the spring of 1923 the United States War Department granted permission to construct a cantilever bridge across Carquinez Straits between Vallejo and Valona, Cal., spanning one of the upper reaches of San Francisco Bay. The project involved a cantilever bridge with a central pier and two 1100-foot spans. Work was started shortly after the permission was

obtained and on August 29 the first concrete was poured in the north anchor pier. This structure was designed for vehicular traffic exclusively and would be the longest bridge of this type used for such a purpose. There were to be two 1100-foot spans and two 500-foot spans, the former consisting of two 300-foot overhanging arms and a 500-foot supported approach anchor-span.

There was a centre pier located in the Strait but on either side of this central pier a clear channel 1070 feet wide would be left. The other piers would be located within the pier head lines and each would be reached by a 500-foot approach anchor-span. The new bridge was estimated to cost \$4,000,000 and would be completed by July 4, 1925.

Bascule Bridge. The bascule bridge in its various types of which there were several of considerable merit continued in vogue during the period under consideration both for railway and highway bridges. The most notable designs of bascule bridge were the Rall type, and the Scherzer type. The length of span and capacities of bascule bridges had been increased, and in many cases they were considered preferable to swing bridges for crossing narrow waterways where there was considerable traffic. This type of bridge was extensively employed in Chicago, and here in 1923, 22 simple trunnion bridges were employed. Two of these were built with double decks and that across the Chicago River at Wells Street completed in 1921 had a span of 268 feet centre to centre of trunnions affording a clear channel width of 220 feet. Each leaf of this bridge is carried by two trunnions and weighs 2500 tons of which 1300 tons is counterweight. In addition to Chicago these bridges found extensive use across the waterways of Seattle.

BIBLIOGRAPHY: Among the important works on bridge construction published in the period under review were the following:

J. A. L. Waddell, *Bridge Engineering* (New York, 1916); id. *Economics of Bridge Work*, (New York, 1921); C. A. Ellis, *Essentials in the Theory of Framed Structures* (New York, 1922); *The Structural Engineers' Handbook Library* (New York, 1923-24), edited by George A. Hool and W. S. Kinne, included the following titles, which were special articles prepared by authorities in the different fields, and covered a wide range of subjects connected with bridge building: *Foundations, Abutments and Footings* (1923); *Structural Members and Connections* (1923); *Stresses in Framed Structures* (1924); *Steel and Timber Structures* (1924); *Reinforced Concrete and Masonry Structures* (1924); *Movable and Long Span Steel Bridges* (1923). See also **FOUNDATIONS**.

BRIDGES, CALVIN BLACKMAN (1889-). An American biologist, born at Schuylers Falls, N. Y., and educated at Columbia University. He was research assistant in genetics to Professor Morgan (1910-19) and member of the research staff in genetics at the Carnegie Institution of Washington (1919). He published numerous papers on genetics and was co-author of *Mechanism of Mendelian Heredity*, with Muller, Morgan, and Sturtevant (2d. ed., 1923).

BRIDGES, ROBERT (1844-). An English poet laureate. In 1923-24 he had the Honorary Fellowship in Creative Arts, University of Michigan. He published *Anthology in English and French* (1916), *Yattendon Hym-*

nal, Ibant Obscuri (1917), *Britannia Victrix* (1919), and *October, and Other Poems* (1920).

BRIDGES-ADAMS, W. (1889-). A British stage director, educated at Oxford. He gained experience as an actor in the provinces and in 1910 was assistant manager to William Poel. A year later he joined the late Laurence Irving. He was part manager and producer for the Bristol Repertory Theatre, 1914-15, and in 1916-17 manager and producer for the Liverpool Repertory Theatre, which he renamed the Playhouse. In 1919 he undertook the direction of the Stratford-on-Avon Shakespearean Festivals and founded and organized the New Shakespeare Company under the auspices of a joint committee of the Shakespeare Memorial National Theatre and the governors of the Memorial Theatre, Stratford-on-Avon. Bridges-Adams designed the scenery for the Gilbert and Sullivan revivals at the Prince's Theatre during 1919-21.

BRIDGMAN, PERCY WILLIAMS (1882-). An American physicist, born at Cambridge, Mass., and educated at Harvard. Receiving a fellowship, he continued his scientific studies and also served as an instructor in physics, of which department he was made full professor in 1919 and given the directorship of the Jefferson laboratory. His researches have included important studies on various topics in mechanical physics, such as measurements of high hydrostatic pressure, and in physical chemistry, such as change of phase under pressure and modifications of phosphorus.

BRIEUX, EUGÈNE (1858-). A French dramatist (see Vol. III). His recent works include *Le Bourgeois aux Champs* (1914) and *Les Américains Chez Nous* (1920).

BRIGADE. See **ARMIES AND ARMY ORGANIZATION**.

BRIGHAM YOUNG UNIVERSITY. An institution at Provo, Utah, under the auspices of the Church of the Latter Day Saints, founded in 1875. The enrollment increased from 650 in 1914 to 1123 in 1923-24; the faculty was increased in the same decade from 30 to 80 members, and the library from 6000 volumes to 30,000 bound volumes and about the same number of pamphlets. President, Franklin Stewart Harris, Ph.D.

BRIGHOUSE, HAROLD (1882-). A writer of plays and fiction. His recent productions include *The Road to Raebury*, in collaboration with Stanley Houghton (1915); *Hobson's Choice* and *The Clock Goes Round* (1916); *Other Times* and *Three Lancashire Plays* (1920); *Once a Hero* (1922); *The Happy Hangman* (1922), and *The Apple Tree* (1923). His stories include: *Fossie for Short*; *The Silver Lining*; *The Marbeck Inn* (1920); *Hepplestalls* (1922); and *The Wrong Shadow* (1923). He filmed *Hobson's Choice* and *The Game* in 1920. During the War he was with the Royal Air Force.

BRIGHTMAN, EDGAR SHEFFIELD (1884-). An American professor of philosophy, born at Holbrook, Mass., and educated at Brown and Boston Universities and at Berlin and Marburg in Germany. He taught successively at Brown University, Wesleyan College (Neb.), and Wesleyan University (Conn.). In 1919 he was called to Boston University. In his philosophy he is a strong advocate of the religious doctrine of personalism. His works include *The Sources of the Hexateuch* (1918) and *Re-*

ligious Values and Recent Philosophy (1921). He is also a contributor to the projected *Encyclopædia of Protestant Theology*, *The American Journal of Theology*, *The Journal of Religion*, and other periodicals.

BRIGHT'S DISEASE. See NEPHRITIS.

BRILL, GEORGE MACKENZIE (1866-). An American mechanical engineer, born at Poughquag, N. Y., and educated at Cornell University. During 1891-96 he was engineer of tests with the Solvay Process Company of Syracuse, N. Y., of which he then became chief engineer; in 1897 he entered the employ of Swift and Company, of Chicago, serving them as their chief engineer until 1900. He was chairman of the jury of awards on general machinery at the Panama-Pacific Exposition in 1915 and during the War was in the Ordnance Department with the rank of major. He served also as chief of the requirement section of the Emergency Fleet Corporation in 1918.

BRILL, NATHANIEL EDWIN (1861-). An American physician, born in New York and educated at the College of the City of New York and the University of New York. He was appointed physician to Mt. Sinai Hospital in 1891 and clinical professor of medicine at Columbia in 1910. In 1917 he was made a major of the medical officers' reserve corps and director of Base Hospital No. 3 in France. In 1910 he acquired much renown for the recognition of an endemic, non-contagious form of typhus fever which had evidently prevailed in New York City at intervals for many years. This aberrant form of typhus is known in honor of its discoverer as Brill's disease. He contributed much to periodical medical literature on this and numerous other subjects and in 1898 translated Klemperer's book on physical diagnosis under the title *Clinical Diagnosis*.

BRINTON, CHRISTIAN (1870-). An American art critic, born at West Chester, Pa., and educated at Haverford College, the Universities of Heidelberg and Paris, and the Ecole du Louvre. Among his works on art are *Modern Artists* (1908), *Masterpieces of American Painting* (1910), *Impressions of Art at the Panama-Pacific Exposition* (1916), *Introduction to the History of Scandinavian Art* (1921), and many catalogues and contributions to leading magazines and art reviews. He also contributed to the *Iconographic Dictionary of Art*. Christian Brinton was decorated by King Gustav V of Sweden in 1917 and in 1915 was made advisory editor of *Art in America*.

BRISBANE, ARTHUR (1864-). An American newspaper editor (see VOL. III). He bought the *Washington Times* in 1917 and the *Evening Wisconsin* in 1918. Both of these he sold to William Randolph Hearst in the following year. In 1918 he became editor of the *Chicago Herald and Examiner*. He resigned from the editorship of the *New York Evening Journal* in 1921.

BRISTOL, MARK LAMBERT (1868-). An American naval officer, born in Glassboro, N. J. He graduated from the United States Naval Academy in 1887 and in 1889 was appointed ensign. During the Spanish-American War he served on the battleship *Texas*. He made a special study of gunnery, torpedoes, and aircraft. From 1913 to 1916 he was in charge of the development of aeronautics for the Navy. In 1917 he commanded the *North Carolina*, conveying troops to Europe, and was given

command of the *Oklahoma* in the American battleship division in European waters in 1918. In 1918-19 he commanded the United States Naval Base at Plymouth, England. He was a member of the International Armistice Commission in Belgium in 1918, and in the following year commanded the United States Naval Forces in Turkey. He served as high commissioner to Turkey in 1919-20 and was a member of the International Commission of Inquiry in the Greek occupation of Smyrna, in 1919. He had general charge of American interests in Asia Minor during the Greco-Turkish campaign of 1922 and did efficient service after the destruction of Smyrna in relief of refugees and protection of American interests, 1922-23.

BRITISH COLUMBIA. A Canadian province on the Pacific coast. Area, 355,855 square miles; population in 1911, 392,480; in 1921, 524,582. In 1921 the urban population numbered 247,562 and the rural 277,020. The rural thus comprised 52.8 per cent of the population, which was a gain over the 48.1 per cent of 1911. Chinese immigration was restricted by a head tax, while Japanese and Hindu immigrants were regulated by diplomatic arrangements. Vancouver, the largest city, had a population in 1921 of 117,217 (100,401 in 1911); Victoria, the capital, had 38,727 (31,660 in 1911); New Westminster, 14,495 (13,199 in 1911). By 1922 enrollment in elementary and secondary schools had increased to 91,919 (44,945 in 1911). The educational system also included 48 high schools, several normal schools, and the provincial university. Total expenditures for education in 1911, \$2,641,522; in 1922, \$7,833,578.

Industry. Only a small proportion of the country was under crops. Intensive agriculture was the rule, the leading activities centering in fruit raising, hop growing, stock raising, and the cultivation of root crops. Oats was the most important field crop. Recent developments were the increasing attention given to barnyard animals (poultry, swine, etc.) and dairy products. Lumbering, pulpwood, etc., ranked first among the industries. In 1921, the value of products was \$71,108,307. Of this, the pulpwood produced was valued at \$4,796,000, and newsprint about \$8,000,000. The woods most sought after were Douglas fir and white spruce. The mineral production of the province ranked second only to that of Nova Scotia. In 1922, the total value of minerals was \$39,423,962 as compared with \$30,076,635 in 1912. Gold, in 1922, yielded \$4,286,718; silver, \$4,828,384; coal, \$14,622,317; lead, \$5,430,265; and copper, \$4,273,700. The undeveloped coal fields were particularly rich. The local fisheries ranked next in importance, the 1922 catch being valued at \$18,872,833. The leading commercial fish were salmon (\$13,106,315), halibut (\$3,918,441), and cod, sturgeon, smelts, sardines, and herring. Whaling brought in \$158,814. The seal industry was economically terminated, as only natives were permitted to participate in it. Capital invested in the industry was divided: \$6,765,827 in boats, etc., \$13,185,742 in canning and curing establishments. The depletion of the Fraser River salmon pack was giving provincial authorities much concern and conservation schemes were receiving attention. In 1921, there were in all 2470 industrial establishments, mainly concerned with the lumber and fish industries,

that represented a capital of \$210,798,811. Employees totaled 28,700; wages, \$35,775,528; and value added by manufacture, \$82,604,700. The total available water power in the province was estimated at over 1,931,142 h.p.; of this 328,977 had been developed.

Trade and Communications. In 1922, there were 4374 miles of railway in the province as compared with 1855 in 1912. Ocean-going steamboats and coastwise vessels were being operated by the Canadian Pacific railway. Communications were regularly maintained between Vancouver and Prince Rupert. The Panama Canal was being utilized to bring Canadian Pacific and Atlantic ports into closer touch. In 1921-22, 37,475 vessels entered and cleared, while 35,705 vessels entered and cleared in the coastwise trade. The trade of the province increased considerably over the period. In 1912, exports and imports were valued at \$20,272,840 and \$49,345,161; by 1923, these were \$93,971,000 and \$60,257,000. Exports consisted of minerals (gold, silver, copper, coal), sea products (salmon, halibut, herrings, whale products and oil), lumber, furs, skins, etc. Fruit was shipped in large quantities to the Canadian prairie provinces.

Government. The province's representation in the Canadian Parliament was increased to 6 in the Senate and 13 in the House of Commons. Revenues for 1921-22 were \$16,987,869 (\$10,479,259 in 1913-14); expenditures for 1920-21 were \$17,436,487 (\$15,762,912 in 1913-14). Women were granted the ballot.

BRITISH EMPIRE. The purpose of this article is to deal with general matters concerning the British Empire as a whole, the affairs of Great Britain, Ireland and the several colonies being set forth elsewhere in separate articles, to which the reader is referred for details.

Much to the chagrin of its enemies, the British Empire failed to disintegrate, on the outbreak of war in 1914, under pressure of the secessionist forces upon which German imperialists had so confidently counted. Only in South Africa (q.v.) were the German hopes of an anti-imperial rebellion measurably gratified, and even there the insurrection led by Boer irreconcilables (Maritz, de Wet, Beyers, and Kemp), in October, 1914, was speedily crushed by Boer loyalists, Premier Botha and Defense Minister Smuts. Conspiracies in India and elsewhere were only flashes in the pan. The Turkish sultan's proclamation of a Holy War failed to move the Moslem masses in British possessions. The Empire held together. Moreover, the self-governing dominions came to the mother country's aid with an enthusiastic loyalty few had ventured to anticipate. Canada enlisted 595,441 men and sent 432,642 of them to fight overseas; Australia sent 329,082; New Zealand raised an army of 124,211 and sent 100,444 soldiers and nurses to distant battle fronts; South Africa mustered 146,515 men, of whom 30,000 were used in Europe and 43,000 in East Africa, besides conquering German Southwest Africa and raising a force of 85,000 colored troopers and military laborers. India, instead of rebelling, supplied 1,679,416 men, to be drawn on for battles in France, on Gallipoli, in East Africa, while the British garrison in India was at one time reduced to as few as 15,000 men. Altogether, the dominions, colonies, and India contributed 3,284,943

men, of whom 202,321 were killed and 428,644 wounded, to defend the empire to which they belonged.

The War not only demonstrated the strength but also enlarged the territorial extent of the Empire. Cyprus, occupied since 1878, and Egypt, occupied since 1882, were declared British protectorates shortly after Turkey entered the conflict in 1914, and were definitely ceded by the latter in the Treaties of Sèvres (1920) and Lausanne (1923), along with Palestine and Mesopotamia over which Great Britain became mandatory, together with the connecting Arabian hinterlands. The former Turkish province of Hedjaz, having declared independence at British prompting during the War, became a veiled protectorate, whose nominally independent king accepted a subsidy and advice from Britain. All except the northwestern corner of German East Africa, a thin slice of the Cameroons, somewhat less than half of Togoland, and the island of Nauru, became British mandates as a result of the peace settlement; but to these should be added the Australian mandate over German New Guinea (Kaiser Wilhelm's Land and Bismarck Archipelago), the New Zealand mandate over German Samoa, and the South African mandate over German Southwest Africa. The mandates gained by Britain and her dominions added 884,500 square miles to the Empire, and if one includes Egypt, Cyprus, and Hedjaz, the total territorial accretion was about 1,300,000 square miles. At the close of the world conflict, the Empire embraced over 2,000,000 square miles and 330,000,000 persons in Asia; over 4,000,000 square miles and 63,000,000 persons in Africa; 4,000,000 square miles and 11,000,000 inhabitants in America; and 3,250,000 square miles and almost 8,000,000 persons in Australasia: a grand total of almost 14,000,000 square miles and nearly half a billion human beings.

So huge an empire proved, in years after the War, to be not an unmixed blessing. Cyprus, the mandates, and several older colonies, presented the harassed taxpayers of England with unwelcome annual deficits to be paid, while the maintenance of occupying forces in Mesopotamia, Persia and elsewhere was almost incredibly expensive. Moreover, the awakened nationalism of backward races strengthened the tendency toward which the need of financial retrenchment pointed. Instead of meeting native demands with bullet and bayonet, Great Britain granted conditional independence to Egypt (q.v.) and to Mesopotamia (q.v.) in 1922, withdrew from Persia (q.v.) and Baku in 1920-21, acquiesced in Afghanistan's (q.v.) reassertion of independence in 1921, and by the Government of India Act of 1919 accorded incomplete satisfaction to the Indian aspiration for "swaraj." Different in motive, but similar in the tendency to diminish rather than expand the Empire's holdings, were the cession to Italy after the War, of the Jarabaih strip on the West-Egyptian frontier and of Jubaland (from Northeastern Kenya), and the promise at the Washington Conference to restore Wei-hai-wei to China. With the accession of a Labor government to power in 1924, the decline of aggressive British imperialism was accentuated, for Labor in principle favored extension of self-government for backward peoples and professed immunity from imperialist land-hunger.

While perceptibly loosening her grasp on a

few colonial areas, the mother country significantly readjusted her relations with the great self-governing dominions. Due largely to the personal influence of the South African General Smuts, Downing Street statesmen were brought to realize that the solidarity of the Empire could be strengthened better by placating than by resisting the desire of the dominions for complete autonomy. Accordingly, the dominions and India received separate representation in the Peace Conference (q.v.) and separate membership in the League (q.v.) as quasi-independent states in the proposed Anglo-French alliance, a clause permitting separate adhesion by the dominions was inserted; Canada's request for a separate legation at Washington was conceded, though not actually realized; and in general the principle of independence in international status seemed to be tentatively, and only tentatively, established. It was also believed by some observers that as regards internal affairs Downing Street would adopt General Smuts's principle of complete non-interference, allowing the common sovereign and common loyalty alone to preserve unity. Ireland (q.v.), it should be remembered in this connection, took its place on a par with the dominions under the Free State Treaty of 1921 (which, by the way, substituted the locution "Commonwealth of Nations" for "Empire") and southern Rhodesia was promised responsible self-government in 1923. For authority, Downing Street endeavored to substitute co-operation in its relations with the dominions. In 1917, an Imperial Conference of their representatives, and, significantly, of Indian representatives, was held in London, and simultaneously the dominion premiers were allowed to sit with the War Cabinet, which, for the time being, was considered an "Imperial War Cabinet." At this time it was planned to hold in 1922 a constituent Imperial Conference which would establish a stable constitutional basis for imperial solidarity. The sessions of the Imperial Conference and Imperial War Cabinet in 1918 were interested chiefly in plans to develop empire resources and to prevent foreign control of raw materials after the War. The notable Imperial Conference in 1921 not only considered the proposed renewal of the Anglo-Japanese Alliance (to which Canada objected), and naval defense, but also decided that dominion premiers and Indian representatives should be summoned annually for conference, and that the projected constituent meeting in 1922 would be unnecessary. The seventh Imperial Conference, convening in October, 1923, included the president and minister of external affairs of the Irish Free State, as well as representatives from Canada, Australia, New Zealand, South Africa, Newfoundland, India, and Great Britain. Various questions of foreign policy and imperial defense were discussed, but what chiefly attracted attention was the demand of General Smuts of South Africa, seconded by other dominion spokesmen and reinforced by the Imperial Economic Conference then in session, for effective measures to develop the Empire's natural resources and industries. As it later developed, this plea meant, practically, the adoption by Great Britain of a protective tariff, with preferential rebates for colonial products, which would thus be able to compete victoriously with American beef, grain, cotton, tobacco, and fruits in the English market. How

Premier Baldwin determined to establish a preferential tariff, but was decisively defeated by the British electorate, is told in the article on Great Britain (q.v.). But it should be remarked here that the British election of 1923 marked a definite setback for the movement which had been gaining headway for a generation, especially during the War and since, toward the cementing of imperial ties by tariff preferences, the establishment (after the War) of protective duties in several crown colonies, besides the dominions, the imposition of discriminatory export duties on raw materials (e.g. palm kernels, goatskins, tin)—in short, a system of economic imperialism which, if perfected, would surely arouse envy and resentment among the other industrial nations of the world.

BRITISH HONDURAS. A British crown colony in Central America. Area, 8592 square miles; population in 1921, 45,317 as compared with 40,458 in 1911. Belize, the chief town, had 12,661 inhabitants in 1921. Agriculture continued to engage the population. Chief exports, in 1921, in value of dollars, were: bananas, \$169,298; cedar, \$24,494; chicle, \$1,323,967; coconuts, \$142,564; mahogany, \$1,054,165; plantains, \$22,301. The War saw the colony's trade mount, but totals fell again in 1922, as the following reveals: imports for 1913-14, \$3,186,062; for 1922, \$3,290,402; exports for 1913-14, \$3,126,954; for 1920-21, \$5,051,895; for 1922, \$2,817,597. The United States in the decade 1913-23, became the most important factor in the country's trade, taking 71 per cent of her exports in 1922 to Great Britain's 19.38 per cent, and furnishing 57.46 per cent of her imports to Great Britain's 27.38 per cent. In 1923, the country's commerce gained somewhat. By 1922-23, revenues and expenditures almost doubled those of 1913-14. For 1922-23, they were: revenue, \$1,137,529; expenditure, \$1,477,194. The debt in 1923, \$1,073,164, was greater than that of previous years. The attempts to exploit the forests of the country showed little success during the period, for production of cedar, mahogany, and logwood was considerably lower in 1921 than in 1911.

BRITISH ISLES. See GREAT BRITAIN.

BRITISH LABOR PARTY. See GREAT BRITAIN, *History*.

BROAD, CHARLIE DUNBAR (1887-). An English professor of philosophy, born in London, and educated at Cambridge, where he achieved high honors as a student of metaphysical and ethical philosophy. He was successively fellow of Trinity College, assistant professor of logic at the University of St. Andrews, lecturer on logic at University College, Dundee, and professor of philosophy at the University of Bristol. In common with the rest of the so-called Cambridge group, Professor Broad approaches philosophy from the point of view of science. His first work, *Perception, Physics and Reality* (1914), was an attempt to find out what knowledge science gives us about the real world. This investigation is continued in *Scientific Thought* (1923). In both of these he has expounded a theory of perception involving epistemological dualism. In addition to these works he has contributed several articles to *Mind*, *The Hibbert Journal*, *Proceedings of the Aristotelian Society*, and *International Journal of Ethics*.

BROADCASTING. See RADIO TELEPHONY; RENSSELAER POLYTECHNIC INSTITUTE.

BROADCASTING MUSIC. See MUSIC, *Mechanical Reproduction.*

BROCA, BENJAMIN AUGUST (1857-). A distinguished French surgeon, usually spoken of as August Broca, who received his medical degree from the University of Paris. His numerous writings include *Traitement des Tumeurs Blanches chez l'Enfant* (1890); *Traité de Thérapeutique Infantile*, with Légendre (1894); *Sur l'Anatomie Chirurgicale et Chirurgie d'Oreille Moyenne*, translated into English (1901); and *Leçons Cliniques de Chirurgie Infantile* (1902). During the War Broca produced numerous works on military surgery, *Précis de Médecine Opératoire* (1916); *La Prothèse des Amputés en Chirurgie de Guerre* (1917); *Les Séquelles Osteo-articulaires des Plaies de Guerre*, translated into English (1916); *Ligations et Amputations*, English translation (1917), and *Chirurgie de Guerre et Apres-guerre* (1921).

BROCK, REGINALD WALTER (1874-). A Canadian geologist, born at Perth, Ont. He studied at Toronto, and later at Heidelberg. Meanwhile he was instructor at the School of Mining in Kingston, Canada, but in 1897 entered the service of the Geological Survey of Canada, of which he was director in 1905-14. In the latter year he was deputy commissioner of mines of Canada and dean of the faculty of applied science in British Columbia. From 1902 to 1914 he had been professor of geology in the School of Mining. As consulting geologist he served in Egypt, and during the War in the Canadian Military forces, with the rank of major. He was a member of many scientific and technical societies and a fellow of the Royal Society of Canada, which he served as general secretary.

BROCKDORFF, BARON CAY VON (1874-). A German writer on philosophical topics. He was educated in the German state universities and became professor of philosophy at the University of Kiel. His philosophical works include *Die Philosophischen Anfangsgründe der Psychologie* (1905), *Die Geschichte der Philosophie und der Problem ihrer Bergreiflichkeit* (1906), *Die Wissenschaftliche Selbstkenntnis* (1908), *Philosophie und Pädagogik* (1912), *Diskontinuität und Dialektik* (1914), *Die Wahrheit über Bergson* (1915), *Hobbes* (1919), and *Schopenhauer und die Nachkantianern* (1919). In his volume on Bergson, which was written during the War, he charged the French philosopher with borrowing his principal ideas from German sources, particularly from Schelling.

BROCKELMANN, KARL (1863-). A professor at the University of Halle (see VOL. IV). In 1917 he published *Die Alteren Vorläufer der Osmanischen Litteratur*.

BRODRICK, WILLIAM ST. JOHN F. (VISCOUNT MIDDLETON) (1856-). An English statesman (see VOL. IV). He became Knight of the Order of St. Patrick in 1915. In 1917-18 he served on the Irish Convention. He was created First Earl of Middleton, Ireland, and Viscount Dunsford of Dunsford, Surrey, in 1920.

BRONSON, HOWARD LOGAN (1878-). An American physicist, born at Washington, Conn., and educated at Yale. In 1904 he was called to McGill University and remained there

until 1910, when he accepted the Munro chair of physics at Dalhousie. His original work has included studies on radio-activity, high resistance and standard cells, on which he has published valuable papers. He was president of the Nova Scotian Institute of Science, 1918-20.

BROOKE, RUPERT (1887-1915). An English poet, born at Rugby, and educated at Rugby School and King's College, Cambridge, where he later won a fellowship. His first published volume was *Poems* (1911). Two years later he made a trip to America and on to the Samoan Islands, meanwhile writing letters home about his travels. These were published at the time in a London newspaper and have since been published in book form as *Letters from America* (1916), with a preface by Henry James. One other book, *1914 and Other Poems*, published posthumously, and an essay on *John Webster and the Elizabethan Drama* (1916) conclude his short list of contributions to literature. Brooke's writing possessed so much power that lovers of poetry felt sharply the loss to English literature in his premature death on Apr. 23, 1915. He had joined the Naval Brigade early in the War and was on his way to Gallipoli when he became a victim of blood-poisoning. His *Collected Poems*, prefaced by Edward Marsh, were published in 1918.

BROOKLYN INSTITUTE OF ARTS AND SCIENCES. An institution founded in 1824 in Brooklyn, N. Y., and reincorporated in 1890. Until 1917 it was divided into three general departments, education, museums, and the botanic garden; in that year the biological laboratory, founded in 1889 under Institute auspices, became a fourth department of the Institute. The department of education offered courses in a variety of subjects, and also arranged lectures and concerts by prominent men and women and eminent artists. A branch of the Institute was maintained throughout the period at Jamaica, L. I., but the Huntington branch was discontinued in 1921. The receipts rose from \$385,748 in 1917 to \$600,000 in 1923, and the permanent funds from \$942,400 to \$1,639,000. Membership in 1924 was about 10,000, including an enrollment of 600 at Jamaica. The Institute received a bequest of \$61,000 from Mrs. Georgietta Proctor for the work of the departments of physics and engineering, \$10,000 from Mrs. Caroline Mather for its general work, and the final payment of \$20,000 on the Robert B. Woodward bequest. Frank L. Babbott succeeded A. Augustus Healy as president in 1920, and John H. Denbigh became secretary in 1922, succeeding Herman Stutzer.

BROOKLYN POLYTECHNIC INSTITUTE. An institution for the technical education of men founded in 1853. The day registration increased from a total in 1914 of 187, covering all departments, to a total in 1924 of 465, and the evening registration from 514 in 1914 to 1000 in 1924. The graduating class increased from 45 to 102 during the same period. Productive funds rose from \$389,876 to \$580,665, the annual income from \$163,278 to \$221,300, and the value of buildings, grounds and equipment from \$935,292 to \$1,339,281. The laboratories increased from 10 to 27; the one general library became six departmental libraries, i.e. English literature, mathematics, modern languages, mechanical engineering, chemistry, and the Mailloux Electrical Library.

Ten additional fraternities were organized and eight general societies; two new publications were established. The courses were radically revised; two special courses of one year each, three graduate courses, and summer review courses were added. President, Fred W. Atkinson, Ph.D.

BROOKS, ALFRED HULSE (1871-). An American geologist and explorer (see VOL. IV). He was Lieutenant-Colonel of Engineers in 1918, and also chief geologist of the A.E.F., serving in France from 1917 to 1919. He was with the American Peace Commission in February and April, 1919.

BROOKS, CHARLES (1872-). An American plant pathologist, born in Salem, Ind. He graduated from the University of Indiana in 1904 and took graduate courses at the University of Missouri. In 1906 he was instructor of botany at the New Hampshire College, and from 1906 to 1912, professor and botanist of the New Hampshire Agricultural Experiment Station. From 1912 he was pathologist at the Bureau of Plant Industry of the United States Department of Agriculture. He was a member of several scientific societies and in 1917 was vice-president of the Phytopathological Society. He carried on researches in fruit diseases, especially those of apples.

BROOKS, JOHN GRAHAM (1846-). An American author and lecturer (see VOL. IV). He published *Labor's Challenge to the Social Order* in 1920.

BROOKS, VAN WYCK (1886-). An American critic, born at Plainfield, N. J., and educated at Harvard. For a time he was an instructor at Leland Stanford Junior University. In 1920 he came to the *Freeman*, whose literary editor he was until that excellent periodical suspended publication in 1924. Early works published were: *The Wine of the Puritans* (1909); *The Malady of the Ideal* (1913), and *John Addington Symonds* (1914). With the appearance of his *America's Coming-of-Age* (1915) it at once was apparent that Mr. Brooks, better than any one else in his generation, had placed his fingers on the reason for America's æsthetic sterility. His appreciation of the material and moral conditioning influence of the frontier on the development of American cultural life was a discovery of the first importance. His *Ordeal of Mark Twain* (1919) and his papers on Henry James published in the *Dial* (1923), really developments of the same theme, were by many considered the most important critical works of the period. For the latter he received the *Dial* prize for 1923.

BROOKS, WILLIAM PENN (1851-). An American agriculturist, born at South Scituate, Mass., and educated at the Massachusetts Agricultural College and in Germany. From 1877 to 1887 he was on the faculty of the Imperial College in Japan and for several years acted as its president. From 1889 to 1906 he was on the faculty of the Massachusetts Agricultural College. In 1889 he became director of the Massachusetts Agricultural Experiment Station and also acted after 1918 as consulting agriculturalist. He was a member of several scientific societies and contributed many reports on agricultural subjects to their proceedings. He wrote *Agriculture* (1901) and *General Agriculture, Dairying and Poultry Farming*.

BROSSART, FERDINAND (1849-). An American bishop of the Roman Catholic Church, born in Germany, and educated at St. Francis College, at Mt. St. Mary Seminary (Cincinnati), and in Belgium at the College of St. Nicolas and the University of Louvain. From 1872 until 1916 he was rector in various towns in Kentucky or vicar general of the diocese of Covington. He became bishop of Covington in 1916. He translated several theological works from the German of Denifle, Meyenberg, and Schaeffer.

BROUGHTON, RHODA (1840-1920). An English novelist (see VOL. IV). She died at Headington on June 5, 1920. Her latest novels include *Concerning a Vow* (1914; 6th ed., 1920), *A Thorn in the Flesh* (1917), *A Fool in her Folly* (1920).

BROWN, HEYWOOD (CAMPBELL) (1888-). A newspaper columnist and author, born in Brooklyn, N. Y., and educated at Harvard. He was connected with the *Morning Telegraph* (1908-09; 1910-12), the *New York Tribune* (1912-21), and the *New York World* (1921-). He is the editor of the column "It Seems To Me" in the *World*. Heywood Brown has made himself known as a breezy and outspoken humorist, with now and then a guarded philosophy breaking the surface of his mirth. He is the author of *American Expeditionary Forces—With General Pershing and the American Forces* (1918); *Seeing Things at Night* (1921); *The Boy Grew Older* (1923), and *The Sun Field* (1923).

BROWN, ALICE (1857-). An American author (see VOL. IV). Her later books include *Children of Earth* (1915); *Bromley Neighborhood* (1917); *The Prisoner* (1916); *The Flying Teuton* (1918); *Homespun and Gold* (1920); *The Wind Between the Worlds* (1920); *One-Act Plays* (1921); *Louise Imogen Guiney—a Study* (1921); *The Old Crow* (1922); and *Ellen Prior*, verse (1923).

BROWN, ARTHUR JUDSON (1856-). An American clergyman and author (see VOL. IV). He has written *The Why and How of Foreign Missions* (rev. ed., 1921), *Unity and Missions—Can a Divided Church Save the World?* (1915), *Rising Churches in Non-Christian Lands* (1915), *Russia in Transformation* (1917), and *The Mastery of the Far East* (1919; rev. ed., 1921).

BROWN, CHARLES REYNOLDS (1862-). An American clergyman (see VOL. IV). In 1920 he was Ingersoll lecturer on immortality at Harvard University, and in the same year published his lectures under the title *Living Again*. He is also the author of *The Healing Power of Suggestion* (1916), *Five Young Men* (1917), *Who Is Jesus Christ?* (an address, 1917), *The Master's Way* (1919), *Story Books of the Early Hebrews* (1919), *Yale Talks* (1919), *The Religion of a Layman* (1921), *Social Rebuilders* (Mendenhall Lectures, 1921), *The Honor of the Church* (1922), *Lincoln, the Greatest Man of the Nineteenth Century* (1922), *The Art of Preaching* (Yale University Lyman Beecher Lectures, 1922), and *The Larger Faith* (1923).

BROWN, DEMETRA KENNETH (DEMETRA VAKA) (1877-). A Greek-American author, born on the Island of Bouyouk Ada, Sea of Marmora. Her early life was passed in close touch with the Turkish people, but many of their customs revolted her, especially the pre-

arranged marriages. She ran away from home to escape such a marriage, and came to the United States with the family of a relative. She joined the staff of the Greek newspaper *Atlantis* in New York City, but after six months of this, she gave up journalism and became a teacher of French at the Comstock School (New York), where she remained until 1903, except for a short interval in 1901 when she returned to Turkey for a visit. In 1904 she was married to Kenneth Brown, (q.v.) novelist, and soon began to write. Her second book, *Haremlik*, published in 1909, commanded wide attention. It consisted of 10 studies of Turkish women. *A Child of the Orient* (1914) relates the story of the author's own childhood. Other books of hers include *The First Secretary* (1907); *The Duke's Price* (1910); *Finella in Fairyland* (1910); *In the Shadow of Islam* (1911); *The Grasp of the Sultan* (1916); *The Heart of the Balkans* (1917); and *In the Heart of German Intrigue* (1918), which grew out of interviews with King Constantine.

BROWN, ERNEST WILLIAM (1866-). An American mathematician (see VOL. IV). He was president of the American Mathematical Society from 1914 to 1916. In 1920 he published *Tables of the Motion of the Moon*.

BROWN, FRANK CHOUTEAU (1876-). An American architect, born at Minneapolis, Minn., and educated at the Minneapolis School of Fine Arts and the Boston Art Club and in Europe. In 1902 he began practice in Boston and from 1907 until 1919 was editor of the *Architectural Review*. In 1916 he became a member of the faculty of Boston University and in 1919 head of the department of art and architecture. His publications include *Letters and Lettering* (1902); *The Orders of Architecture* (1904); *New England Colonial Houses* (1915); *Modern English Churches* (1917); and *The Brick House* (1919).

BROWN, GLENN (1854-). An American architect, born in Fauquier County, Va., and educated at Washington and Lee and George Washington Universities and the Massachusetts Institute of Technology. He began practice in 1878, and was admitted to membership in important architectural societies of Europe and America, as well as to the American Academy in Rome and the National Institute of Arts and Letters. His publications include *Healthy Foundations for Houses* (1885); *Trap Syphonage* (1886); *A History of the United States Capitol* (1900); *Papers on the Improvement of Washington City* (1901); *Personal Recollections of Charles F. McKim* (1916), and *Roosevelt and the Fine Arts* (1919). He was also the editor of several series, among them being the *Proceedings of the American Institute of Architects* (1899-1909).

BROWN, KENNETH (1868-). An American author and journalist (see VOL. IV). In 1917 he went with his wife to study the Greek situation; together they published *In Pawn to a Throne* (1919). He is also author of *Putter Perkins* (1923). See BROWN, DEMETRA.

BROWN, PHILIP MARSHALL (1875-). An American educator and diplomat, born at Hampden, Me., and educated at Williams College. In 1900-01, he served as secretary to Lloyd C. Griscom and from 1901 to 1903 was second secretary for the American Legation of Constantinople. He served as Secretary of Le-

gation to Guatemala and Honduras, 1903-07, and as secretary of the American Embassy of Constantinople, 1907-08. From the latter year to 1910 he was minister to Honduras. Resigning from the diplomatic service, he was appointed instructor in international law at Harvard University in 1912 and in the following year became assistant professor of international law and diplomacy at Princeton, where he was later appointed professor of international law (1915). He was associate editor of the *American Journal of International Law* and was an associate member of the Institute of International Law at Brussels. He was the author of *Foreigners in Turkey* (1914), *International Realities* (1917), *International Society* (1923), etc.

BROWN, PRESTON (1872-). An American army officer, born in Lexington, Ky. He graduated from Yale in 1892 and in 1904 entered the army as a private. He was commissioned 2d lieutenant in 1897 and rose through the various grades; he became a major in 1916 and a lieutenant-colonel in 1917. In 1918 he was appointed colonel of the national army and in August of the same year was promoted to be brigadier-general. He served as Chief of Staff in the 2d division at Château-Thierry and St. Mihiel in 1918, and was Chief of Staff for the 4th army corps. In August, 1918, he was appointed Commanding General of the 3d division, serving in that capacity through the battle of Meuse-Argonne. In November, 1918, he became Assistant Chief of Staff at General Headquarters in the occupied German territory. He was appointed instructor in the Army General Staff College in 1919. He was awarded the Distinguished Service Medal for Exceptional Service for his work as Chief of Staff and in other capacities. In 1921 he was acting commander of the Army War College and in the same year appointed Commanding General of the third infantry brigade.

BROWN, ROY STUART (1888-). A major in the United States air service, born in Minneapolis. He was in charge of pilots' schools and experimental work during the War. In 1919-21 he saw service in the Philippine Islands.

BROWN, WILLIAM ADAMS (1865-). An American theologian (see VOL. IV). He was acting provost of Yale University, 1919-20. From 1917 to 1919 he was Secretary of the General War-time Commission of the Churches. He was also chairman of the committee on the War and religion, and a member of the committee of the *Outlook*, the Committee of Fourteen, and the administrative committee of the Federal Council of Churches of Christ in America. He is the author of *Modern Theology and the Preaching of the Gospel* (1914), *Is Christianity Practicable?* (1916); *Modern Missions in the Far East*, privately printed (1917); *Christianity and Industry*, addresses (1919); *Minister as Teacher*, lectures (1920), and *The Church in America* (1922).

BROWNE, EDWARD GRANVILLE (1862-). An English professor (see VOL. IV). He is the author of *The Press and Poetry in Modern Persia* (1914), *Material for the Study of the Bâbi Religion* (1918); *The Persian Constitutional Movement* (1918), a continuation of his *Literary History of Persia* (1920); *Literary History of Persia*, vol. ii, 3d ed. (1921); *Translation*

of *Chatár Magáta*, with notes (1921); and *Arabian Medicine* (1921).

BROWNE, GEORGE ELMER (1871-). An American artist born at Gloucester, Mass., educated at the School of Drawing and Painting, the Museum of Fine Arts and Cowles Art School (Boston) and was a pupil of Jules Lefebvre and Robert Fleury in Paris. He was elected an Associate of the National Academy in 1919. Mr. Browne's canvases are broad in treatment and his manner very energetic. His pictures have been exhibited throughout Europe and the United States. In 1904 the French government bought his painting, "The Bait Sellers of Cape Cod," from the Salon. A collection of nine lithographs is in the New York Public Library. "The Wain Team" is in the National Gallery at Washington.

BROWNE, MAURICE (1881-). A theatrical director and dramatist, born in England, and educated at Cambridge. He came to the United States in 1910 and founded, with Ellen Van Volkenburg, the Chicago Little Theatre, in 1912. His most recent books include *The Rhythmic Drama* (1914) and *The King of the Jews*, a tragic drama (1916).

BROWNE, PORTER EMBERSON (1879-). An American novelist and playwright, born in Beverly, Mass. He began writing short stories, verse, and essays in 1901. He was one of the founders of the *Vigilantes* in 1916. Among his plays are *A Fool There Was* (1906), *The Spendthrift* (1908), *A Girl of To-day* (1915), and *The Bad Man* (1920). He also wrote of the one-act plays, *A Hero, In and Out, Married*, etc. Other works of his are *A Fool There Was*, a novel (1908); *Peace at Any Price* (1916); *Stars and Stripes* (1917), and *Some one and Somebody* (1917).

BROWNELL, WILLIAM CRAWY (1851-). An American author (see VOL. IV). He has written *Criticism* (1914), *Standards* (1917), and *American Prose Masters* (new edition, 1923).

BROWNING, OSCAR (1837-1923). An English author and lecturer. (See VOL. IV). He became Fellow of the Arcadia Academy, Rome, in 1918. In 1921 he was made trustee and chairman of the British Academy of Arts in Rome. He is the author of *A History of Mediæval Italy, 568-1530* (1914), *A General History of Italy* (1915), *History of the Modern World* (popular edition, 1916), and *Memories of Later Years* (1923).

BROWN-TAIL MOTH. See ENTOMOLOGY, ECONOMIC.

BROWN UNIVERSITY. An institution at Providence, R. I., founded in 1764. It increased in enrollment during the decade 1914-24 as follows: Undergraduate men students from 910 in 1914 to 1233 in 1924; graduate students from 102 to 157; students in the Women's College, which is entirely separate, from 203 in 1914 to 370 in 1924; students in the School of Education, instituted in 1916, 51; and extension students from 360 to 1606 in 1924. In 1919, the university liberalized the entrance requirements by modifying the language and mathematics requirements and increasing the number of electives, and made compulsory a comprehensive psychological test. The faculty was increased in membership during the decade from 77 to 113; \$4,015,000 was added to the endowment, bringing the total to \$8,291,983; the library was increased by approximately 68,-

000 volumes, making the total 292,827, including the McClellan Collection of Lincolniana given in 1922. The Arnold Biological Laboratory was built in 1915; the Soldiers' Memorial Gate in 1919; and the Jesse Metcalf Chemical Laboratory in 1923. At the Women's College, Metcalf Hall was completed in 1919. In 1924, the university began the construction of a new stadium, baseball field, and extensive facilities for baseball, football and tennis. Funds were also available and the plans under consideration in 1924, under a gift from the estate of the late John R. Hegeman, for the erection of Hegeman Hall, a new dormitory, and under the gift of Edgar L. Marston, for the erection of the Marston Modern Language Building. In 1924, William H. P. Faunce, D.D., LL.D., completed 25 years of service as president of the university.

BRUCE, ANDREW ALEXANDER (1866-). An American jurist, born at Nunda Drug in the Madras Presidency of India, and educated in England, and at the University of Wisconsin. He practiced law in Chicago from 1893 to 1898 and in the latter year was appointed assistant professor of law at the University of Wisconsin. In 1902 he was appointed professor of law at the University of North Dakota and from 1904 to 1911 acted also as dean of the College of Law. He was appointed associate justice of the Supreme Court of North Dakota in 1911 and served until 1916, when he became chief justice. In 1919 he was appointed professor of law at the University of Minnesota. He was a member of the Committee of the American Bar Association which investigated on the report of court martial proceedings in the United States army in 1919. He was the author of *Property and Society*. (1916), *Non-Partisan League* (1921), and *The Law of Bailments*, and was a frequent contributor on legal subjects to magazines and newspapers.

BRUCE, DONALD (1884-). An American forester, born at Newtonville, Mass., and educated at Yale University. He graduated from the Yale School of Forestry in 1910. From that year until 1916 he was forest assistant, forest examiner, and forest professor of the United States Forest Service. He was professor of forestry at the University of California from 1915. He wrote on subjects of forest engineering.

BRUCE, (HENRY) ADDINGTON (BAYLEY) (1874-). An American author (see VOL. IV). In 1916 he resigned as staff contributor to the *Outlook*. In 1915 he became psychological adviser to the *Associated Newspapers*. He is the author of *Adventurings in the Psychical* (1914), *Sleep and Sleeplessness* (1915), *Psychology and Parenthood* (1915), *The Riddle of Personality* (new and revised edition, 1916), *Handicaps of Childhood* (1917), *Nerve Control and how to Gain It* (1918), and *Self-Development* (1921). He has edited *The Education of Karl Witte* (1914) and the *Mind and Health Series of Medical Handbooks* (1915).

BRUCE, STANLEY MELBOURNE (1884-). A premier of Australia. He was educated at Cambridge and served with distinction in the War from 1914 to 1917, being twice wounded. In 1918 he was elected to the Australian Parliament and represented his country before the League of Nations in 1921. He succeeded William M. Hughes as premier in 1923.

BRUCE, WILLIAM SPIERS (1867-1921).

Scottish explorer and scientist (see Vol. IV). Between 1912 and 1920 he made four scientific voyages to Spitzbergen, on which region he was an acknowledged authority.

BRUCE-JOY, ALBERT (1842-). An Irish sculptor (see Vol. IV), whose later ideal subjects include: "Thetis and Achilles," "The Pets," "The Cricketer," "The Fencers," "Tennis" and "The Boy Scout."

BRUNE, ADOLPH GERHARD (1870-). An American composer, born at Bakkum, Germany. He received his first instruction from his father and then studied organ with E. Brennecke in Osnabrück. In 1889 he went to Peoria, Ill., where he remained five years as organist of St. Joseph's and the Cathedral. He then moved to Chicago and after further study there under E. Liebling (piano) and B. Ziehn (composition) was appointed professor of piano and composition at the Chicago Musical College in 1898, a position he still held in 1924. Included among his works are three symphonies (E flat, A minor, and D); three symphonic poems, *Lied des Singschwans*, *Evangeline*, *Ein Dämmerungsbild*; four overtures; *Symphonic Fantasy* in C; variations on a theme by Beethoven; *A Fairy Tale*; two concertos for piano and orchestra, in C minor and F minor; a concerto for organ and orchestra in E flat minor; *Jerusalem*, a cantata for mixed voices and orchestra; two male choruses with orchestra, *Sängers Fluch* and *Saxons' War Song*; a Mass, six parts à cappella; Psalm 84 for ten parts; five string quartets; two string quintets; a string sextet; and numerous works for organ and for piano.

BRUNEL. See STRAITS SETTLEMENT.

BRUNSCHVIG, LÉON (1869-). A French philosopher born at Nantes. On the death of Lachelier and Boutroux he became the recognized leader of the French school of critical idealists. Accepting from Boutroux the notion of the contingency of the laws of nature and from Lachelier the belief in the primacy of the act of judgment, he has transformed the legacy of his masters into a modern philosophy of science standing equidistant from pure empiricism and from ontological rationalism. Brunschvig was educated at the Ecole Normale Supérieure and won a prize from the Academy of Moral and Political Science in 1891 for a memoir on Spinoza. This youthful work, subsequently revised and expanded by the most painstaking scholarly research, has gone through several editions, and has earned for its author the reputation of one of the keenest modern interpreters of Spinozism. Through his interest in the philosophy of the seventeenth century he was led to undertake a commentary on Pascal and published an edition of the *Pensées* in three volumes and the complete works in 14 volumes. His philosophic reputation rests chiefly on two volumes on the philosophy of mathematics and of science. After ascending the regular academic ladder, Brunschvig was called to the Sorbonne in 1914. In 1920 he was elected to the Academy of Moral and Political Science, and in 1923 he was nominated to the Legion of Honor. His works include *Spinoza* (1894), *Cambronne* (1894), *La Modalité du Jugement* (1897), *Pensées et Opuscules de Pascal* (1897), *Introduction à la Vie de l'Esprit* (1900), *L'Idéalisme Contemporain* (1905), *Étapes de la Philosophie Mathématique* (1912), *Nature et Liberté* (1921), *L'Expérience Humaine et la Causalité Physique* (1922), *Spinoza et ses Con-*

temporains (1923), and *Œuvres de Pascal* (1904-14).

BRUNTON, SIR THOMAS LAUDER (1844-1916). A distinguished British physician who devoted much of his time to original research in physiology and pharmacology. Born in Bowdon, Roxburghshire, he was educated at the University of Edinburgh. He spent years on the Continent, at Vienna, Berlin, Leipzig and other medical centres, in the study of drug action, physiological chemistry and physiology. With St. Bartholomew's he discovered the medical uses of amyl nitrite. As early as 1874 he tested a muscle extract on a diabetic patient and thus claimed priority in the use of internal secretions. His principal writings are *On Digitalis*, his graduation thesis (1868); *Tables of Materia Medica* (1877); *Textbook of Pharmacology, Therapeutics and Materia Medica* (1885); *On Disorders of Digestion* (1886); *Lectures on the Action of Medicines* (1897); *Index of Diseases and Remedies* (1890), translated into German, Italian and Russian; *Disorders of Assimilation and Digestion* (1901); *Therapeutics of the Circulation* (1908); and *Collected Papers on Circulation and Respiration* (1916). He was knighted in 1900 and made a baronet in 1908.

BRUSILOFF, ALEXEI ALEXEIVITCH (1853-). A Russian general, born at Kutais in the Russian Caucasus. He came from a family long distinguished in Russian military and political life. Having been educated for the Russian army, he embarked on a career of unvarying success. By 1910 he had risen to the rank of corps commander and at the outbreak of the War he was elevated to head the Russian eighth army. He distinguished himself in Galicia first in 1914 and 1915 and again in the great Russian victories of 1915-16. With the Russian Revolution, he accepted Bolshevism, tacitly at any rate, and was for a time reported to be in command of the Red armies. He never approved of the operations of Kolchak, Denikin, Yudenich, and Wrangel, but valued the welfare of the Russian nation more than any one faction. For a time he was at work in creating a militia system for Russia. He soon retired to his stud farm near Moscow and in 1924 was living in seclusion.

BRUSSELS CONFERENCE. See REPARATIONS.

BRYAN-CHAMORRO TREATY. See NICARAGUA.

BRYAN, CHARLES W. (1867-). An American politician, born at Salem, Ill. He is the younger brother of William Jennings Bryan. He was educated in the public schools and for a short time read for the bar but soon relinquished these studies to take up farming. For many years he was associated with the political activities of his more distinguished brother, to whom he was personal adviser, business manager, and assistant in the editing of *The Commoner*. As his brother's interests in Nebraskan politics declined, Charles W. Bryan's correspondingly increased, so that at one time or another he was mayor of Lincoln, member of its council, and street commissioner. In 1922 he ran for governor of Nebraska and carried that normally Republican State by a majority of 50,300. It was because he had in this campaign the support of the Farmer-Labor party, the "Big Four" railway brotherhoods, and unorganized labor, that he was tendered the nom-

ination for the vice-presidency of the United States by the Democratic national convention in July, 1924.

BRYAN, ELMER BURRITT (1865-). An American university president (see VOL. IV). On his resignation from the presidency of Colgate University he became president of Ohio University in 1921.

BRYAN, NATHAN PHILEMON (1872-). An American judge (see VOL. IV). He became judge of the United States Circuit Court of Appeals, fifth judicial circuit, in 1920.

BRYAN, WILLIAM JENNINGS (1860-). Ex-Secretary of State of the United States (see VOL. IV). He resigned as Secretary of State on June 9, 1915. In 1918 he became president of the National Dry Federation. He is the author of *The Making of a Man* (1914), *Man* (1914), *A Message from Bethlehem* (1914), *The People's Law* (1914), *The Price of a Soul* (1914), *Royal Art* (1914), *The Value of an Ideal* (1914); *Prohibition*, an address (1916); *The War in Europe and Its Lesson for Us* (reprinted, 1916), *World Peace*, a debate with William Howard Taft (1917), *The First Commandment* (1917), *Heart-to-heart Appeals* (1917), *The Menace of Darwinism, and the Bible and Its Enemies* (1921), and *In His Image* (James Sprunt Lectures, 10th series, 1922).

BRYAN, WILLIAM LOWE (1860-). An American psychologist and university president, born at Bloomington, Ind., and educated at the Universities of Indiana, Berlin, Paris, and Wurzburg. He taught philosophy as a member of the faculty of the University of Indiana (1885-), and in 1893 became vice-president and in 1902 president of the university. In 1910 he was chosen trustee of the Carnegie Foundation. His principal professional contributions to psychology have dealt with the development of motor ability and the psychology of occupations.

BRYCE, JAMES (1838-1922). An eminent English writer and diplomat (see VOL. IV). During the War he exercised great influence in favor of the Allies and was chairman of a committee to investigate the charges of outrages in Belgium and France by the Germans. He was an ardent supporter of the League of Nations. During his later years he was engaged in writing a book on *Modern Democracies* which was published in 1921. It is a comparative history of several democratic governments.

BRYN MAWR COLLEGE. A nonsectarian institution for the higher education of women at Bryn Mawr, Pa., founded in 1880. Throughout the decade between 1914 and 1923-24, the student enrollment and the number of members of the teaching staff remained about the same; in the latter year the registration was 468 and the faculty numbered 64. The number of volumes in the library increased from 74,293 volumes in 1914 to 101,900 volumes in 1923-24, and the productive funds of the college were increased from \$1,184,323 to \$5,753,560.87, largely as the result of an endowment campaign carried on 1918-20. A summer school for women workers in industry was opened in 1921 under the direction of a committee composed of an equal number of representatives of the college and of women workers in industry. A department of music was established in 1921 in the winter session of the college. M. Carey Thomas, Ph.D., resigned from the presidency of the college, which she had held for 28 years, in 1922,

and was succeeded in office by Marion Edward Parks, Ph.D.

BRYUSOV, VALERY J. (1873-). A Russian Bolshevik poet, novelist, and critic, born in Moscow. With Balmont (q.v.) he was one of the leading Decadents and helped found the Modernist school. Also, like Balmont, he was strongly influenced by Poe's works, both prose and verse. His first verses, published in 1894, show an affinity for the French Symbolists, but in his later works, which include excellent critical studies, he expresses his real character better. He writes of the modern industrial city. Using Pushkin as his model, he emphasizes the horrible. He was editor of *The Scales* during its entire existence and subsequently became director of the literary section of *Russkaja Mysl'*. The character of public criticism of him swerved from laughter and ridicule to admiration, and eventually Bryusov was recognized as a master of classical literature. His works include *Stephanos* (1905); *The Axis of the Globe*, short stories and plays (1907); *The Flaming Angel*, a novel (1909); and *The Far and Near*, two volumes of essays. His complete works in 25 volumes were published in 1912. He is the translator of numerous foreign poets, including Verlaine, Maeterlinck, D'Annunzio, Oscar Wilde, and Verhaeren.

BUBER, MARTIN (1878-). A Jewish author and scholar, born in Vienna. His principal works are *Die Geschichte des Rabbi Nachman* (1906), *Die Legende des Baalschem* (1907), *Ekatatische Konfessionen* (1908), *Reden und Gleichnisse des Tschuang-Tse* (1910), *Drei Reden über das Judentum* (1911), *Daniel* (1913), *Vom Geiste des Judentums* (1915), *Die Jüdische Bewegung* (1917), *Die Rede, die Lehre und das Lied* (1917), *Worte an die Zeit* (1919), *Cheruth* (1919), *Der Heilige Weg* (1919), and *Der Grosse Maggid* (1921). Buber edited the *Kalevala* and identified himself with *Die Gesellschaft*.

BUBONIC PLAGUE. It has been supposed that this disease is primarily endemic among rats and that man is secondarily infected from the rodent but recent experience with the plague in Africa shows that although this may be the rule, the reverse may be seen, man carrying the infection to man and the rat becoming infected only after some time has elapsed. In regard to man-to-man diffusion, it is an error to believe that a victim of plague is too ill to travel long distances. Photographs of plague patients may show vigorous looking men with no other apparent anomaly than the large swellings in the groins, which of course are not visible in the clad man. In this connection it may be reaffirmed that plague in the bubonic form is not necessarily dangerous to a community of whites even in a plague focus in a tropical city. When, as often happens, isolated cases appear in the cities of the temperate zone, as has been the case in the United States, Great Britain, France, and elsewhere, there seems little tendency to diffusion. Nevertheless there is every reason for promptly stamping out the disease wherever it gains a foothold, for the pneumonic form may develop from the ordinary bubonic form and the disease then becomes highly contagious and highly fatal. Even the ordinary bubonic form may have its virulence intensified and the disease may spread to different kinds of rodent and thus become a permanent menace.

The close similarity in some respects between

plague-pneumonia and influenza-pneumonia gave rise to the belief that the influenza pandemic of 1918 with its huge percentage of pneumonic complications was nothing but plague-pneumonia. It was pointed out that in both affections the high mortality came not so much from the immediate cause of the disease as from the superadded infection from the ordinary streptococcus and pneumococcus and that in both diseases there was a similar type of bronchopneumonia. The best way of exploding this parallelism is by study of the epidemiology of the two diseases, both of which occurred but a few years apart in the large city of Dakar, in West Africa. In 1914-15, a severe epidemic of plague occurred in this locality. It was originally of the pneumonic form and had been brought from a distant focus by persons unknown. But throughout it was limited to certain quarters of the town, certain streets and even certain houses. Quarters inhabited by Europeans only were spared entirely. The disease lingered for eight months, despite the most vigorous measures to combat it. About four years later the same city was visited by the influenza pandemic, which had probably been brought to it by European steamers. It diffused itself quickly, attacking all quarters of the town and black and white indifferently and ran its course rapidly, becoming extinct within a very short time. See INFLUENZA.

BUCHAN, JOHN (1875-). An English author, born at Perth, and educated at Glasgow University and Brasenose College. He received the Newdigate Prize in 1898. In 1901-03, he was private secretary to Lord Milnor, then the High Commissioner of South Africa, and in 1906 joined the Edinburgh publishing firm of Thomas Nelson and Company. In the War he was on the headquarters staff of the British Army in France (1916-17) and was later made an Officer of the Crown of Belgium and the Crown of Italy. His early publications, which include *The African Colony* (1903) and *A Lodge in the Wilderness* (1906), are obviously based on his life in Africa early in his career. Among his later publications are some exceptionally well-written novels and accounts of the War, particularly a *History of the Great War* (1921-22; 4 vols., 1923). The last mentioned is an effective summary of its gigantic subject.

BUCHAREST, TREATY OF, MARCH, 1918. See RUMANIA.

BUCHER, KARL (1847-). A German historian and economist, born in Kirberg. He studied history, philology, and economy at Bonn and Göttingen and was professor at the universities of Dorpat, Basle, and Karlsruhe, and rector at Leipzig. He is the author of many works on economic and social topics, among them *Die Aufstände der Unfreien Arbeiter* (1874), *Die Frauenfrage im Mittelalter* (1882), *Die Gewerblichen Betriebsformen in Ihrer Historischen Entwicklung* (1892), *Arbeit und Rhythmus*, 5th ed. (1919), *Der Deutsche Buchhandel und die Wissenschaften* (1904), *Das Zeitungswesen* (1911), *Der Deutsche Kaufmann und die Handelshochschule* (1911), *Unsere Sache und die Tagespresse* (1915), *Das Städtische Beamtentum im Mittelalter* (1915), *Die Deutsche Tagespresse und die Kritik* (1917), *Der Sozialismus* (1919), and *Lebenserinnerungen* (1919).

BUCHHORN, JONNY (1875-). A German writer, born at Cologne. He has been con-

nected with various newspapers and has published *Die Hohenstauffen*, a novel (1908); *Lug- insland*, a volume of sketches of the lower Rhine (1909); the plays, *Studenten und Sehnsucht* (1918); the comedy, *Der Schäfer von Jena* (1920); some volumes of war verse, *Deutsche Jugend, Wach' Auf* (1917); *Der Deutsche Zeitspiegel* (1920); and numerous works of a militant character, like *Wir Vergessen zu Leicht* (1917), *Zwischen Goethe und Scheidemann* (1919), *Politik und Presse* (1919), *Bekenntnisse* (1920), *Hindenburg, der Führer in Unsere Zukunft* (1920), *Lasst uns vom Reiche Zeugen* (1921), etc.

BUCHNER, MAX (1881-). A German writer, born at Munich. He studied at the university, specialized on the history of the Carolingian period, and wrote, among other works, *Eine Humanistische Lobrede auf Kilian von Bibra* (1908), *Entstehung und Ausbildung der Kurfürstenschaft* (1912), *Bayerns Teilnahme an den Deutschen Königsuahlen* (1913), *Grundlagen der Beziehungen zwischen Landeskirche und Thronfolge im Mittelalter* (1913), *Biographie des Aldrich* (1914), *Zum Briefwechsel Einhardts und des Anseigs* (1918), and *Einhard als Künstler* (1919).

BUCK, BEAUMONT BONAPARTE (1860-). An American army officer, born in Mayhew, Miss. He graduated from the United States Military Academy in 1885 and was commissioned second lieutenant in the same year. During the Spanish-American War he served as major of the 2d Texas infantry. He was appointed captain in the regular army in 1899 and in 1914 was commissioned lieutenant-colonel of infantry. He became a colonel in 1916 and brigadier-general of the national army in 1917. He commanded the 28th Infantry of the 1st division of the American Expeditionary Force in 1917, and in the same year was given command of the 2d infantry brigade of the 1st division. In 1918 he was appointed commander of the 34th division and participated in the first all-American offensive in 1918. He also took part in all the other major campaigns of the American troops in France. In November, 1918, he returned to the United States and was appointed commander of Camp McArthur. He served as commander of various other camps and departments and in 1921 became acting chief of staff with the 90th division of organized reserves.

BUDGET, AMERICAN. See FINANCE AND BANKING.

BUFFALO. A city of New York, the second of the State in population and one of the Great Lakes ports. The population increased from 423,715 in 1910 to 506,775 in 1920, and to 545,273 by estimate for 1924. The industries of the city numbered 2225 in 1914; in 1924 nearly 2500 (estimates). The number of wage earners increased from 54,416 in 1914 to 75,899 in 1919, while the value of the product increased from \$247,516,000 in 1914 to \$634,410,000 in 1919. After 1920 several new flour milling companies, which increased the annual output of flour approximately from 6,000,000 barrels to 10,000,000, were added to the city's industries. The capacity of its grain elevators, all of modern construction, was enlarged to 32,000,000 bushels. The city also increased in the decade as a steel, iron, copper, and brass centre, and during and following the War it became the largest airplane manufacturing city, the largest aniline

producing centre, and one of the most important rubber and tire centres of the country. The city developed its commerce in the 10 years to such an extent that in 1924 it was the third largest port in the country, the second largest inland port in amount of tonnage, and the fifth port in foreign commerce. The growth of industry forced the greater utilization of the hydro-electric power resources of Niagara Falls, so that by 1924 more than 95 per cent of the power used was from that source. The assessed valuation of property increased from \$346,560,790 in 1914 to \$768,821,091 in 1924. Bank clearings increased from approximately \$500,000,000 to \$2,500,000,000. The number of dwellings erected within the limits of the city increased from 2007 in 1914 to 3615 in 1923.

Several important municipal improvements were effected in this period. A tunnel 6500 feet long was bored to carry the water from Lake Erie to the city's new pumping station, and a new water purification plant was built at a cost of \$4,000,000. A high pressure system for fire protection was installed in the business districts. The outer harbor was improved during the decade; the Buffalo River was deepened and enlarged upstream, and a new drawbridge, permitting the passage of large vessels, was built. In 1924 the city had 37.4 miles of water front.

Many new office buildings and other structures were completed. These included hotels, apartment houses, the Buffalo Athletic Club, the new Elks Club Building, the Liberty Bank Building, the Saturn Club, the largest normal school in the State, the National Sciences Museum, seven branch libraries, and new bath buildings. Two water front parks were constructed by reclaiming land from Lake Erie and Niagara River. The New York Barge Canal system, which had its western terminus in Buffalo, was provided in the decade with two large terminals at which the largest lake freighters transferred their cargoes.

In 1916 the city adopted the commission form of government. It provided for a council, composed of the mayor and four commissioners elected at large on a nonpartisan ticket for four-year terms. The mayor is head of the department of public safety; the other departments are finance and accounts, public affairs, public works and parks, and public buildings. See GARBAGE AND REFUSE DISPOSAL.

BUILDING. See CITY PLANNING.

BUKOVINA. Formerly a crownland of Austria, but since November, 1918, a Rumanian province. Area, 4031 square miles; population in 1910, 800,098; estimated population in 1922, 689,907. In spite of Austrian occupation since 1777, the population was largely Rumanian and Ruthenian. The Rumans, numbering about 275,000 in 1910, had spread north from their plain country; the Ruthenians, 300,000 in 1910, had moved south from Galicia. The rest were Germans. Among all these there were some 100,000 Jews. The largest town, Cernauti (Czernowitz), had an estimated population of 100,000 in 1920. The inhabitants, densely settled on the land, devoted themselves to agriculture and its by-products, the most important industries being brewing and flour milling. The cultural level of the people was low, and illiteracy was higher there than in any other of the former Austro-Hungarian crownlands except Dalmatia. There were, in 1920, 400 miles of railway. Late in 1918, when the fall of the

Austrian monarchy seemed imminent, the people expressed their desire for reunion with Rumania, only the Ruthenians, who indeed were in a plurality, dissenting because of their traditional friendship with Austria. The Treaty of St. Germain allocated almost the whole province to Rumania except for a small territory in the north crossed by the railroad running from Zaleszeyki to Kolomea and including a railroad junction, which was given to Poland. In 1920, Bukovina's national council was dissolved and a provincial government was erected, drawing its powers from the central government. Bukovina was represented by 19 senators and 16 deputies in the Rumanian parliament.

BULGARIA. A European kingdom situated in the Balkan Peninsula. Area in 1923, 40,667 square miles; in 1914, 43,305 square miles. The census of Dec. 31, 1920, recorded 4,861,439 inhabitants. By the census of 1910 there were 4,337,513 inhabitants to which were added 130,000 people in 1913, as a result of the territorial gains of the Balkan wars. By the Treaty of Neuilly, Bulgaria was compelled to cede to Jugo-Slavia the following districts on its western front: Tsaribrod (21,000 Bulgarians and no Serbs), Bosilegrad (22,000 Bulgarians and no Serbs), Strumitsa (25,000 inhabitants, mostly Bulgarians with a few Macedonians and Serbs), and a portion of the Timok valley. To Greece went Western Thrace, thus depriving Bulgaria of her outlet on the Aegean. (See THRACE.) The capital, Sofia, in 1920 had 154,431 inhabitants. Other large towns, with their populations in 1920, are: Philippopolis (63,418), Varna (50,819), Ruschuk (41,574), Slivno (28,695), Plevna (27,770).

Agriculture and Industry. Agriculture as the chief occupation continued to engage two-thirds of the people, most of whom possessed their lands outright. In 1921, 9,290,175 acres were under cultivation. The accompanying table indicates the principal crops, and their yields (in short tons) for 1913 and 1922. (Figures are not exactly comparable because of changes in boundaries.)

Crops	1913		1922	
	Acreage	Yield	Acreage	Yield
Wheat	2,539,150	1,219,605	2,224,803	1,133,816
Rye	404,180	223,744	441,920	208,630
Barley	508,075	247,457	543,801	286,511
Oats	390,150	136,075	351,552	146,266
Corn	1,465,850	773,612	1,312,414	433,285
Tobacco	15,366	5,616	53,550	19,836

It is evident, therefore, that the country's leading activity was little deranged. While the export of surplus cereals fell off considerably as the two years are compared (370,110 metric tons in 1913 and 225,272 in 1922), the export of tobacco was more than six times that of 1913 (4543 metric tons in 1913 and 29,025 in 1922). Other articles to gain were silk cocoons and charcoal. The mining industry, too, showed great advances. Coal mined in 1923 totaled 1,063,662 metric tons as compared with an average pre-war yield of 125,000 tons. Copper, salt, and lead production were considerable.

Commerce and Transportation. Because of the fluctuating state of the exchange, the lev being worth 5 to the dollar in 1914, 7 to the dollar in 1915, 70 to the dollar in 1921, and 160 to the dollar in 1922 (though the June, 1923, quotation showed a rise to 80.0108), the commerce of the country, considered generally, was

sadly disorganized. Converted on a basis of average annual exchange, imports for 1913, 1920, 1922, were valued at \$36,535,000, \$39,849,000, \$27,795,000; exports for the same years were \$18,013,000, \$29,574,000, \$29,805,000. Thus 1922 saw the first favorable trade balance since the War. Principal countries of origin of imports (1922) were Germany, United Kingdom, Italy, Austria, United States. American imports reached an average of \$200,000 for 1910-14, \$1,900,000 for 1921, and \$600,000 for 1922. Principal countries of destination of exports in 1922 were Turkey, Germany, Italy, France, United States. Exports to the United States totaled an average of \$400,000 for 1910-14, \$400,000 for 1921, and \$1,300,000 for 1922. Size of shipping, an excellent index of the state of the country, showed that 4,951,452 tons entered Bulgarian ports in 1911; in 1920, only 1,111,515 tons. In 1913, total length of railways was 1388 miles, all state owned; in 1921, these had increased to 1582 miles. Several short lines were projected after the War but lack of funds held up the work of construction.

Finance. On Jan. 1, 1912, the public debt totaled 623,346,807 leva (with the lev equal to the franc). On May 31, 1922, the foreign debt stood at 530,985,000 francs, consolidated debt; 432,057,500 francs, unconsolidated; other, 24,967,000 francs. Reparations by the Treaty of Neuilly were fixed at 2,250,000,000 gold francs but early in 1923 were lowered to 550,000,000 gold francs, payable during 60 years. The internal debt, of course, was insignificant because of the depreciation of the currency. Revenues in 1909 were \$38,584,418; expenditures, \$36,830,884; of which latter, for debt service, \$415,120. For 1922, government finances were (converted at average exchange rate): revenues, \$29,912,000; expenditures, \$31,980,000; of which, for debt service, \$8,074,000. The paper currency steadily increased. In 1913, 188,742,000 leva were in circulation; at the end of 1923, 3,977,621,000. For this, there was in the country on Dec. 1, 1923, 39,000,000 leva in gold and 14,412,000 leva in silver. The cost of living rose twentyfold between 1913 and 1922, and continued to rise in 1923 and 1924.

Defense. By the Treaty of Neuilly, Bulgaria's war establishment was to be reduced to an army of 20,000 men, voluntarily enlisted for a 12-year term; a frontier guard of 3000, and a gendarmerie of 10,000. Enlistments were slow, however, so that by September, 1922, the regular army consisted only of 7000 men, the frontier guard of 430, and the gendarmerie of 3800.

History. Still smarting from the humiliations of the Treaty of Bucharest (1913), Tsar Ferdinand and the ruling clique—for the Bulgarian population was a peasantry and had little understanding of the purport of modern nationalism—regarded the War as an opportunity for the retrieving of their fortunes. The outcome in the beginning was uncertain, and while Ferdinand really meant to enter the struggle, he wavered for more than a year. During this period propaganda and counter-propaganda filled the country, as representatives of the Entente and the Central Powers exerted all their blandishments to gain Bulgarian aid. It was the Entente's inability to meet all of Bulgaria's demands, because of the unwillingness of Serbia and Greece to relinquish the portions of Macedonia claimed by

Bulgaria, that made the latter's coöperation with the Central Powers inevitable. An opposition for a brief moment lifted its head: Stambulisky, the leader of the Agrarian party, boldly declared for neutrality, but with his silencing (he was sentenced to life imprisonment), the way was clear, and on Oct. 12, 1915, war was declared on Serbia. Bulgaria's entry was a strategic victory, rather than a material one, for the Central Powers. While great aid might be expected in the Balkans, it was the fact that now the road lay clear to Constantinople and the East, that Gallipoli might be defended with munitions sent through an open land route, the connection between the Allies and Russians severed, and that the Allies must send troops to the southeastern front, i.e. Saloniki, that made Bulgaria's step such an important one. On her own side, Bulgaria's successes were phenomenal in the first two years. Serbia was immediately overrun, her armies pressed to the Adriatic, and a vain-glorious manifesto from the Bulgarian king declared that the traditional enemy no longer existed. War was declared on Rumania, Sept. 1, 1916, and armies occupied the Dobrudja. In November, Monastir fell, opening Macedonia to the invader. Germany had helped her Balkan ally with an annual allotment of money and technical units; Field-Marshal von Mackensen himself had directed the Bulgarian armies to their victories. Yet, though Bulgaria was united to Germany by every bond of gratitude, it was perceptible in 1917 that the Bulgarian war effort was weakening. The failing food supply, the discontent of the soldiers who had long been gone from their homes and their fields, and the necessity for lengthening the line of defense because of the Austro-Hungarian defeat in Albania in July, 1918, all served to render the Bulgarian position a precarious one. In September, 1918, the Serbian troops broke across the frontiers, and the Bulgarian high command, realizing defeat, asked for an armistice. On Oct. 4, 1918, King Ferdinand abdicated, and with him fled the ministry. Boris III succeeded to the throne. Stambulisky was released from prison and formed an Agrarian government, which was, on Nov. 27, 1919, invited to sign the Treaty of Neuilly. The terms were onerous. Territorial cessions were required in disregard of economic and ethnographic considerations. Certain small districts on the western frontier were turned over to Jugo-Slavia purely for strategic reasons. The renunciations of Thrace deprived Bulgaria of her Aegean littoral as well as important winter pasture lands in the valleys south of the mountains which were made the international boundary. Other terms were: the confirmation of the cession of the southern Dobrudja to Rumania; the reduction of the army; the surrender of all tanks, armored cars, poison gas, aeroplanes; a reparation charge of 2,250,000,000 gold francs; restitution of all live stock seized; an annual supply for 5 years of 50,000 tons of coal to Jugo-Slavia; the support of all Allied commissions. Concessions were made in a guarantee of freedom of transit to the Aegean and a promise of the protection of Bulgarian minorities in neighboring states. The problems of the new government were intensified by the 300,000 refugees who flocked into the country from Thrace, Macedonia, and the Dobrudja.

The Agrarian government was confirmed in

power by the general elections of Mar. 28, 1920, which returned 110 Agrarians, 50 Communists, and 9 Socialists, as compared with 59 for the bourgeois parties. Under M. Stambulisky an internal policy was formulated wholly in the interest of the agricultural class. A reconstruction programme, stubbornly pushed in the face of the opposition of the bourgeoisie, included such diverse items as compulsory labor (1920), the expropriation of Crown and Church lands and all estates over 75 acres in the interests of the landless peasantry (1921), the prohibition of speculation and profiteering (1920), the extension of the education code (1920), government control of foreign trade through consortiums. Stambulisky's tone toward his Central European neighbors was friendly. A healthy agrarianism was the foundation of his country's well-being as, he saw, it was also of Czecho-Slovakia, Poland, Jugo-Slavia and Rumania. In January, 1921, he tried to gain the support of the first two for the creation of an international agrarian league, the so-called Green International, for their common protection against the bourgeois reactionaries and the communist radicals. The same purpose was expressed in the declarations of the congress of the Bulgarian Peasant Union, held in February, 1921. To lighten his country's burdens by gaining the good will of the Supreme Council and to show Western Europe that Bulgaria had parted with the old ways, Stambulisky during 1921-23 proceeded against those ministers who had involved the country in the War by contracting an alliance with Germany and breaking off relations with Serbia without the consent of the Sobranje. The last step taken was the sentencing to life imprisonment of six members of the Radoslawoff ministry, April, 1923. As a result of these activities, Lloyd George, at the Genoa conference (1922) gave Stambulisky his support, while in March, 1923, the Reparations Commission, equally convinced of Bulgaria's good intentions, reduced the Bulgarian indemnity to 550,000,000 gold francs.

There was no lack of opposition at home, of course. Bourgeois outbreaks occurred frequently during 1922 and, in September, street fighting in Sofia led to 15 deaths and the wounding of over 200. The elections of April, 1923, seemed to indicate that the country wholeheartedly supported the Agrarian cabinet, for 212 Agrarians, 16 Communists, and 15 Bourgeois were returned; but that any hope for continued domestic peace and sanity was illusory was shown when, in the morning of June 9, 1923, a *coup d'état* overthrew the government, forced the arrest of all the ministers save Stambulisky, who was absent from the capital, and set up a bourgeois bloc ministry headed by M. Tsankoff. Stambulisky himself was tracked down and killed five days later; the Sobranje was dissolved; and with the recognition of the revolutionary government, first by King Boris, and later (June 27) by the Little Entente, the revolution was complete. An indication of the temper of the new government was shown in the insistence with which it made demand upon the Lausanne Conference for an outlet to the Aegean by way of the Maritza valley and the port of Dedeağatch, and the refusal of the treaty commissioners to comply resulted in the familiar sabre-rattling, so characteristic of the old Bulgaria. Throughout the year affairs

were turbulent. The government attempted a diversion by attacks on the Communists, 95 of whom were brought to trial in July for counter-revolutionary agitation; while Agrarians and Communists retaliated by disorders and riots, even going so far as to seize and hold several towns in the northeast (September, 1923). The rising was short-lived though the government did not cease its repressive actions, and this in spite of the presumably popular victory which it obtained at the polls, November 18, when the bourgeois parties gained 185 seats against the opposition's 62. Where once there had been confidence, now was to be found suspicion: Bulgaria again became the storm-centre of Balkan intrigue and recriminations. Jugo-Slavia, Rumania, and Greece regarded askance Bulgaria's request for permission to employ conscription in the recruiting of the army; Bulgaria, Serbs charged, had become the stamping ground of Macedonian anti-Serb propaganda; from Greece came the demand that the recruiting of bands near the Thracian frontier cease. Throughout 1924 two discordant notes were still in evidence in internal affairs: the agitations of the Macedonian party which threatened repeatedly to embroil Bulgaria in a war with Jugo-Slavia, and the continued activities of the Communists and Agrarians, whose strength could not be broken in spite of the high-handed actions of the government. Early in 1924, the government broke up the Communist party and in May, 1924, suppressed all newspapers showing Communist tendencies. Yet in the provincial councils' elections, the Communists-Agrarians gained 150 seats as against 352 by the government party (May, 1924). See also SLAVONIC LITERATURE; WAR, DIPLOMACY OF THE.

BULKLEY, LUCIUS DUNCAN (1845-). An American physician (see VOL. IV). As a dermatologist and founder of the Skin and Cancer Hospital, Dr. Bulkley's natural interest in the subject of malignant tumors led him to devote his attention entirely to the possibility of their non-surgical treatment. He has published four new books on this subject since 1915, *Cancer: Its Cause and Treatment*, 2 vols. (1915-16); *The Medical Treatment of Cancer* (1919); *Cancer and Its Non-surgical Treatment* (1921), and *Cancer of the Breast* (1924). He also established a new quarterly periodical, *Cancer*, the first number of which was issued in October, 1923.

BULLARD, ARTHUR (1879-). An American author, born at St. Joseph, Mo., and educated at Blair Presbyterian Academy and Hamilton College (Clinton, N. Y.). As foreign correspondent he has been connected with *Harper's Weekly*, *Collier's Weekly*, *The Outlook*, *Atlantic Monthly*, etc. In 1917-19, he was a member of the committee on public information and subsequently director of its Russian and Siberian divisions. Among his works are *The Diplomacy of the Great War* (1915); *Mobilizing America* (1917); *The Russian Pendulum* (1919); *The Stranger* (1920), and *A B C's of Disarmament and Pacific Problems* (1920).

BULLARD, ROBERT LEE (1861-). An American army officer, born in Youngsboro, Ala. He graduated from the United States Military Academy in 1885 and was appointed second lieutenant in the same year. During the Spanish-American War he served as colonel of

the third Alabama Infantry. In 1889 he was commissioned colonel of volunteers in the army, and in 1902, following his discharge from the Volunteer Service, became a major in the Regular Army. He was promoted to be colonel in 1911 and major general in 1917. He commanded the second brigade of the first division in France in June, July, and August, 1917, and in the last month was appointed major general in the national army. He commanded the first division in all its engagements and operations against the Germans, from December, 1917, to July, 1918. He was promoted lieutenant-general in 1918 and major general of the Regular Army in November of the same year. From October, 1918, to April, 1919, he commanded the second army. He was awarded the Distinguished Service Medal and was decorated by France, Belgium, and Italy. He was appointed commander of the Department of the East in 1921. He was the author of numerous articles in magazines and military journals.

BULLOCK, SHAN F. (1865-). An English novelist (see VOL. IV). He is the author of *The Making of a Soldier* (1916) and *Mr. Ruby Jumps the Traces* (1917).

BÜLOW, BERNHARD HEINRICH KARL MARTIN, PRINCE VON (1849-). A German statesman (see VOL. IV). Having been very active previously in furthering the German policy which caused the War, he was given temporary charge of the German Embassy in Rome on Dec. 19, 1914, to try to smooth over the differences between Austria-Hungary and Italy. He was unsuccessful, and Italy declared war on May 23, 1915. He is the author of *Imperial Germany*, a book defending his own foreign policy. It was translated into English in 1914, and a revised edition, omitting many compromising passages, appeared in 1916.

BUMPUS, HERMAN CAREY (1862-). An American educator (see VOL. IV). He resigned as president of Tufts College in 1919 and in the same year held the chairmanship of the Massachusetts Security League.

BUMSTEAD, HENRY ANDREWS (1870-1920). An American physicist, born at Pekin, Ill., and educated at Johns Hopkins University, where he became instructor in physics until 1893, when he received a similar appointment in the Sheffield Scientific School of Yale. He left Yale in 1906 to become full professor at the Sloane Physical Laboratory. He also became director of the latter, a place which he held until his death. During the War he was a scientific attaché of the United States Embassy in London (1918-19). He was connected with the National Research Council (1920). His scientific researches included studies on radioactive gas in water and on atmospheric radioactivity, as well as on the effects produced by röntgen rays in different metals. He also published a series of papers on the emission of electrons by metals under the influence of alpha rays.

BUNDY, OMAB (1861-). An American army officer, born in Newcastle, Ind. He graduated from the United States Military Academy in 1883 and in the same year was commissioned second lieutenant. He rose through the various grades, becoming colonel of the 16th infantry in 1914 and adjutant general in 1915. His earlier service included campaigns against the Indians and the Spanish-American War. He served in the General Staff College from

1902 to 1905. In 1917 he was appointed brigadier general of the national army and major general in the same year. From October, 1917, to July, 1918, he commanded the second division of the American Expeditionary Forces in France; in 1918 he commanded the sixth and seventh army corps. At the close of the War he was appointed major general of the regular army and was given command of the Philippine department in 1922.

BUNIN, IVAN A. (1870-). A Russian poet and novelist. An opponent of the modernists, he followed the older classic tradition. And in exile in Paris since the Revolution, he has described with vivid realism ruined estates, the miserable life of the peasants (for whom, however, he had no love), and the *Intelligenzia*. He made his real début about 1905, with a volume of short stories and poems, becoming a stabilizing force in Russian literature, which had run wild under the influence of the decadents and the early revolution. His works include various collections of poems (1886-1915); *The Village*, sketches (1910); *The Temple of the Sun* (travel sketches); *The Gentleman from San Francisco*, short stories, (1917); *The Cry*, ten stories (1921); and translations of Byron, Tennyson, and Longfellow.

BUNZELL, HERBERT HORACE (1887-). An American chemist, born near Prague, Czechoslovakia. In 1903 he removed to the United States and in 1906 graduated from the University of Chicago. He did graduate work at that institution and in Berlin. After service at the University of Chicago, he was an expert with the United States Department of Agriculture in 1910-11 and chemical biologist in the same department, 1911-16. He served for several years on the faculty of Georgetown University and in 1917-18 was professor and head of the department at the University of Cincinnati. He was professor of chemistry at the Woman's Medical College of Pennsylvania in 1920 and also practiced as consulting chemist. He contributed numerous papers to chemical journals and was a member of several scientific societies.

BURBANK, LUTHER (1849-). An American naturalist (see VOL. IV). He continued his experiments at the Burbank Experiment Farms at Santa Rosa, Cal. Here he evolved many new varieties of fruits and flowers, including new apples, peaches, nuts, berries, and valuable trees. On these farms he has over 5000 distinctive botanical specimens from all parts of the world, and over 1,000,000 plants are raised every year for testing. He was special lecturer on evolution at Leland Stanford Junior University. He wrote *Training of the American Plant*; *Luther Burbank, His Methods and Discoveries*; and *How Plants Are Trained to Work for Man* (1921).

BURGENLAND. The problem which this region, sometimes known as German West Hungary, presented in the peace settlement, was unusual in involving the transfer of territory from one enemy country, Austria, to another, Hungary. The Burgenland, lying on the frontier between Austria and Hungary and including parts of the three Hungarian counties of Vas, Sopron, and Moson, has an area of 1684 square miles and a population of 330,000. Ethnical divisions were: Germans, 235,000; Croats and Wends, 50,000; Magyars, 25,000; Jews and others, 20,000. On the grounds of race, therefore, the validity of the Austrian

claims before the Peace Conference were obvious. Other considerations were favorable to the transfer, and it is likely that some of these bore more weight with the Supreme Council than the matter of ethnography. It was pointed out that the Burgenland was "the kitchen garden of Vienna" and that its separation from the city by an international boundary would entail distinct hardships. Again, the territory would serve as an excellent buffer region between the two states, an important desideratum in view of the establishment of the Bolshevik régime of Béla Kun in Hungary. It has also been suggested, not without reason, that the Allies purposed, by making Burgenland a cause of dissension between Austria and Hungary, to prevent the restoration of the former Habsburg Empire. Therefore, on July 20, 1919, the Peace Conference decided to cede the Burgenland to Austria without a plebiscite, though it is interesting to note that the Austrians themselves suggested a vote for the ascertainment of the wishes of the inhabitants. Throughout 1920 Hungary remained in control, and as negotiations regarding the cession yielded no definite results, tension increased. The advent of reaction in Hungary under Horthy complicated matters. A frenzied propaganda in favor of the retention of the disputed region filled the country, and cultural and sentimental reasons were adduced to feed the flame of the new Hungarian nationalism. It was maintained that the Burgenland was one of the richest regions of the former kingdom and that 30 per cent of its population had been engaged in various manufacturing establishments vital to the economic life of Hungary. There were located coal mines and stone quarries as well as the city of Sopron (Oedenburg), the centre of a great carrying trade of cattle and foodstuffs. From the Burgenland had come Haydn, Liszt, and Count Stephen Szecsenyi; and its counties had always been regarded by the patriotic as the outposts of Magyar civilization on the West and the rampart of Hungary against Germanism. It was becoming plain that Hungarians would not relinquish the region without a struggle. In August, 1921, irregular troops, of the party of ex-premier Friedrich and the reactionary society known as "The Awakening Hungarians," poured into the country and forcibly ejected the Austrian officials who had appeared to take possession in accordance with the provisions of the Treaty of the Trianon. Austria, by this time, had become more than eager for the cession; Hungary, for her part, stubbornly maintained her rights to the eastern portion and refused to move against the armed bands. In September, Czechoslovakia, for the Little Entente, appealed to the Allies in behalf of Austria. On September 25 the Council of Ambassadors demanded the withdrawal of Hungarian troops, meanwhile, at the behest of Italy, refusing to permit Czechoslovakia and Jugo-Slavia to interfere. Largely as a result of Italian intervention a truce was patched up, October 13, by which Hungary promised to clear the counties of the predatory bands and hand over the Burgenland to Austria, while Austria consented to the holding of a plebiscite in the town of Sopron and its environs. Such a plebiscite was held in December at Sopron and proved favorable for Hungary. On December 30, therefore, Sopron and those districts contiguous to the Hungarian

frontier were turned over to the Hungarian police by an Allied military commission.

The encounter had aroused great interest in Europe because of the anomalous position of Austria throughout. At first accepting the decision of the Supreme Council with a real reluctance, her government had complied with the spirit of the treaties in every particular, only to see itself thwarted by a lawless aggression on the part of Hungarians, encouraged by French intrigue; and then, for fear of estranging a powerful neighbor, she had yielded to the Italian plan for a plebiscite. The impotence of Austria under these conditions chagrined her citizens and troubled the liberal elements of Europe and America. The settlement revealed to them the basic injustice of the peace treaties and their aftermath.

BURGESS, (FRANK) GELETT (1866-). An American author and illustrator (see VOL. IV). He is the author of *Burgess Unabridged* (1914), *The Goop Encyclopædia* (1915), *The Romance of the Commonplace*, enlarged edition (1916), *War the Creator* (1916), and *Mrs. Hope's Husband* (1917). He edited *My Maiden Effort* (1921) and *Have You an Educated Heart?* (1923).

BURGESS, GEORGE KIMBALL (1874-). An American physicist, born at Newton, Mass. He was graduated in 1896 from the Massachusetts Institute of Technology, where for two years he served as assistant in physics. Receiving a fellowship, he studied in Paris. On returning to the United States he taught in the Universities of Michigan and California. In 1903 he went to Washington as physicist in the Bureau of Standards, where after successive promotions he became in 1923 director of the Bureau in succession to Dr. S. W. Stratton. Dr. Burgess also served the United States as a member of various foreign service and engineering commissions of the National Research Council, especially during the War, and he was likewise a member of the National Aircraft Standards Board. The results of his many investigations have been published in a series of papers on the constant of gravitation, on high temperature measurements, and on the properties of metals and alloys; many of these were issued in the series of technical papers of the Bureau of Standards.

BURGESS, JOHN WILLIAM (1844-). An American university dean (see VOL. IV). In 1914-15 he was visiting American professor in Austrian universities. He is the author of *Causes of the European Conflict* (1914), *The European War of 1914* (1915; popular edition, 1916), *The Reconciliation of Government with Liberty* (1915), *The Administration of President Rutherford B. Hayes* (1915), *America's Relations to the Great War* (1916), *Militarism and the Emperor* (1916), *The Russian Revolution and the Soviet Constitution* (1919), *The Transformation of the Constitutional Law of the United States Between 1898 and 1920* (1921), and *Recent Changes in American Constitutional Theory* (1923).

BURKE, BILLIE (MRS. FLORENZ ZIEGFELD, JR.) (1886-). An American actress, born in Washington, D. C. She made her début in London in support of Edna May in *The School Girl* at the Pavilion Music Hall. She appeared as leading woman in *Mr. George* (1907). In the same year she came to America and was very successful in her characterization of Bea-

trice Dupré as John Drew's leading woman in *My Wife*. Her later successes in New York were in *Jerry, The Rescuing Angel, Cæsar's Wife* and *The Intimate Strangers* (1921). She has also devoted much time to the movies.

BURKITT, FRANCIS CRAWFORD (1863-). An English professor (see VOL. IV). Among his later works are *Jewish and Christian Apocalypses* (Sweich Lectures) (1914), *Some Thoughts on the Athanasian Creed* (1916), *Eucharist and Sacrifice* (1921), and *Earliest Sources of the Life of Jesus* (rev. ed., 1922).

BURLEIGH, HENRY THACKER (1866-). An American song writer, born at Erie, Pa. In 1892 he entered the National Conservatory in New York City, studying there with Rukin Goldmark, J. White, and M. Spicker. In 1894 he became baritone soloist at St. George's, and in 1899 baritone soloist at the Temple Emanu-El. As a song writer he justly gained wide popularity. In 1917 he was awarded the Spingarn Medal for the highest achievement during 1916 by an American citizen of African descent. In 1920 Harvard University conferred on him the degree of Doctor of Music.

BURLESON, ALBERT SIDNEY (1863-). An American Postmaster-General (see VOL. IV). In 1918 he became chairman of the United States telephone and telegraph administration. He retired from the office of Postmaster-General in 1921.

BURLESON, HUGH LATIMER (1865-). An American bishop, born at Northfield, Minn., and educated at Racine College, Wis., and at the General Theological Seminary in New York City. From 1893 to 1900 he was curate, assistant, or rector of Protestant Episcopal churches in New York and Wisconsin. During the seven years following, he was dean of the Cathedral of the District of North Dakota, and in 1909-16, secretary of the Board of Missions of the Protestant Episcopal Church of the United States. In the latter year he became bishop of South Dakota. He wrote *The Conquest of the Continent* (1911) and *Our Church and Our Country* (1918).

BURLIN, NATALIE CURTIS (?-1921). An American writer born in New York City. She studied music in France and Germany and devoted herself particularly to the collection of folk-songs of Indian tribes, traveling widely among them for that purpose. She made similar studies among the Zulu and other tribes of South Africa and among American Negroes. In 1917 she married the artist, Paul Burlin. Among her writings, which include probably the most successful works in the field of aboriginal American life, are *Songs of Ancient America* and *The Indian's Book*. The latter was again published in 1923 under the title, *The Indian Book*, with a few additions.

BURNET, JOHN (1863-). An English professor and dean (see VOL. IV). In 1919, he became Associate of the Royal Academy of Belgium and in the same year was also made Honorary Fellow of the Educational Institute of Scotland. He is author of *Greek Philosophy: Thales and Plato* (1914), *The Socratic Doctrine of the Soul* (1916), and *Higher Education and the War* (1917).

BURNETT, FRANCES (ELIZA) HODGSON (1849-). An American author (see VOL. IV). After 1914 she added to her already long list of works *One I Knew the Best of All* (1915), *Little Hunchback Zia* (1916), *White People*

(1917), *Good Wolf* (1919), *The Head of the House of Coombe* (1922), *The Fair Barbarian* (1923), *Robin* (sequel to *The Head of the House of Coombe*, 1922), and others. She edited *The Children's Book* (1914).

BURNHAM, CLARA LOUISE (1861-). An American author, born at Newton, Mass. She wrote many stories and poems for the magazines and the text for many of her father's cantatas. Among her novels were *Dr. Latimer* (1893); *The Right Princess* (1902); *Jewel* (1903); *Jewel's Story Book* (1904); *The Opened Shutters* (1906); *The Leaven of Love* (1908); *The Inner Flame* (1912); *The Right Track* (1914); *Instead of the Thorn* (1916); *Hearts' Haven* (1918); *In Apple-blossom Time* (1919), and *The Keynote* (1921). She was a Christian Scientist and most of her books are permeated with the principles of that faith. She was notably successful in depicting New England characters.

BURNS, JAMES ALOYSIUS (1867-). An American clergyman and college president, born at Michigan City, Ind., and educated at the University of Notre Dame. After two years spent as a lay teacher he was ordained to the Roman Catholic priesthood in 1893 and from that time until 1900 was professor of sciences in the University of Notre Dame. He was then made president and professor of moral theology in Holy Cross College (Washington). In 1919 he returned to the University of Notre Dame as president. His publications include *Principles, Origin and Establishment of the Catholic School System* (1908); *The Growth and Development of the Catholic School System* (1912), and *Catholic Education: A Study of Conditions* (1917).

BURNS, RT. HON. JOHN (1858-). An English parliamentarian (see VOL. IV). In 1914 he resigned from the presidency of the Local Government Board, and became president of the Board of Trade. He resigned from the latter office when war was declared. Until 1918 he was a radical member of Parliament.

BURNS, KEVIN (1881-). An American spectroscopist, born at Pleasant Ridge, N. B. He was graduated at the University of Minnesota in 1903. He was connected with the Lick Observatory during 1904-07 and again as a Martin Kellogg fellow during 1910-12. In 1913 he was a physicist at the Bureau of Standards (Washington), but in 1920 he became the astronomer at the Allegheny Observatory. His specialty is the application of the spectroscope to heavenly bodies, the orbit of lambda Andromedæ, the ring nebula in Lyra, and the Orion region, on which he has published his findings.

BURNSIDE, RICHARD H. ("ZIP") (?-). A dramatic author and stage director best known for *Chin-Chin*, written with Anne Caldwell (1914), *Hip-Hip Hooyay!* (1915), *The Big Show* (1916), *Cheer Up* (1917), *Happy Days* (1919), *Miss Millions* (1919), *Tip-Top*, with Anne Caldwell (1920); and others. He was general producer for the New York Hippodrome.

BURR, GEORGE LINCOLN (1857-). An American professor (see VOL. IV). In 1919 he became John Stambaugh professor of history in Cornell University. He edited *Narratives of Witchcraft Cases* (1913).

BURR, WILLIAM WESLEY (1880-). An American agriculturalist, born at Goodland, Ind. He graduated from the University of Nebraska in 1908 and until 1913 was associate professor

of crops and soils there. From 1903 to 1913 he was also in charge of the coöperative work in the office of dry land agriculture in the North Platte Experiment Station, Bureau of Plant Industry, United States Department of Agriculture. From 1913 to 1916 he was assistant agriculturalist and from the latter date professor of agronomy and head of the department at the University of Nebraska. He was also vice-director of the experiment station of that university. He was a member of several scientific societies and wrote on soil moisture, crop production, dry land agriculture, etc.

BURRAGE, CHAMPLIN (1874-). An American scholar born at Portland, Me., and educated at Brown University and at Berlin, Marburg, and Oxford. From 1912 to 1915 he was librarian of Manchester College, Oxford, and from 1915 to 1917, librarian and member of the faculty of Brown University. His publications include *A New Year's Gift by Robert Browne, 1588* (1904); *The Church Covenant Idea* (1904); *The True Story of Robert Browne* (1906); *New Facts Concerning John Robinson* (1910); *The Early English Dissenters in the Light of Recent Research* (1912); *John Penry, the So-Called Martyr of Congregationalism* (1913); *Nazareth and the Beginnings of Christianity* (1914); *John Pory's Lost Description of Plymouth Colony* (1918); *An Answer to John Robinson of Leyden* (1920); *The Minoan Hieroglyphic Inscriptions, I: The Phaistos Whorl* (1921), and *Prehistoric Aegean Inscriptions from Minoan Crete, the Aegean Islands, Cyprus, Greece and Troy, Part I* (1922).

BURRELL, DAVID JAMES (1844-). An American clergyman (see VOL. IV). He is the author of *We Would See Jesus* (1914), *The Apostles' Creed* (1915), *Why I Believe the Bible* (1917), *The Laughter of God* (1918), *Campaigns of Paul* (1919), *The Resurrection and the Life Beyond* (1920), *Paul's Companions* (1921), and *Paul's Letters* (1921).

BURRELL, MARTIN (1858-). A Canadian statesman (see VOL. IV). From 1917 to 1919 he was Secretary of State of Canada and Minister of Mines, having previously been Minister of Agriculture. In 1920 he became Parliamentary Librarian of Canada.

BURRITT, MAURICE CHASE (1883-). An American agriculturist, born at Hilton, N. Y., educated at Cornell. From 1902 he was engaged in farming at Hilton, N. Y. He was scientific assistant for the United States Department of Agriculture from 1908 to 1911 and was county agent leader for the New York State College of Agriculture at Cornell University, 1914-17. In 1917 he became vice-director of extension work at that institution. He took a prominent part in organizing a farm bureau and agricultural extension system in New York State. He wrote *Apple Growing* (1915), and *The County Agent and the Farm Bureau* (1922).

BURROUGHS, JOHN (1837-1921). An American essayist and naturalist, born at Roxbury, N. Y. His writings in his later years took on a wider aspect than his earlier books and were devoted largely to a general study of life and its meaning. In 1913 he published *The Summit of the Years*; in 1915, *The Breath of Life*; in 1916, *Under the Apple Trees*, and in 1919, *Field and Study*. John Burroughs died on March 29, 1921, and was buried at his farm on the Hudson River, "Slabsides." Since he had lived there for many years, the farm was

purchased by a number of his admirers and made a permanent memorial to his life and works.

BURROWS, MONTROSE THOMAS (1884-). An American pathologist, born at Halstead, Kan., and educated at Kansas and Johns Hopkins. For a year he held a fellowship at the Rockefeller Institute, where also during 1909-10 he was assistant pathologist. In 1910 he became instructor in anatomy at the Cornell Medical College, and in 1915 he accepted the appointment of pathologist to the Hopkins Hospital. Five years later he was called to the chair of pathology in the Washington University Medical School in St. Louis, and in 1920, he became director of the research laboratory at the Barnard Face, Skin and Cancer Hospital (St. Louis). His original investigations have included studies of tissue cultivation, mechanism of growth and division of cells and heart muscle contraction, inter-cranial processes, and various problems in epidermiology.

BURSTING CHARGES. See EXPLOSIVES.

BURTON, ERNEST DEWITT (1856-). An American theologian (see VOL. IV). He is the author of *Harmony of the Synoptic Gospels in Greek*, with Edgar J. Goodspeed (1920); *Commentary on Paul's Epistle to the Galatians* (1920); *Jesus of Nazareth, How He Thought, Lived, Worked, and Achieved* (1920); and *Source Book for the Study of the Teaching of Jesus in Its Historical Relationships* (1923).

BURTON, MARION LE ROY (1874-). An American University president (see VOL. IV). In 1917 he resigned as president of Smith College (Northampton, Mass.), to accept the presidency of the University of Minnesota. He stayed in the latter institution until 1920, when he became president of the University of Michigan. His works include *Life Which Is Life Indeed* (1914), *First Things* (1915), and *On Being Divine* (1916).

BURTON, RICHARD EUGENE (1861-). An American college professor (see VOL. IV). His works include *How to See a Play* (1914), *Bernard Shaw—the Man and the Mask* (1916), *Poems of Earth's Meaning* (1917), and *Charles Dickens—How to Know Him* (1919). He was president of the Drama League of America, (1914-15).

BURTON, THEODORE ELIJAH (1851-). An American Congressman (see VOL. IV). He was a member of the Sixty-seventh Congress (1921-23) for the Twenty-second District of Ohio. In 1921 he was a member of the executive committee of the Interparliamentary Union. He had the unanimous support of the Ohio delegation for presidential nominee in the Republican national convention in 1916. From 1917 to 1919 he was president of the Merchants' National Bank of New York City, and in the latter year he was also Stafford Little Lecturer at Princeton University. His works include *Some Political Tendencies of the Times and the Effect of the War Thereon* (1919).

BURTON, WILLIAM MERRIAM (1865-). An American chemist, born at Cleveland, Ohio, and educated at Western Reserve and Johns Hopkins Universities. In 1889 he entered the service of the Standard Oil Company of Indiana as chemist and after serving as superintendent and vice-president became its president in 1918. His important investigations have had to do with the technology of petroleum, notably a "cracking" process which has doubled the out-

put of gasoline. The Willard Gibbs medal of the American Chemical Society was conferred on him in 1918, and in 1922 he received the Perkins medal of the Society of Chemical Industry.

BURY, SIR GEORGE (1866-). A Canadian railway official. He was educated at Montreal College and in 1883 entered the employ of the Canadian Pacific Railroad. In 1907 he was made general manager of its western lines and from 1911 was president of the road. In 1917 he visited Russia in order to assist in the reorganization of shipping in that country. In the same year he was knighted.

BUSCH, CARL (1862-). An American composer and conductor, born at Bjerre, Denmark. After completion of his studies at the Conservatory in Copenhagen he spent a year in Paris as viola player in Godard's orchestra. In 1887 he settled in Kansas City, where in 1912 he founded the Kansas City Symphony Orchestra, which he conducted. He frequently appeared with other orchestras in the United States, Germany, and Denmark, as conductor of his own works. His works include a symphonic prologue, *The Passing of King Arthur*; a symphonic poem, *Minnehaha's Vision*; *Ode to France* and *Negro Carnival* for orchestra; *A Chant from the Great Plains* for military band; *Sir Galahad* for baritone, chorus and orchestra; and nine cantatas.

BUSCH, JOSEPH FRANCIS (1866-). An American bishop, born at Red Wing, Minn., and educated at Innsbruck, Austria, and at the Catholic University (Washington, D. C.). Ordained to the Roman Catholic priesthood in 1889, he became secretary to Archbishop Ireland and assistant pastor in St. Paul, Minn. He was then pastor in South St. Paul, Minneapolis and LeSueur, Minn. In 1910 he was made bishop of Lead, S. D., and in 1915 bishop of St. Cloud, Minn.

BUSH, BENJAMIN FRANKLIN (1860-). An American railway official, born in Wellsboro, Pa., and educated at the State Normal School at Mansfield, Pa. He began his railway service on the Northern Pacific Railroad in 1882. In 1887 he was appointed division engineer of the Union Pacific Railroad in Idaho and Oregon. He served as general manager and superintendent of several railroads in the west and in 1907 was appointed president of the Western Maryland Railroad. He was president also of the Denver and Rio Grande Railroad in 1912 and 1915 and of the Western Pacific Railroad in 1913. He went back as president to the Western Maryland in 1917. In addition to his service as railway official he held several important government offices and was a member of the advisory board on fuels and structural material in 1907. During the War he acted as regional director in the southwestern district for the Federal railroad administration.

BUTLER, HENRY MONTAGU (1833-1918). An English educator (see VOL. IV). He published a volume of classical verse, *Leisure Hours of a Long Life* (1914). He died at Cambridge on Jan. 14, 1918.

BUTLER, HOWARD RUSSELL (?-). An American artist who won the Carnegie prize from the National Academy of Design (1916) and the prize from the Duxbury Exhibition in 1917. He accompanied the United States Naval Observation Expedition to Baker, Oregon, and painted the solar eclipse of June 1918. This

last painting is owned by the American Museum of Natural History.

BUTLER, NICHOLAS MURRAY (1862-). An American educator, president of Columbia University (see VOL. IV). He continued to take an active part in educational and political affairs in the decade 1914-24. From 1914 he was president of the France-America Society, and from 1919 was corresponding member of the Academy of Arts and Letters of Naples. In 1917 he was president of the American Hellenic Society. He was mentioned as a possible candidate for the presidency in 1920 and received several votes in the National Convention. In May, 1924, he created a nation-wide sensation by a speech delivered at a dinner of the Missouri Society, in which he denounced the Prohibition Constitutional Amendment, and declared that it should be repealed. For this attitude he was both praised and denounced by newspapers, organizations and individuals throughout the country. His later publications include *The Meaning of Education* (1915); *The World in Ferment* (1917); *Is America Worth Saving? and Other Addresses* (1920); *Scholarship and Service*, (1921).

BUTTENWEISER, MOSES (1862-). An American scholar, born at Beerfelden in Germany and educated at the universities of Würzburg, Leipzig, and Heidelberg. In 1897 he became professor of Biblical exegesis in the Hebrew Union College of Cincinnati, Ohio. His works include *The Hebrew Elias-Apocalypse*, in German (1897); *An Outline of Neo-Hebraic Apocalyptic Literature* (1901); *The Prophets of Israel* (1914); *The Book of Job* (1920), and numerous articles in learned publications.

BUTTER. See DAIRYING.

BUXTON, NOEL (1869-). An English social reformer and labor leader. He was educated at Cambridge and acted as aide-de-camp to his father when the latter was Governor of South Australia. He founded a farmers' co-operative society, was an active member of many organizations engaged in social reform work and also of the Christian Social Union. In January, 1924, he was appointed minister for agriculture in the Labor cabinet of Ramsay MacDonald. He published *Europe and the Turks* and *With the Bulgarian Staff*, and was part author of *The Heart of the Empire*, *Travel and Politics in Armenia*, *The War and the Balkans*, and *Balkan Problems and European Peace*.

BUXTON, SYDNEY CHARLES BUXTON, first Viscount (1853-). An English statesman (see VOL. IV.) He became High Commissioner and Governor General of South Africa in 1914 and was at the same time created Viscount Buxton. In 1920 he retired from office.

BYELY, ANDREY (B. N. BUGAYEV) (1880-). A Russian poet, novelist, and critic. He early showed talent in a variety of directions; he was gifted in mathematics, philosophy, and music, but turned all his gifts to the cause of the literary symbolists. Just as he passed through many stages in the development of his philosophy as a theosophist, so his writings include all genres and styles. He began his career in 1904 by a series of philosophical and critical essays in *The Scales* and also by his first volume of collected poetry, entitled *Gold in Blue*. He came to be regarded as the most individual of the Russian modernists.

His works include *Symphonies* (symbolic poems in prose; *The Heroic* (Northern Symphony), 1902; *The Second* (Dramatic Symphony), 1904; *The Return* (Third Symphony), 1905; *The Goblet of Snow-Storms* (Fourth Symphony), 1908; *The Silver Dove*, a novel, 1910; *Petersburg*, a novel, 1912; *Poems*, 1904-17; and *Symbolism* (essays on artistic creation), 1910. The two novels form parts of a trilogy, of which the third part, *Kotik Letajev*, appeared during the Revolution.

BYNG, JULIAN HEDWORTH GEORGE BYNG, first BARON OF (1862-). A British general. He saw service in India and South Africa, and in 1909 was made major general. When the British occupied Egypt in 1912 he was placed in charge of the army of occupation. During the War he was a Corps commander, first in the Dardanelles campaign (1915-16) and then on the western front where he was chosen to head the newly formed Canadian army corps (1916). In this position he was responsible for the celebrated storming of Vimy Ridge (Apr. 9, 1917). In June, 1917, he was raised to the post of army commander, executed the attack on the Cambrai front in November, and was promoted to the rank of full general. His other honors included a peerage in 1919, a grant of £30,000, and decorations from all the Allies. In 1921 he was appointed Governor General of Canada.

BYNNER, WITTER (1881-). An American playwright, born in Brooklyn and educated at Harvard. He is associate editor of *Palms*. His best known work includes *The New World* (1915); *Iphigenia in Tauris* (1915); *Any Girl* (1917); *Grenstone Poems* (1917); *A Canticle of Praise* (1919); *The Beloved Stranger* (1919); *A Canticle of Pan* (1920); *Pins for Wings* (1920, under pseudonym of Emanuel Morgan); *A Book of Plays*, from the French of Vildrac (1922), and *A Book of Love* (1923). He is co-author with Arthur Davison Ficke of *Spectra* (1916); with Julia Ford, *Snickerty Nick* (1919); with Dr. Kiang Kang-hu, *The Jade*

Mountain, translated from the T'ang poets (1924).

BY-PRODUCT COKE. See COKE.

BY-PRODUCTS. RECOVERY OF. See CHEMISTRY, ORGANIC.

BYRAM, HARRY E. (1865-). An American railway official, born in Galesburg, Ill., and educated in the common schools. He began his railway service with the Chicago, Burlington and Quincy Railroad at the age of 16. He served in several capacities in this company until 1894, when he began service with the Great Northern Railroad as chief clerk in the vice-president's office. In the years following he filled important positions with several railroads in the Middle and Far West and was appointed general superintendent for Nebraska of the Chicago, Burlington and Quincy in 1904. In 1917 he was appointed president of the Chicago, Milwaukee and St. Paul Railroad.

BYRNE, CHRISTOPHER EDWARD (1867-). An American bishop, born at Byrnesville, Mo., and educated at St. Mary's College (Kan.) and St. Mary's Seminary (Baltimore, Md.). From 1891 to 1918 he was pastor of churches in Columbia, Edina, and Saint Louis, Mo. In 1918 he was made bishop of Galveston, Tex.

BYRNE, DONN (BRIAN OSWALD DONN BYRNE) (1889-). An American author, born in New York City, and educated at the University College, Dublin, and in Paris and Leipzig. On his return to New York he was connected with the *New York Sun* and the *Brooklyn Daily Eagle*. Even though Donn Byrne said of his own writing, "its faults are because I cannot write better yet," and though that was perhaps true, he has, in his contributions to magazines and in his books, caught a beauty which is haunting and elusive. *Stories Without Women*, published in 1915, was followed by *The Stranger's Banquet* (1919); *The Foolish Matron* (1920); *The Woman God Changed* (1921); *Messer Marco Polo* (1921); *The Wind Bloweth* (1922); and *The Changeling* (1923), a collection of short stories.

CABELL, JAMES BRANCH (1879-). An American author, born at Richmond, Va., and educated at William and Mary College. For a year he was instructor in French and Greek in William and Mary College, and thereafter, until 1901, was occupied as a journalist in Richmond and New York. His works include *The Soul of Melicent* (afterwards published under the title *Domnei*) (1913); *The Rivet in Grandfather's Neck* (1915); *The Certain Hour* (1916); *The Cream of the Jest* (1917); *Jurgen* (1919); *The Judging of Jurgen* (1920); *Figures of Earth* (1921); *Joseph Hergesheimer* (1921); *The Jewel Merchants* (1921); *The Lineage of Litchfield* (1922), and others.

CABLE STEERING. See NAVIGATION.

CABOT, RICHARD CLARKE (1868-). An American physician, born at Brookline, Mass., and educated at Harvard University (A.B. 1889; M.D. 1892). He became full professor of medicine at Harvard in 1919 and was Chief of the Medical Staff of the Massachusetts General Hospital from 1912 to 1921. During the War he saw service abroad and became Lieutenant-Colonel of the Medical Reserve Corps. Among his publications are: *A Guide to the Clinical Examination of the Blood* (1898); *Physical Diagnosis of Diseases of the Chest* (1900); *Case Teaching in Medicine* (1906); *Differential Diagnosis* (1911); *What Men Live By* (1914); *A Layman's Handbook of Medicine* (1916); *Social Work* (1919). Several of his practical works have gone through numerous editions and his *Differential Diagnosis* was translated into German. The author originated a new feature in medical teaching in these volumes, the subject matter consisting wholly of case histories presented in novel fashion.

CADMAN, CHARLES WAKEFIELD (1881-). An American composer, born at Johnstown, Pa., Dec. 24, 1881. He received his entire musical education from private teachers in Pittsburgh, where he lived until 1909 as organist of various churches, conductor of a male chorus and critic of the *Pittsburgh Dispatch*. Having become interested in the music of the American Indians, he spent some time at the reservation of the Omaha Indians, making phonographic records of their songs and pieces for flute. Together with Princess Tsianina Redfeather, a full-blooded Indian mezzo-soprano, he lectured on Indian lore, making extensive tours of the United States and also visiting Paris and London. Of his operas, *Shanewis* or *The Robin Woman* was produced at the Metropolitan Opera House (Mar. 23, 1918). *The Garden of Mystery* (one act) and *The Red Rivals or Daoma* (three acts) have not yet been produced. His other works consist of a piano-trio in D, a piano-sonata in A, a Japanese song-cycle, and several Indian song cycles.

CADMAN, (SAMUEL) PARKER (1864-). An American clergyman, born at Wellington, England, and educated at the University of Lon-

don. From 1896 to 1901 he was pastor of the Metropolitan Temple, New York City, and after that time pastor of the Central Congregational Church of Brooklyn, N. Y. He was a popular lecturer, active in Y. M. C. A. work, his Sunday afternoon talks being broadcast by radio. His works include: *Charles Darwin and Other English Thinkers* (1911); *The Victory of Christmas*; *The Religious Uses of Memory* (1912); *The Life of William Owen* (1912); *The Three Religious Leaders of Oxford* (1916); and *Ambassadors of God* (1920).

CADORNA, COUNT LUIGI (1850-). An Italian general, born at Pallanza of a distinguished Italian family. He entered the army in 1886, was promoted steadily, and in 1914 became chief of the general staff. After the defeat at Caporetto he was transferred to the Military Council at Versailles, and later, as a result of the findings of the Caporetto inquiry commission, was retired from the army.

CAILLAUX, JOSEPH (1863-). A French public official (see VOL. IV). Six days after the release of Mme. Caillaux, who had been tried for the shooting of M. Gaston Calmette, and acquitted, the War began. In 1916, Caillaux went to Rome, and because of remarks made by him to Italian statesmen that France could not continue the War after the spring of 1917 and that first peace and then an alliance with Germany should be concluded, Briand gave permission to the Italian government to arrest Caillaux and confiscate his papers. The taking of these papers proved most embarrassing to Caillaux, one being the elaboration of a project to overthrow the legal government and have himself made dictator, and the other containing the names of politicians, newspaper managers, etc., whom it would be necessary to arrest or exile. He claimed they were merely dreams, but he was condemned to three years in prison and to 10 years' suspension of his civil rights. He was not allowed to live in Paris or in several other large cities. He was released several days after the verdict, however, but up to July, 1924 was an exile in the provinces. In that month he was granted amnesty and allowed to return to France.

CALCIUM. See CHEMISTRY.

CALDER, JAMES ALEXANDER (1868-). Canadian public official (see VOL. IV). After 1914 he was Minister of Railways and Highways, first vice-president of the Canadian Chamber of Commerce of London, and a member of the Imperial War Conference (1918).

CALDWELL, ANNE (?-). A dramatic author and composer whose best known works include besides collaborations with Richard Burnside (q.v.): *Pom-Pom* (1916); *Go to It* (with John Golden and J. E. Hazzard, 1916); *A New Girl* (1919); *The Lady in Red* (1919); *She's a Good Fellow* (1919); *The Night Boat* (1919); *The Sweetheart Shop* (1920).

CALDWELL, BURNS DUBBIN (1858-). An American railway official, born in Placerville,

Cal. He was educated in the public schools of Chambersburg, Pa., and began his railway service in 1875 with the Vandalia Line. From 1886 to 1892, he was employed in important capacities with several western railroads and from 1889 to 1902 was traffic manager of the D. L. & W. Railroad. From 1902 to 1911, he served as vice-president of that road and from 1911 was president of Wells Fargo & Company. From 1918, he was chairman of the board of the American Railway Express Company.

CALENDAR. See ASTRONOMY.

CALIFORNIA. The second State in size (158,297 square miles), and the eighth in population; capital Sacramento. The population of the State increased during the decade 1910-20, from 2,377,549 in 1910 to 3,426,861 in 1920, a gain of 44.1 per cent. The white population increased from 2,259,672 to 3,264,711; the Negro, from 21,645 to 38,763; the Indian, from 16,371 to 17,360; in 1920. While the Chinese showed a decrease from 36,248 in 1910 to 28,812 in 1920, the Japanese increased from 41,356 to 71,952. The native white population increased from 1,742,422 in 1910 to 2,583,049 in 1920, while the foreign-born whites increased from 517,250 to 681,662. The urban population in 1910 was 1,469,739; in 1920, 2,331,729; while the rural population showed an increase of from 907,810 to 1,095,132. The populations of the chief cities increased as follows: San Francisco (q.v.) from 416,912 in 1910 to 506,676 in 1920; Oakland (q.v.), from 150,174 to 216,261; San Diego from 39,578 to 74,683. During the decade, Los Angeles (q.v.) passed San Francisco as the largest city in the State, with a population of 319,198 in 1910 and 576,673 in 1920.

Agriculture. While the population in the State was increasing 44.1 per cent in the decade, 1910-20, the number of farms was increasing by 33.4 per cent (from 88,197 in 1910 to 117,670 in 1920), owing partly to the cutting up of large tracts. In 1910, the acreage was 27,931,444; in 1920 it was 29,365,667, an increase of 5.1 per cent; and the improved land in farms increased from 11,389,894 acres in 1910 to 11,878,339 in 1920. The total value of farm property in the State apparently increased from \$1,614,694,584 to \$3,431,021,861, or 112.5 per cent; the average value of farm property, from \$18,308 to \$29,158, an increase of 59.30 per cent. In interpreting these values, however, and, indeed, all comparative values in the decade 1914-24, the inflation of the currency in the latter part of that period is to be taken into account. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of the land area in farms increased from 28 per cent in 1910 to 29.5 per cent in 1920; but the percentage of improved farm land decreased slightly, from 40.8 to 40.4 per cent. Of the total of 117,670 farms in 1920, the number operated by owners was 81,580 as compared with 66,632 in 1910; by managers 4949, as compared with 3417; and by tenants, 25,141, as compared with 18,148. There was an increase in the decade of about 20,000 owners and 7000 tenants. The white farmers in 1920 numbered 111,184, as compared with 85,119 in 1910; and the number of Japanese farmers had increased from 1816 to 5152 during that time. The total number of colored farmers, including Negroes, Indians, Japanese and Chinese, was 6486 in 1920 as compared with 3078 in 1910. The farms free

from mortgage numbered 36,042 in 1920, as compared with 39,368 in 1910; while the number of mortgaged farms increased from 26,749 in 1910 to 44,109 in 1920. Of the 117,670 farms in the State in 1920, 67,391 were irrigated, or a total irrigated area of 4,219,040 acres. In 1920, 57.3 per cent of all farms were irrigated, as compared with 44.6 per cent in 1910.

The number of cattle in 1920 and 1910 was 2,008,037 and 1,809,226, respectively. The number of sheep increased from 1,525,288 to 2,400,151. Poultry-raising developed appreciably in the decade, the number of fowls being nearly 11,000,000 in 1920. The production of small fruits in 1919 was 15,458,726 quarts, compared with 26,824,120 quarts in 1909; oranges, 21,628,444 boxes compared with 14,436,180 in 1909; lemons, 6,551,657 boxes compared with 2,756,221 boxes; and grapefruit, 465,085 boxes compared with 122,515. The coming of prohibition, which it was anticipated would paralyze the wine-grape industry and depreciate the value of lands used for the purpose, had quite the opposite effect. The vine-growing area more than doubled, although not all yet in bearing, and prices for the crop far in excess of those that previously prevailed were secured. The estimated production of the chief crops in 1923 was as follows: corn, 4,557,000 bushels; wheat, 16,157,000 bushels; oats, 5,475,000 bushels; barley, 34,346,000 bushels; rice, 5,470,000 bushels; potatoes, 8,121,000 bushels; sweet potatoes, 797,000 bushels; hay, 4,459,000 tons; sugar beets, 538,000 short tons; and cotton, 49,000 bales. Comparative figures for 1913 are: corn, 1,815,000 bushels; wheat, 4,200,000 bushels; barley, 33,150,000 bushels; rice, 293,000 bushels; potatoes, 8,092,000 bushels; hay, 3,600,000 tons; and cotton, 23,000 bales.

Mining. California is one of the most important of the mineral-producing States, and in the value of its products in 1921 ranked third, being surpassed only by Pennsylvania and West Virginia in that year. The most important of its mineral products are petroleum, gold, natural gas, and cement. The development of the petroleum fields of the State has been one of the most important events in the history of mineral production in the country, the extent of this development being shown by a comparison of figures for several of the years in the period 1914 to 1924. In 1914, the production was 99,775,327 barrels, valued at \$48,066,096; in 1916, 90,951,936 barrels, \$53,702,733; in 1918, 97,531,997 barrels, \$118,770,790; in 1920, 103,377,000 barrels, \$178,395,000; in 1921, 112,600,000 barrels, \$203,138,000; in 1922, 138,468,000 barrels, \$173,381,000. On the other hand, the production of gold in the State has decreased, with the exception of one or two years during the decade 1914-24. The production in 1914 was 999,113 fine ounces, valued at \$20,653,496; in 1916, 1,035,745 fine ounces, \$21,410,741; in 1918, 799,588 fine ounces, \$16,528,953; in 1920, 692,297 fine ounces, \$14,311,043; in 1922, 709,677 fine ounces. This decrease was due partly to the exhaustion of a number of the deep mines and to general depression in the gold-mining industry in the last few years. The cement industry has shown a comparatively steady increase during the decade. There were produced in 1914 5,075,114 barrels; in 1916, 5,332,860; in 1920, 7,098,084; in 1921, 7,302,784; and in 1922 8,711,515. The output of natural gas increased from 17,828,928 M. cubic feet in 1914 to 39,718,941 M. cubic feet

in 1918. In 1920, the production was 66,041,000 M. cubic feet, and in 1921, 75,942,000 M. cubic feet. There was produced also a considerable amount of copper, the output varying from 30,507,692 pounds in 1914 to 48,153,139 in 1917; 12,626,272 in 1920; 11,743,404 in 1921, and 22,539,485 in 1922. The silver production of the State has always been important. In 1914 it was 1,471,859 fine ounces; in 1916, 2,564,354; in 1919, 1,107,189; in 1920, 1,706,327; in 1921, 3,629,223, and in 1922, 3,100,065. The State has produced large quantities of lead and zinc. The lead production has varied from 4,251,923 pounds in 1914 to 21,868,628 in 1917; 13,372,049 in 1918; 4,813,510 in 1920; 1,124,276 in 1921, and 6,312,536 in 1922. The zinc production in 1914 was 389,471 pounds, which increased in 1916 to 15,256,485 pounds, fell again in 1919 to 472,990 pounds, then rose in 1921 to 1,057,731 pounds, and in 1922, to 3,012,950. In addition to the minerals mentioned above, California produces asphalt, clay products, stone and many other products of great value. The total value of the mineral production of the State in 1914 was \$101,013,199; in 1918, \$204,673,547; in 1920, \$269,404,686; reaching \$297,025,679 in 1921.

Manufactures. California is an important industrial State. The number of manufacturing establishments increased during the decade from 7659 in 1909 to 10,057 in 1914, and 11,942 in 1919, while the number of persons engaged in manufacture rose from 141,576 to 176,547, and 206,858, in those years. The capital invested in 1909 was \$537,134,359; in 1914, \$736,105,445, and in 1919, \$1,233,480,273. The most important industries are those connected with canning and preserving, California ranking first among the States in the canning of fruits and vegetables. The value of these products in 1909 was \$32,915,000; in 1914, \$61,163,000; and in 1919, \$219,279,000. The value of the products of the petroleum-refining industry, which is second in importance, was \$17,878,000 in 1909; \$55,528,000 in 1914 and \$213,292,000 in 1919. Shipbuilding and boatbuilding, ranking third in the value of its product, had an output in 1909 valued at \$4,132,000; in 1914, \$8,104,000, and in 1919, \$185,882,000; the extraordinary growth from 1914 to 1919 being the result of great shipbuilding operations carried on because of the War. Slaughtering and meat-packing is also an important industry. The value of the product in 1909 was \$34,280,000; in 1914, \$50,012,000, and in 1919, \$94,450,000. The increase in the value of products from 1914 to 1919 is in great measure due to the changes in industrial conditions brought about by the War; a more definite evidence of progress is shown by a comparison of the number of wage earners and of the horse power used, both of which indicate unmistakably a decided growth in the manufactures of the State.

The chief manufacturing cities are San Francisco, Los Angeles and Oakland. In San Francisco, the number of manufacturing establishments, with value of their products, was: in 1909, 1706 and \$133,041,000; 1914, 2334 and \$162,300,000; 1919, 2360 and \$417,321,000. Similar figures for Los Angeles were: in 1909, 1325 and \$68,646,000; 1914, 1911 and \$103,458,000; 1919, 2540 and \$278,184,000. The manufacturing establishments of Oakland increased from 441 in 1909 to 573 in 1914 and 593 in 1919, the value of the product in those years being

\$22,343,000, \$28,522,000, and \$134,755,000, respectively.

Education. California has always been among the foremost States in its educational advancement. In 1913, the ex-officio Board of Education was abolished, and was superseded by the State Department of Education, which, however, was handicapped by the fact that it was in a measure double-headed and divided authority between the Superintendent of Public Instruction and the Governor. In 1921, a special legislative committee on education studied the school system of the State with the object of suggesting improvement in the laws to render the educational administration more efficient; and the Legislature of that year passed a law which carried into effect many of the recommendations made by the commission, although it could not alter the administrative form of the educational system, such a change involving a constitutional amendment. The Legislature of 1923 further amended the law of 1921. The total enrollment in the schools of the State in 1914, including kindergarten, elementary, high and normal schools, was 501,921. In 1919, the enrollment in the kindergartens was 20,721; elementary schools, 423,562; and high schools, 95,405. In 1922, the enrollment in kindergartens was 20,061; in the elementary schools, 571,678, and in the high schools, including junior colleges and special schools, 227,270. The total expenditures for elementary schools in 1922 was \$55,764,910; for high schools, \$27,612,854. California's percentage of illiteracy is among the lowest of the States. It decreased from 4.3 per cent in 1910 to 3.9 per cent in 1920; the decrease among native whites being from 0.6 to 0.4 per cent; among the Negroes from 8.4 to 5.6 per cent.

Finance. For finance, see STATE FINANCES.

Political and Other Events. The decade 1914-24 was important in the political history of the State. During this period Hiram W. Johnson rose to a commanding position in the State government and in national affairs. While James D. Phelan, the Democratic candidate for United States Senator, was elected in 1914, Governor Johnson, running on a Progressive ticket, was reelected by a large majority. At this election a proposed prohibition amendment to the constitution was defeated. The Progressives continued to control the State Legislature. A unique departure in legal procedure was the appointment, in 1914, of a public defender in Los Angeles County. His duties correspond roughly to those of the public prosecutor, except that he serves the defendant. He is allowed to accept cases brought to him by those unable to pay a lawyer, in addition to those assigned to him by the court. On Apr. 30, 1914, there was an eruption of Mt. Lassen, a supposedly extinct volcano in the northern part of the State. In the same year serious floods in Los Angeles and other cities resulted in the death of six persons and the loss of property valued at millions of dollars. There were no events of political importance for 1915. In 1916, as a result of area added in the municipal elections, Los Angeles became the largest municipal area in the country. On July 22, 1916, during a preparedness parade in San Francisco, an infernal machine was exploded in the crowd, causing the death of six and the injury of 25. On Jan. 28, 1916, following a six-day storm, the dam at San Diego burst, causing the death of 65 persons and a property loss of \$200,000,000. In the same

period other floods in the State caused great loss. California occupied a prominent place in the presidential election in 1916. The Republican party was divided by factional dispute and as a result the Democratic electors received a plurality of 3373 votes. This result gave the election to President Wilson. For the first time in the history of the State, women voted in 1916 in the presidential campaign. Governor Johnson was elected to the United States Senate. At this election a constitutional amendment providing for prohibition was again defeated. William D. Stephens, lieutenant-governor, became governor of the State on Mar. 10, 1917, succeeding Senator Johnson, who was reelected in 1918. Two prohibition amendments submitted at the election of this year were decisively defeated. The Supreme Court in 1918 upheld the constitutionality of the State primary election law. Aside from the work of the Legislature, there were no special political events in 1919. In 1920 elections were held for United States Senator and certain State officers. Samuel M. Shortridge was elected Senator, defeating J. D. Phelan, Democrat. At this election a prohibition amendment and an act prohibiting vivisection and compulsory vaccination were defeated. In the presidential election of 1920, W. G. Harding received 624,992 votes and J. M. Cox 229,191. A referendum was held on Nov. 2, 1920, on the anti-alien land leasing law passed by the Legislature. This resulted in a vote of acceptance by a majority of over 220,000 votes and the act was declared in force on Sept. 10, 1920. The chief object of this act is to prevent Japanese from owning agricultural land in California. Its effect is to render it impossible for 60,000 or 70,000 residents in the State to lease land in their own right or in behalf of their children. In the State elections held in November, 1922, Friend W. Richardson, Republican, was elected governor and Hiram W. Johnson was reelected to the Senate. Upton Sinclair, the well-known Socialist and writer, as a candidate for the Senate, received 23,668 votes. Governor Richardson assumed office in January, 1923. He demanded, in his inaugural address, strict enforcement of the prohibition act. An investigation into election expenses by corporations was carried on by the State Senate during the year, and several measures were passed to prevent excessive expenditures. On Sept. 17, 1923, a fire in Berkeley caused a property loss of over \$10,000,000. On November 11 of this year the United States Supreme Court declared valid laws prohibiting alien ownership of land in the State. In the presidential primaries held in 1923, President Coolidge was endorsed by the Republican voters and William G. McAdoo by the Democrats. Senator Johnson, who was a candidate, was defeated by President Coolidge.

Legislation. The most important measures enacted by the Legislature during the decade 1914-24 were as follows: The Legislature of 1915 passed a measure abolishing political party distinction from the ballots. This, however, was defeated by referendum later in the year. Attempts to amend the anti-alien land act, passed in 1913, failed. This law was held constitutional by the State court. The Legislature in 1917 enacted several measures relating to the judiciary and the administration of justice. A constitutional amendment was passed providing for a compensation law subject to the approval of the people. A "blue sky" law was also enacted

and a constitutional amendment providing for social insurance. These were also subject to the approval of the people. In 1919 the Legislature appropriated \$1,000,000 for the extension of the State land settlement project including preferential selection of farms by returned service men. A \$40,000,000 highway bond issue was submitted to the people and adopted on July 1. A constitutional amendment providing for a constitutional convention was voted on in November, 1920, and was also passed. This legislature passed also a compulsory education law and created a department of agriculture. It ratified the Federal prohibition law and the woman suffrage amendment. In 1921 the Legislature passed several measures to aid soldiers; reorganized numerous State boards and offices into six administrative departments under the governor; created a small claims court and county public defenders, and enacted a State prohibition enforcement act. In 1923 the Legislature made instruction in the Constitution of the United States compulsory in all schools, amended the workmen's compensation law, and passed an absent voters act.

CALIFORNIA, UNIVERSITY OF. A nonsectarian, coeducational State institution at Berkeley, Cal., founded in 1860. The student enrollment increased from 7526 in 1914 to 13,167 in 1923-24, plus 1645 fully matriculated students not working for regular degrees; the faculty increased from 434 to approximately 1500 members; and the library from 200,000 to 500,000 volumes. The productive funds grew from \$5,540,263.92 in 1914 to \$8,751,962 in 1924, and the annual income from \$2,793,173.74 to \$7,985,179. Five buildings were completed in 1917 from a \$2,000,000 State bond issue: Wheeler Hall, a classroom named for the president of the university; a new wing for the library; Hilgard Hall, an agriculture building; a wing for the chemical laboratory; and a unit for the power plant. In 1923, Le Conte Hall for the department of physics, Hesse Hall, the first unit of a group of buildings for the engineering departments, and the California Memorial Stadium, costing \$1,350,000, were completed, and Haviland Hall for the School of Education was in the course of construction. In 1917, departments of preventive medicine and home economics were established. David Prescott Barrows, Ph. D., succeeded Benjamin Ide Wheeler as president in 1919 and was succeeded in turn in 1923 by William Wallace Campbell, Sc.D., LL.D.

CALIFORNIA INSTITUTE OF TECHNOLOGY. A nonsectarian institution for the technical education of men at Pasadena, Cal., founded in 1891. The student enrollment rose from 58 in 1914 to 572, of whom 56 were in the Graduate School, in 1924; the library increased from 5185 to 14,893 volumes; and the staff of instruction and research from 22 to 106 members. The productive funds increased from \$576,000 to \$5,565,000, and the income from \$75,000 to \$303,000. The Gates Chemical Laboratory was built in 1917; the east wing of the Norman Bridge Laboratory of Physics was erected in 1917, the central section in 1923, and the west wing in 1924; an auditorium, a high-voltage research laboratory, a research laboratory of applied chemistry, and a temporary building for student activities, were constructed and equipped. Eight acres were added to the campus. The Carnegie Institution (q.v.) of

Washington gave \$30,000 a year for five years for the support of researches on the structure of matter and radiation, under the direction of Dr. R. A. Millikan (q.v.) and Dr. A. A. Noyes. The name of the institute was changed in 1920 from Throop Polytechnic Institute to the form given above. Dr. James A. B. Scherer was president until his resignation in 1920; from that time the administration was in the hands of an executive council, of which Dr. Robert A. Millikan was chairman.

CALIPHATE. The Caliphate or leadership of the Mohammedan world, which had been held by rulers of Turkey since the 16th century, was allowed to lapse on Mar. 3, 1924, when the Turkish Grand National Assembly at Angora deposed Abdul Mejid from the office of Caliph and abolished the institution, at least temporarily, in so far as Turkey was concerned. The Caliphate immediately became the subject of international intrigue and universal discussion. The spiritual and temporal powers which the Turkish Sultans had enjoyed as Caliphs have often been exaggerated, even to the point of erroneously comparing the Caliphate to the Papacy. In theory, to be sure, the Caliph was the representative or vicegerent of the prophet Mohammed, guardian of the sacred law of Islam, defender of the faith, and spokesman of some 300,000,000 Mohammedans. As a matter of fact, although for a while after Mohammed's death, A.D. 632, the Caliphs enjoyed great prestige, the office was not recognized by the large body of schismatic Shahs in Persia and elsewhere, nor did it in modern times command much more than nominal respect among non-Turkish Mohammedan populations. It was a mere shadow when it was taken by Sultan Selim I from the last of the Abbasids, in the sixteenth century, to become hereditary in the house of Othman. Abdul Hamid II used it as a convenient instrument to strengthen his political pretensions and to enlist support from Mohammedans outside his empire, and the dramatic German Emperor William II generously but inaccurately referred to the Sultan "whom 300,000,000 Mohammedans throughout the world revere as the Caliph"; but after the revolution of 1908 and the rise of the Young Turks, the artificially inflated prestige of the Caliphate was punctured by a series of inglorious wars and by Arab revolts against the Pan-Turanian policies of the Young Turk leaders. The Young Turks, indeed, were willing to use the Caliphate for their own nationalistic ends, but placed little confidence in its dubious vitality.

The outbreak of the War made the use of sentiment once more desirable. To rally the Islamic host to the aid of Turkey, the Sultan, Mohammed V, in 1915 was induced to become once again the head of a militant Caliphate and to proclaim the dreaded Jihad or Holy War. The Holy War failed outside of Turkey, for Arab, Berber, and Indian Mohammedans fought in the Allies' cause; it became increasingly evident to the West that the Caliph's position, heretofore magnified by the Powers in the interests of their own policies, was really andly insecure. For Mustafa Kemal and the Nationalist Turks, after the War, the institution of the Caliphate possessed no attraction. It is difficult to say whether, in their admiration for western institutions, the Nationalists did not lean too far over to the left, and in pretending a lack of sympathy for religious ideas, tend to minim-

ize the hold that Mohammedanism still had on the great masses of the Turkish population. At any rate, action was drastic. After the Mudania Convention had given Constantinople into their hands, the Nationalists, on Nov. 2, 1922, deposed the Sultan-Caliph, Mohammed VI, and abolished the Sultanate. They named Abdul Mejid Caliph, but they sheared the office of all its temporal power. Islam was made to realize that Turkey merely waited for a propitious moment to rid herself of the Caliphate altogether. The too eager interest of Indian Mohammedans furnished the opportunity. After the War, Indian extremists worked heroically for the resurgence of the Caliphate's high dignity, not in the interest of Turkey but rather in that of an independent India. The appeal was frankly religious and sentimental; around Nationalist Turkey, which had successfully defied Great Britain, crystallized a myth of the new Mohammedan leader who was to guide the Islamic world back to its former greatness. The Nationalists regarded such talk with suspicion. To them, in an agitation of this kind, the way seemed easily left open for foreign interference in Turkish affairs. When the well-intentioned Indian Mohammedans, the Aga Khan and Ameer Ali, in a letter to Ismet Pasha, the Turkish Premier, on Nov. 24, 1923, urged on the Angora government the necessity for upholding the power of the Caliphate, summary action was decided on. The so-called tribunal of independence was appointed to try the Constantinople editors whose papers were alleged to have published the letter before Ismet Pasha had even received it. And then, in the debate on the budget in the Assembly, on Mar. 1, 1924, Mustapha Kemal demanded the abolition of the Caliphate. Two days later the Assembly complied, and on the next day Abdul Mejid and his son were bundled across the European frontier. To indicate how completely secular and religious affairs were henceforth to be sundered, drastic measures were enacted providing for the seizure of effects and estates belonging to the deposed Othman family, the confiscation of all the property of the Pious Foundations, the subordination to the civil authorities of the law administration based on the Koran, and the abolition of religious schools. Turkey thus parted with her past and frankly accepted Occidental standards. Whether the loss of the prestige which the Caliphate had formerly conferred on her would militate against Turkey's influence remained to be seen. The interesting question to be determined was whether Turkey, now that she had voluntarily relinquished her place as a first rate eastern power, would become, with her diminished population and her broken economic life, merely a third rate western state, or the great driving force of her leaders could succeed in raising her to a commanding position in world affairs. The abolition of the Caliphate threw an apple of discord among Moslems, and among the imperialist Great Powers. Hussein, King of the Hedjaz, with the implicit support of the British government, immediately announced his candidacy. The French looked favorably on the ambitions of the Sultan of Morocco. Other aspirants were King Fuad of Egypt, the Amir of Afghanistan, and the Aga Khan. British diplomacy triumphed when the Arabs of Mesopotamia, Transjordan, and the Hedjaz, on Mar. 7, 1924, formally proclaimed Hussein Caliph. But the matter was by no

means settled, for France and Italy, because of their colonial Mohammedan populations, were too deeply concerned to be ready to accept an initial setback as final defeat, and Indian Mohammedans, most interested in the survival of the Faith which the Caliphate had represented, refused to commit themselves. This aloofness was perhaps more disquieting than the noisy debates of the French and Italian press. At any rate, in 1924 it was perceptible that the problem of the Caliphate had rent wide open the world of Islam and again revealed the fundamental differences existing among Turks, Arabs, and Indians. See, also, TURKEY; PAN-ISLAMISM; and PAN-TURANIANISM.

CALKINS, RANSOM M. (1863-). An American railway official, born at Ogdensburg, N. Y. He was educated in the public schools of that city and began his railway service with the Chicago, Milwaukee and St. Paul Railroad in 1879. He rose through various grades with that road and in the years following served with many important railways in the West, chiefly as traffic manager. He served in this capacity with the Chicago, Milwaukee and St. Paul Railroad from 1913 to 1917 and was made president of that road in 1918. In 1920, he became president of the Chicago, Milwaukee and Southern Pacific Railway.

CALLAN, JOHN GURNEY (1875-). An American mechanical engineer, born in Northfield, Conn. He graduated from the Massachusetts Institute of Technology in 1896 and for several years was with the General Electric Company and with the Arthur D. Little Company of Boston. He was professor of steam and gas engineering at the University of Wisconsin from 1915 to 1920, and from the latter date was professor of industrial management of the Graduate School of Business Administration at Harvard. He took about 70 patents, chiefly in connection with steam turbines, and was a member of several scientific societies.

CALLES, PLUTARCO ELIAS (?-). A Mexican public official, born in the State of Sonora, and at one time governor of that State. He was a close associate of President Obregon, who was born in the same State, as was also Adolfo de la Huerta. Calles became Secretary of the Interior in Obregon's Cabinet, and had the backing of the Labor party. In August, 1923, when the recognition of Mexico by the United States was consummated, Calles resigned from the Cabinet in order to conduct his campaign for the nomination to the presidency. During the last week of August, the Labor party held its convention and he was nominated. He had the support of the administration, and also of the Yucatan Socialist party, and the radical Agrarian party. A month later the Coöperative party nominated de la Huerta, and a bitter fight began which soon led to revolution (see MEXICO). The government was finally victorious, and on Mar. 25, 1924, Calles resigned from the army and resumed his candidacy for the presidency. He reaffirmed his previous declarations regarding social problems in Mexico and offered to continue the social policies of President Obregon. He was elected president of Mexico in July, 1924.

CALLOWAY, ALFRED W. (1872-). An American coal operator, born in Manchester, England. He came to the United States in 1882 and was educated in the public schools of Brooklyn, N. Y. He was employed in many important

capacities in several railroads and from 1913 was president of the Davis Coal and Coke Company, of Baltimore. From 1917, he was also president of the Pittsburgh Terminal Railway Company and was director and official in many important coal-mining and other corporations.

CALMETTE, ALBERT (1863-). A French bacteriologist and sanitarian, born at Nice. He received the degree of M.D. from the University of Paris in 1886 and spent some years as surgeon in the French navy. He devoted himself to bacteriological and hygienic work and was awarded the task of founding and directing a branch Pasteur Institute in Saigon (1889). Resigning from the navy, he was appointed director of the Pasteur Institute at Lille and remained until the death of Metchnikoff, when he succeeded Roux as assistant director of the Paris institute. Calmette's chief publications are along such dissimilar lines as snake venoms, sewage purification, tuberculosis and miners' anæmia. They are as follows: *Recherches sur l'épuration biologique et chimique des eaux d'égout*, 8 vols. (1905-14); *Recherches expérimentales sur le tubercule* (1907-14); *Les venins, les animaux venimeux et la sérothérapie antivenimeuse* (1907; in English translation, 1908); also with Breton, *L'Ankylostomiase* (1905); and (with Imbeaux and Poitevin) *Égouts et vidanges, ordures ménagères, cimetières*, 2 vols. (1911).

CALVERT, LOUIS (1859-1923). An English actor born in Manchester who made his first appearance at the Theatre Royal at Dublin, Natal, in 1878. During 1888-89 he toured in America with Mrs. Langtry and in conjunction with Martin Harvey and William Haviland took out the Lyceum Vacation Company. He toured with Miss Portescue and Ben Greet's company and in 1890 formed his own company and produced Shakespearian plays. From 1915 to 1919 he was in America, where he became famous as Matey in *Dear Brutus* (1918). When he returned to Wimbledon in October, 1919, he began his part in *Daddalums* and later toured in that play. In 1921, he played Caliban in *The Tempest* and in the next year was best known for his presentation of the Baron in *He Who Gets Slapped*. He died July 18, 1923. Among his books were *An Actor's Hamlet* and *Problems of the Actor*.

CALVERT, PHILIP POWELL (1871-). An American zoölogist born at Philadelphia, Pa. He was educated at the University of Pennsylvania (Ph.D., 1885), and at Berlin and Jena. He was assistant instructor in zoölogy at the University of Pennsylvania (1892-97), instructor (1897-1907), assistant professor (1907-12), and professor (1912-). Professor Calvert traveled extensively in Mexico and Central America, and his scientific publications were mainly studies on the dragon flies of Central America.

CALVIN, EDGAR EUGENE (1858-). An American railway official, born in Indianapolis. He was educated in the public schools of that city and began his railroad career as telegraph operator in the Indianapolis, Cincinnati and Lafayette Railroad, in 1875. He entered the service of the Union Pacific Railway in 1882, rising to the office of trainmaster. He served as general superintendent and general manager in several important railways in the West, and in 1916 was appointed president of the Union Pacific Railroad. During the War he acted as

Federal manager for many important roads and from 1920 was vice-president of the Union Pacific System Lines.

CAMBODIA. See FRENCH INDO-CHINA.

CAMBON, JULES MARTIN (1845-). A French diplomat (see VOL. IV). Having been French ambassador in Berlin until the outbreak of the War, his knowledge of German affairs was very valuable to France. He was appointed General Secretary for Foreign Affairs during M. Briand's war premiership. He was elected to the French Academy in 1918, and received into that body the following year.

CAMBON, PIERRE PAUL (1843-1924). A French diplomat, (see VOL. IV), member of the *Institut* (Académie des Sciences, Morales et Politiques). He was largely influential in frustrating Germany's efforts to separate France and England in 1914. He also did much during the peace negotiations to keep France and Great Britain on good terms. He resigned as French Ambassador to England in November, 1920, and died at Paris, May 28, 1924.

CAMBRAI, BATTLE OF. See WAR IN EUROPE, *Western Front*.

CAMBRIDGE. A city of Massachusetts. The population rose from 104,839 in 1910 to 109,694 in 1920 and to 111,444 by estimate of the Bureau of the Census for 1923. Contracts were let in 1921 for a 14,000,000 gallon water-purification plant of the mechanical or rapid-filter type, the first of its kind for general purposes in Massachusetts. The number of industrial establishments increased from 270, representing 243 industries in 1916, capitalized at \$67,000,000, employing 20,000 persons, and producing goods valued at \$60,000,000, to 338, representing 250 different industries in 1923, employing 27,000, and producing goods valued at \$156,430,827. Deposits in savings banks rose during the period from \$22,500,000 to \$30,000,000; bank assets in 1923 were \$125,000,000.

CAMDEN. A city of New Jersey on the Delaware River opposite Philadelphia. Its population rose from 94,538 in 1910 to 116,309 in 1920, and to 126,309 by estimate of the Bureau of the Census for 1924. The commission form of government was adopted in 1923; in 1924, a city plan was under consideration. Work was begun in 1921 on a suspension bridge between Camden and Philadelphia (q.v.), to cost \$28,000,000. The main span was to be 1750 feet in length, with an underclearance of 135 feet; the whole length was to be 1.82 miles. Broadway was to be opened through to the bridge approach. A municipal pier was built, a civic centre plan was under way, a community hotel, to cost \$1,250,000, was begun. In 1924, \$6,000,000 was being expended on new city boulevards; the same year the Philadelphia and Reading Railroad opened a new \$3,000,000 terminal with 14 tracks.

CAMEROON, BRITISH. A British mandate territory formerly a part of the German Kamerun (q.v.), on the west coast of Central Africa stretching from the sea along the Nigerian frontier to Lake Chad. Area, 33,700 square miles; population, 664,000. While the territory was administered from Nigeria, independent accounts were maintained. Up to 1923 the developments had been slight, and the deficit incurred in administration steadily mounted. In 1921, revenues were £52,000 and expenditures £102,000. The leading exports in 1921 were palm products, rubber, ivory, cocoa, and totaled £34,000. Im-

ports totaled £49,000. In 1921, 67 vessels of 100,000 tons entered Victoria. The mark was used until July 1, 1922, and then was replaced by British currency.

CAMEROON, FRENCH. A French mandate territory on the west coast of Central Africa, formerly the German Kamerun (q.v.). Area, 166,489 square miles and population about 2,000,000. By decree of March, 1921, the territory was given autonomy and a seat of government in 1921 was erected at the inland town of Yaoundé (population 30,000). Duala, the chief port, had about 18,000 inhabitants. The Commissioner of the Cameroon sat on the council of the governor of French Equatorial Africa, and thus common action was assured. The budget for 1922 balanced at 17,292,000 francs. A special railway budget included 3,380,000 francs. The leading products were coffee, tobacco, palm oil, and ivory, and netted an export value of 22,498,333 francs in 1921. Imports were 32,581,277 francs. In 1921, 188 vessels, four-fifths of them French, entered the port of Duala. The territory had 359 miles of railway in 1922, and 213 miles of roads. A railway from Duala to Yaoundé was in the course of construction.

CAMMAERTS, ÉMILE (1878-). A Belgian poet born at Brussels. In 1908, he went to England where he continued to live, remaining a Belgian subject. Among his French works are translations of John Ruskin and G. K. Chesterton; two plays, *Les Deux Bossus* and *La Veillée de Noël*; and *Poèmes Intimes* (1922). He also wrote: *Les Bellini—An Essay in Art Criticism*; *Belgian Poems* (1915); *New Belgian Poems* (1917); *Through the Iron Bars* (1917); *Messines and other Poems* (1918); *Belgium, From the Roman Invasion to the Present Day* (1920); and *The Childhood of Christ as seen by the Primitive Masters* (1922). Cammaerts's poems written during the War and his *Through the Iron Bars*, which recounts the sufferings of Belgium in that period, won for him a wide popularity.

CAMOUFLAGE OF VESSELS. See WAR IN EUROPE.

CAMP, WALTER (1859-). An American authority on athletics (see VOL. IV). He is author of the following: *Auction Up-to-Date* (1914); *Captain Danny* (1914); *Danny, the Freshman* (1915); *Keeping Fit All the Way* (1919); *Spalding's Official Football Guide* (1920); *Football Without a Coach* (1920); *Handbook on Health and How to Use It* (1920); *Daily Dozen* (1921); *Training for Sports* (1921); and *How to Play Football* (1922).

CAMPBELL, BEATRICE STELLA TANNER (Mrs. PATRICK) 1867-). An English actress (see VOL. IV). She came to America in 1914 and toured in Shaw's *Pygmalion*. The next year she played *The Second Mrs. Tanqueray* and Mrs. Blaine in *Searchlights*. She returned to London and among her best rôles was Lady Macbeth (1920), played to James K. Hackett's *Macbeth*. In 1914 she married George F. M. Cornwallis-West.

CAMPBELL, EDWARD DE MILLE (1863-). An American chemist (see VOL. IV). In 1917, he was consulting chemist of the United States Ordnance Department at large. He wrote many articles on chemical and allied subjects, and was a member of many scientific societies.

CAMPBELL, HENRY DONALD (1862-). An American geologist, born at Lexington, Va. He was graduated at Washington and Lee Uni-

versity where he received the degrees of A.M. in 1882 and Ph.D., in 1885. He also studied in 1886-87 at Berlin and in 1887-88 at Heidelberg. In 1882, he was made an instructor in chemistry and geology at Washington and Lee and in 1888 attained the chair of geology and biology, but in 1920 he gave attention to geology only. Dr. Campbell served as dean of the academic faculty during 1906-08 and in 1908 became dean of Washington and Lee University. He is an authority on the geology of West Virginia and on the Mesozoic diabases of the Atlantic border.

CAMPBELL, OSCAR JAMES, JR. (1879-). An American educator, born at Cleveland, Ohio. He was professor of English at the University of Wisconsin from 1911 to 1921, and in 1921 became professor of English at the University of Michigan. In 1918, the United States government commissioned him to collect information about Turkey to be used at the Peace Conference. His writings include: *The Comedies of Holberg* (1914); *A Book of Narratives* (with R. A. Rice) (1917); *The Position of the Roode en Witte Roos in the Saga of Richard III* (1919).

CAMPBELL, MRS. PATRICK. See CAMPBELL, BEATRICE STELLA TANNER.

CAMPBELL, WILLIAM (1876-). An English metallurgist, born at Newcastle on Tyne, England. He was graduated at the Durham College of Science in 1898, where he also received degrees in 1903 and in 1905. After a year at the Royal School of Mines in London as Research Scholar, he came to New York and studied at Columbia, receiving his Ph.D., in 1903. He lectured on geology and metallurgy at Durham, and in 1903, became a lecturer on geology at Columbia where in 1917 he became full professor of metallurgy. During 1907-11, he was metallographer to the United States Geological Survey and after 1911 he held a similar relation to the Bureau of Mines. After 1913, he also lectured on metallurgy to the postgraduate school of the United States Naval Academy. He has given special attention to the micro-structure and physical properties of metals and alloys and has studied the influence of heat and the mechanical treatment on the structure and properties of iron and steel and other alloys. During the War he served with the National Research Council on his specialties.

CAMP FIRE GIRLS. An organization for girls founded in 1912 for the purpose of promoting good health and better citizenship by providing a programme of wholesome and pleasant outdoor activities, and of service. Between the date of its foundation and 1924 the organization spread into every State and territory of the United States, and to 21 foreign countries located on every continent. Twenty-five per cent of the camp fires were organized as part of school systems, and 75 per cent in connection with churches. Six and one half per cent of the members were of foreign parentage. Six hundred thousand girls followed the programme in the ten years between 1914 and 1924; the membership increased from 35,980 in 1916 to 160,000 in 1923. In 1923, 100,000 girls camped out. The same year 70 training courses for leaders were held in universities, colleges, normal schools, and camps, and 42 trained local executives directing activities in their given localities were paid by their communities. During the War 90 per cent of the members were engaged in War activities.

CANADA. A British dominion in the northern half of the North American continent, bounded on the west by the Pacific Ocean and Alaska; on the south by the United States; on the east by the Atlantic Ocean, the Gulf of St. Lawrence and Davis Strait; and on the north by the Arctic Ocean. The total area of Canada is 3,729,665 square miles, consisting of 3,603,336 square miles of land and 126,329 square miles of water. The sixth census of the Dominion of Canada shows the total population on June 1, 1921, as 8,788,483, as compared with 7,206,643 on June 1, 1911, an increase of 1,581,840, or 21.95 per cent in the decade. From 1911 to 1921, there occurred in the four western provinces an increase of population from 1,720,601 to 2,480,604 or 44.2 per cent, while the five eastern provinces increased from 5,471,023 to 6,295,189, an increase of 824,166 persons, which, though absolutely larger than the figure for the west, constituted an increase of only 15 per cent over the 1911 population. Ontario and Quebec still contained the major portion of the population; in 1921, 60 per cent as compared with 63 per cent in 1911. The density of population in Canada was 2.44 to the square mile. In 1921, the ratio of males to females was 515 males to 485 females per 1000 of population, as compared to 530 males to 470 females per 1000 in 1911. The decline was accounted for by the loss of 60,000 Canadian men during the War and the checking of immigration. Of Canada's total population, 4,436,041 or 49.52 per cent were classed as rural in 1921, as compared with 3,933,696 in 1911. The urban population numbered 4,352,442 in 1921 and 3,272,947 in 1911. In 1921, there were only 83,599 more persons in the rural communities than in the urban; in 1911, the excess was 660,749. The census of 1921 showed that for the first time Canada possessed cities of more than a half million population. These were Montreal and Toronto. Populations of important cities in 1921, with 1911 shown in parentheses, were: Montreal, 618,506 (490,504); Toronto, 521,893 (381,833); Winnipeg, 179,087 (136,035); Vancouver, 117,217 (100,401); Hamilton, 114,151 (81,969); Ottawa, 107,843 (87,062); Quebec, 95,193 (78,710); Calgary, 63,305 (43,704); London, 60,959 (46,300); Edmonton, 58,821 (31,064); Halifax, 58,372 (46,619). Births in 1921 were 257,728, marriages 69,732, and deaths 101,155. Immigrant arrivals in 1923 totaled 72,887, of whom 22,007 came from the United States and 34,508 from the United Kingdom. In 1913, immigrant arrivals totaled 402,432; of whom 139,009 came from the United States and 150,542 from the United Kingdom. The racial distribution of the population was, in percentages: English, (1921) 28.96 and (1911) 25.30; Irish, (1921) 12.60 and (1911) 14.58; Scotch, (1921) 13.36 and (1911) 13.85. The total population of the British races was 54 per cent in 1911 and 55 per cent in 1921.

Education. Throughout the Dominion of Canada public education was a matter of provincial concern. In Quebec there were two distinct systems of education in each of which the teaching of religion occupied a prominent position—the Protestant and the Roman Catholic systems. In the academic year ended in 1922, there were 2,123,618 pupils in attendance at educational institutions in Canada, or 24.2 per cent of the 1921 population. Of the above, 1,860,760 were enrolled in ordinary day school

under public control, the average daily attendance numbering 1,377,423; in 1911, 1,350,821 pupils were enrolled, the average attendance being 866,956. Pupils attending vocational school numbered 80,549 in 1922. There were 23,929 students in private business colleges, and 71,504 in other private schools under college grade. University students in regular courses numbered 18,245 and college students in regular courses 5902. Students in classical colleges numbered 9502. There were, in 1922, 59,312 teachers in schools under public control, 10,596 males and 48,716 females; in 1911, there were 40,502 teachers. The total expenditures on schools under public control was \$107,685,069, of which governments contributed \$13,934,113, and local taxation most of the balance. Higher education in Canada was carried on in 23 universities and 65 colleges, including 21 classical colleges in Quebec. Of the universities, six were state controlled (New Brunswick, Toronto, Manitoba, Saskatchewan, Alberta, and British Columbia); four others were undenominational (Dalhousie, McGill, Queen's and Western); while the remainder were denominational. The number of students registered in universities during the year 1922 was 10,821 in state controlled institutions (teaching staff, 1038); 6074 in other undenominational institutions (staff, 674); and 14,267 in denominational institutions (staff, 1425); making a grand total of 31,792 with a teaching staff of 3137.

by lower prices applicable to almost every crop. The total value of all field crops in 1913 was \$552,771,500. Canada's most important crop was wheat, the total yield for the year 1923 being finally estimated at 474,199,000 bushels from an area of 22,671,864 acres, as compared with 399,786,400 bushels from 22,422,693 acres in 1922, and with 231,717,000 bushels in 1913 from 11,015,000 acres. The wheat crop of 474,199,000 bushels in 1923 was the largest on record for Canada, and compared with 399,786,400 bushels, last year's record crop, and with 393,542,600 bushels, the previous record crop of 1915. The average yield per acre for all wheat in 1923 was 21 bushels, as compared with 17¾ bushels in 1922, 26 bushels in 1915, and 21 bushels in 1913. Oats yielded in 1923 the total of 563,997,500 bushels from 14,387,807 acres, as compared with 491,239,000 bushels from 14,541,229 acres in 1922, and with 404,669,000 bushels from 10,434,000 acres in 1913. The average yield per acre was 39¼ bushels in 1923, 33¾ bushels in 1922, and 38.78 bushels in 1913. The total crop for 1923 was the highest on record, the previous record being 530,709,700 bushels in 1920. Barley yielded the total of 76,997,800 bushels from 2,784,571 acres, as compared with 71,865,300 bushels from 2,599,520 in 1922 and with 48,319,000 bushels from 1,613,000 acres in 1913. The average yields per acre were 27¾ bushels in 1923, 27¼ bushels in 1922, and 29.96 bushels in 1913.

	1913		1922		1923	
	Area Acres	Yield Cwt.	Area Acres	Yield Cwt.	Area Acres	Yield Cwt.
Potatoes	473,500	47,126,400	683,594	55,745,300	560,942	55,497,000
Turnips, mangolds, etc	186,400	40,072,800	224,256	43,973,500	194,512	38,116,500
		Ton		Ton		Ton
Sugar beets	17,000	148,000	20,725	190,400	22,450	216,200
Hay and Clover	8,169,000	10,859,000	10,001,667	14,488,200	9,725,602	14,844,900
Grain hay					1,920,432	4,836,100
Alfalfa	93,560	237,770	805,933	806,400	891,116	1,028,600
Fodder corn	303,650	2,616,300	654,624	5,879,000	659,070	5,320,800

Agriculture. The economic prosperity of Canada continued dependent primarily upon agriculture. Farm products comprised 55 per cent of Canadian exports, the most important being wheat and flour, pork products and dairy products. The total area under field crops in 1923 was 56,560,794 acres, as against 57,189,681 in 1922, and 35,375,430 in 1913. The total values of field crops for 1913, 1922, and 1923 were estimated as follows:

	1913	1922	1923
Wheat	\$156,462,000	\$339,419,000	\$316,934,700
Oats	128,893,000	186,455,000	184,857,400
Barley	20,144,000	33,335,300	32,670,700
Rye	1,524,000	18,703,200	11,339,909
Peas	4,382,000	6,818,200	4,987,400
Beans	1,605,000	3,713,800	2,773,000
Buckwheat...	5,320,000	8,140,800	8,101,700
Mixed grains	8,685,000	16,500,700	17,654,800
Flax seed ..	17,084,000	8,638,900	12,443,900
Corn for husking ..	10,784,300	11,509,700	12,466,000
Potatoes ...	38,418,000	50,320,000	56,397,800
Turnips, mangolds, etc.	18,643,000	23,886,000	22,483,100
Hay and clover ...	124,696,000	194,950,000	162,882,000
Alfalfa	2,819,200	10,295,000	11,914,000
Grain hay ..			15,063,800
Fodder corn	12,606,000	29,197,600	24,605,000
Sugar beets	906,000	1,500,000	1,401,000

The aggregate value of all field crops in 1923 was \$909,160,200, as compared with \$902,293,200 in 1922, a decrease of \$63,127,000, caused mainly

Flaxseed in 1923 yielded 7,139,500 bushels from 629,938 acres, as compared with 5,008,500 bushels from 565,479 acres in 1922 and with 17,539,000 bushels from 1,522,800 acres in 1913. The yield per acre was 11.30 bushels in 1923 as against 8.85 bushels in 1922 and 11.30 bushels in 1913. The total yields of root and fodder crops, in 1923, as compared with 1922 and 1913, are given in the above table.

For the year 1923, the estimated quantities and values of various fruits produced commercially in Canada were as follows, the corresponding figures for 1922 and quantities only for 1910 being given, if available: apples, (provisional estimate) 4,063,719 barrels, no estimate of value as yet, (5,048,405 barrels, value \$24,692,182; 10,618,666 bushels); pears 227,335 bushels, value \$550,587, (461,227 bushels, value \$668,854; 504,171 bushels); plums and prunes, 348,482 bushels, value \$916,050, (408,438 bushels, value \$522,393; 508,994 bushels); peaches 403,660 bushels, value \$916,050 (577,561 bushels, \$668,854; 046,826 bushels); cherries 203,125 bushels, value \$722,440, (202,740 bushels, \$481,850; 238,974 bushels). The gross agricultural wealth of Canada for 1923 was estimated to be \$7,365,013,000, as compared with \$6,774,461,000 in 1922. The total estimated agricultural revenue of Canada in 1923 was \$1,342,132,000, as compared with \$1,389,289,000 in 1922, \$1,383,958,000 in 1921, \$2,011,201,000 in 1920, and \$2,109,291,000 the peak year in 1919.

The numbers of farm live stock for the Dominion were estimated as follows, the corresponding numbers for 1922 and 1913 (where available) being given within parentheses: horses, 3,530,641 (3,648,871; 2,866,008); mules, 8722 (9202); cattle, 9,246,231 (9,719,869; 6,849,433); sheep, 2,753,800 (3,263,525; 2,598,470); swine, 4,405,316 (3,915,684; 2,753,964); poultry, 45,469,292 (42,930,562); rabbits in British Columbia 48,359 (51,623). All descriptions of farm live stock showed a decrease in 1923, excepting swine and poultry, which increased. The total production of farm eggs in Canada for the year 1923 was approximately 202,186,508 dozen, as compared with 194,058,468 dozen in 1922, and 123,071,034 dozen in 1910, the total estimated value being \$48,770,780 in 1923, as compared with \$48,490,578 in 1922. The total production of wool in Canada from 2,755,273 sheep and lambs in 1923 was placed at 15,539,416 pounds, as compared with 18,523,292 pounds from 3,262,626 sheep and lambs in 1922, and 6,933,955 pounds in 1913.

Forestry. The total land area of Canada is approximately 3,600,000 square miles. The area covered by existing forests covered approximately 950,000 square miles, some of which was agricultural land. The estimated stand of timber of merchantable size in Canada in 1922 was 141 billion cubic feet, of which 102 billion cubic feet was softwood and 39 billion hardwood. The manufacture of lumber, lath, shingles, and other products and by-products of the sawmill, formed the principal industry in Canada depending on the forest for its raw materials. The lumber cut in 1921 was 2,869,307 thousand feet board measure, valued at \$82,448,585; shingles cut 2,986,580 thousand feet, value \$10,727,096; lath cut 804,440 thousand feet, value \$4,188,121; in 1913 the lumber cut was 3,816,642 thousand feet, value \$65,796,438; shingles cut 1,485,279 thousand feet, value \$3,064,641; lath cut 739,678 thousand feet, value \$1,783,283. The total value of all classes of forest products in 1921 was \$218,270,769, as compared with \$312,683,509 in 1920, and \$177,120,000 in 1913. The pulp and paper industry of Canada made rapid progress in the last two decades. In 1924, there were in existence in Canada about 50 pulp mills, 35 combined pulp and paper mills, and 40 mills making paper only, although not all of these were operating; in 1901, there were 25 mills all told. The industry in Canada included three forms of industrial activity, i.e. the operations in the woods with pulpwood as a product, the manu-

facture of pulp, and the manufacture of paper. The total production of pulpwood in 1922 was 3,923,940 cords, valued at \$50,735,361, of which 2,912,608 cords were used in Canadian pulp mills and 1,011,332 cords were exported unmanufactured. In 1913, total production was 2,144,064 cords, value \$14,313,939; used in Canadian pulp mills, 1,109,034 cords; exported unmanufactured 1,035,030 cords. After 1902 the exports of raw pulpwood went exclusively to the United States, and amounted annually to about 1,000,000 cords. The total pulp production in 1922 was 2,150,251 tons, value \$84,947,598; the amount of mechanical pulp produced was 1,241,185 tons, value \$31,079,429; and the amount of chemical fiber, 897,533 tons, valued at \$53,615,692. The earliest accurate detailed statistics available concerning the industry were those of 1917, when the total pulp production was 1,464,308 tons, valued at \$65,515,335; in 1913, the total production was 854,624 tons. Canada's paper production in 1922 was 1,366,815 tons, valued at \$106,260,078; in 1917, production was 853,689 tons, valued at \$58,750,341. The United States market absorbed annually about four-fifths of Canada's pulp and paper shipments; and two-thirds of the newsprint paper consumed in the United States was either of Canadian manufacture or was made from wood or wood pulp imported from Canada. Exports of wood pulp to the United States in the year ended Mar 31, 1923, totaled 12,853,589 cwt., valued at \$26,595,387; exports of pulpwood amounted to 1,096,462 cords, valued at \$10,755,655; and exports of paper were valued at \$70,054,256. During 1923, a Royal commission was appointed to inquire primarily into the pulpwood resources of the Dominion and the expediency of prohibiting export from freehold lands. The commission held sittings throughout Canada and was expected to make its report during the 1924 session of Parliament.

Fisheries. The total value of the products of the Canadian fishing industry in the calendar year 1921 was \$34,931,935, compared with \$49,241,339 for 1920, and with \$33,207,748 in 1913. This was the lowest since 1914, and \$25,000,000 below the record year of 1918. In 1921, the total capital invested in the fisheries was \$45,669,477. The number of employees engaged in the primary operations of fishing was 55,230 in 1921, and in canning and curing establishments, 14,104; a total of 69,334. Perhaps 60 per cent of the annual capture was an average export, of which the United States took approximately one-half, and Great Britain one-quarter. In the fiscal year 1922-23, total exports amounted to \$27,557,717, of which \$13,057,031 went to the United States and \$3,675,202 to Great Britain.

Minerals. The value of the mineral production of Canada for 1923 was (the production in 1922 and 1913 is shown in parentheses): metal-

		Quantity		Value	
		1913	1923	1913	1923
Coal	tons	15,012 178	17,132,536	\$37,334,940	\$74,269,000
Gold	ounce	802,973	1,179,500	16,598,923	24,382,000
Nickel	pound	49,676,772	61,444,000	14,903,032	18,433,000
Copper	pound	76,976,925	86,312,000	11,753,606	12,515,000
Silver	ounce	31,845,803	18,312,000	19,040,924	10,944,000
Lead	pound	37,662,703	112,600,000	1,754,705	7,882,000
Asbestos	tons	161,086	.....	3,849,925	7,508,138
Natural gas	thousand feet	20,477,838	.....	3,809,381	5,875,150
Cobalt	pound	928,383	.....	605,589	2,753,157
Pig iron	tons	1,128,967	880,018	16,540,012	.....
Cement	barrel	8,658,805	7,652,000	11,019,418	14,291,000

facture of pulp, and the manufacture of paper. The total production of pulpwood in 1922 was 3,923,940 cords, valued at \$50,735,361, of which 2,912,608 cords were used in Canadian pulp mills and 1,011,332 cords were exported unmanufactured. In 1913, total production was 2,144,064 cords, value \$14,313,939; used in Canadian pulp

lies, \$84,187,783 (\$62,120,291; \$66,361,351); non-metallics, \$92,838,961 (\$82,642,210; \$79,273,461); structural materials and clay products, \$36,993,088 (1922, \$39,534,741). For principal products of the mineral industry in 1923, as compared with 1913, see above table.

Manufactures. According to the census of

1921, there were in Canada 41,323 manufacturing establishments, as compared with 19,218 in 1910. In 1921, the total number of employees was 517,141, the amount of capital invested \$3,210,709,288, and the output was valued at \$2,747,926,675. In 1910, the total number of employees was 515,203, capital \$1,247,583,609, and output \$1,165,975,639. The cost of materials was \$1,446,304,122 in 1921, leaving \$1,301,622,553 as the value added by manufacture; in 1910, the cost of materials was \$601,509,018 and the value added by manufacture, \$564,466,621. The salaries and wages of employees in 1921 was \$581,402,385, as compared with \$283,311,505 in 1910.

Commerce. The trade of Canada during the fiscal year ending Mar. 31, 1923, showed a marked increase in value as well as in volume, compared with that for the previous fiscal year, 1922. The total value of the imports for the fiscal year 1923 was \$802,465,043; for 1922, \$747,804,332; and for 1914, \$619,193,998; while the exports of Canadian produce in 1923 were valued at \$931,451,443, in 1922 at \$740,240,680, and in 1914 at \$431,588,439. Of Canada's total trade, 55 per cent was with the United States and 30 per cent with the United Kingdom. In 1923, the total trade with the United States amounted to \$909,997,650, imports accounting for \$540,917,432 of this amount, and exports for \$369,080,218, while in 1922 the trade totaled \$808,546,839, imports amounting to \$515,958,196 and exports to \$292,588,643. In 1914, the total trade with the United States was \$559,674,963, imports from the United States being valued at \$396,302,138 and exports to the United States at \$163,674,963. Imports from the United States were greater than in 1914 by \$144,615,294 and exports to the United States by \$205,707,393. The trade of Canada with the United Kingdom during the year ending Mar. 31, 1923, amounted to \$520,355,116; imports amounted to \$141,287,671, and exports to \$379,067,445. During 1922, the total trade was valued at \$416,497,018, the imports accounting for \$117,135,343 of this amount, and exports for \$299,361,675; and during 1914 the total trade was valued

at \$416,497,018, of which imports amounted to \$117,135,343 and exports to \$299,361,675.

Comparing the trade of Canada for 1923 with a normal pre-war year—i.e. 1914—it will be found that the interchange of merchandise increased about 70 per cent. The increase in exports was considerably in excess of the increase in imports. The accompanying table shows a comparison of Canadian imports and exports of principal commodities in 1923 with 1914.

During the year ended Mar. 31, 1923, the trade balance was favorable to Canada by \$142,830,794, as compared with a favorable balance in 1922 of \$6,122,677, and an unfavorable balance in 1921 of \$29,730,763, and, for the pre-war year 1914 of \$163,756,774. From 1916 to 1920, Canada's exports exceeded her imports each year by a very large amount, due principally to abnormal conditions which existed during the war period and the reconstruction period following the termination of hostilities. Prior to 1916, the trade balance was unfavorable to Canada for a number of years. The exports of Canadian produce, with portions exported to the British Empire and foreign countries for the fiscal years 1914, 1920, 1921, 1922, and 1923 were:

Fiscal Years	Total Exports	To British Empire	To Foreign Countries
1914	\$431,588,439	\$238,642,517	\$192,945,922
1920	1,239,492,098	561,791,887	677,700,211
1921	1,189,163,701	403,452,219	785,711,482
1922	740,240,680	345,835,410	394,405,270
1923	931,451,443	439,625,892	491,825,551

Canada vastly improved her position among the principal exporting countries of the world after 1913. In 1913, Canada occupied tenth place as an exporting country, but by 1922 she had advanced to fifth place, being surpassed by the United States, the United Kingdom, France, and Germany. With respect to the principal importing countries, Canada in 1922 occupied exactly the same position as in 1913, viz., eighth place.

Railways. As Canada is nearly 4000 miles wide, railway transportation is a problem of vital economic importance. In 1922, there were

CANADIAN IMPORTS AND EXPORTS (Figures in thousands)

Articles		Quantity	Value *	Quantity	Value *
Imports					
Coal	ton	18,140	\$46,875	14,323	\$72,114
Corn	bushel	7,198	4,692	11,000	7,795
Cotton, raw	pound	76,993	9,752	125,261	28,325
Cottons, dyed	yard	69,103	6,580	58,496	13,512
Cottons, grey	yard	26,948	1,454	13,488	1,493
Distilled beverages	gallon	8,750	5,457	1,210	19,743
Farm implements and machinery			7,541		8,124
Machinery			26,273		24,069
Petroleum, crude	gallon	177,880	5,994	397,604	20,051
Tea	pound	37,628	6,650	40,274	10,357
Tobacco	pound	17,598	5,110	15,068	7,089
Sugar, raw	pound	694,337	14,764	1,143,456	36,061
Wool, raw	pound	7,252	1,872	18,273	5,079
Exports					
Automobiles	number		8,572	49	27,051
Hacon and hams, etc.	hundred-weight	258	4,033	1,015	22,536
Cattle, over one year old	number	199	7,655	229	8,738
Cheese	hundred-weight	1,446	18,869	1,145	20,822
Furs			5,668		16,384
Newsprint paper	hundred-weight	5,852	11,387	20,130	72,668
Oats	bushel	34,997	13,380	29,022	14,533
Planks, laths and shingles	thousand feet	1,688	21,290	6,024	75,156
Sugar refined	pound			292,441	19,756
Wheat	bushel	120,427	117,710	215,075	252,146
Wheat flour	barrel	4,832	20,581	10,227	60,075
Wood pulp	hundred-weight	6,882	6,365	16,989	42,987

* Canadian dollars; conversions not made. During 1923 the Canadian dollar was 2 per cent below par on New York

39,773 miles of steam railways in operation, as compared with 29,304 miles in 1913. During 1922, 495 miles of new line were opened; 267 miles were completed but not opened for traffic, and 1115 miles were under construction. Of the 1922 mileage, 22,681 miles were owned by the government, as compared with 2734 miles in 1914. Much of the increase in government-owned railways was after 1915 when it became necessary for the government to take over and operate the National Transcontinental Railway. Thereafter the government acquired control of the Canadian Northern, Grand Trunk Pacific and the Grand Trunk proper, the first and third in 1918, and the second in 1919. The last step in the consolidation of the various railways under government operation and control was taken on Jan. 30, 1923, when the unification of the Grand Trunk and Canadian National Railways was provided for, and the act to incorporate the Canadian National Railways was brought into effect. In addition to the above roads, the Central Vermont Railway was a part of the Canadian National Railway System. Steam-railway statistics for 1922, with 1913 figures shown in parentheses, were: total train miles, 107,625,144 (113,437,208); passengers carried, 44,383,620 (46,185,968); freight, 108,530,518 tons

31, 1923, a total of 157,980 vessels (19,462 sea-going) of 72,200,372 tons register (17,095,883 sea-going) entered Canadian ports in the sea-going, coastwise, and rivers and lakes trades, as compared with 140,597 (18,320 sea-going) vessels of 72,667,084 tons register (14,982,393) for the fiscal year 1914. Clearances in 1923 totaled 156,045 vessels (19,593 sea-going) registered tonnage 71,172,889 (17,182,454 sea-going); in 1914, clearances numbered 135,542 vessels (17,695 sea-going), registered tonnage 66,707,541 tons (14,586,093 sea-going).

Public Finance. During the fiscal year ending Mar. 31, 1924, the total revenue of the Dominion was \$388,514,567; in 1923, it amounted to \$384,790,135, and in 1914 to \$163,174,395. Expenditures, including those chargeable to the consolidated fund and to the capital account, totaled \$314,327,555 for the fiscal year 1923-24, \$322,069,003 for 1922-23, and \$186,241,048 for 1913-14. The net public debt of Canada on Mar. 31, 1924, no credit being taken for non-active assets, was \$2,409,326,639; on Mar. 31, 1923, it was \$2,430,202,552; and on Mar. 31, 1914, it was \$335,996,850. Details of receipts and expenditures for the fiscal years 1913-14, 1922-23, and 1923-24 are shown in the accompanying table.

DETAILS OF CANADIAN RECEIPTS AND EXPENDITURES

Revenue	1913-14	1922-23	1923-24
Customs	\$104,691,239	\$118,275,804	\$120,807,085
Excise	21,452,037	35,367,480	37,893,658
Post office	12,954,530	28,043,367	28,212,159
Public works, including railways and canals ..	13,394,317	1,139,338	1,301,096
War tax revenue—			
Excise taxes		102,794,070	119,075,988
Business profits tax		12,574,823	4,708,562
Income tax		59,562,176	54,087,516
Other war tax revenue		1,841,485	1,861,847
Miscellaneous	10,682,272	25,191,642	20,566,656
Total	\$163,174,395	\$384,790,135	\$388,514,567
Expenditures			
Interest on public debt	\$14,752,117	\$132,926,597	\$130,473,202
Agriculture	3,224,780	5,872,946	6,265,369
Pensions	311,900	30,099,446	30,451,061
Public works consolidated fund	19,007,512	8,937,590	10,885,724
Post office	12,822,058	23,342,985	23,805,341
Dominion lands and parks	3,849,084	3,963,431	3,436,418
Soldiers land settlement		1,638,159	1,466,366
Soldiers civil re-establishment		11,706,829	9,181,395
Other expenditure accounts	36,434,452	89,243,577	87,653,229
War		4,045,067	385,901
Public works, including railways and canals ..	19,739,861	10,292,376	10,373,549
Railway subsidies	19,036,237		
Provincial subsidies	11,280,469		
Defense	39,084,657		
Collection of revenue	6,697,921		
Total	\$186,241,048	\$322,069,003	\$314,327,555

(106,992,710 tons); gross earnings, \$440,687,128 (\$256,702,703); operating expenses, \$393,927,406 (\$182,011,690); ratio of expenses to receipts, 89.39 per cent (70.90 per cent). Up to Dec. 31, 1922, the total value of government aid granted to steam railways in Canada, exclusive of the two government railways, Intercolonial Railways System, and the Prince Edward Island Railway, amounted to \$722,648,946. Of this sum \$662,843,886 represented aid granted by the Dominion government, \$43,414,386 that granted by the provincial governments, and \$16,390,674 that granted by municipalities. Similar statistics for 1914 were: financial aid granted by Dominion government, \$178,834,529; provincial, \$37,023,275; municipalities, \$17,914,836; total aid, \$233,772,640.

Shipping. For the fiscal year ended Mar.

The government's borrowing operations of 1923 were the most important since 1919, when the last Victory Loan campaign was launched. A \$200,000,000 bond issue was floated in the Canadian market for the purpose of retiring \$172,000,000 of the Victory Bonds due on Nov. 1, 1923. This was the first instance in Canada of a large national financial transaction being carried out on lines similar to the New York and London markets.

National Wealth. The national wealth of Canada for 1920 was estimated by the Dominion statistician at \$22,482,841,122. The major items were: farm values (land, buildings, implements and machinery, and live stock, Census 1921), \$6,592,351,789; forest (estimated value of accessible raw materials, pulpwood, and capital invested in woods operations), \$1,244,

343,100; steam and electric railways (investment in road and equipment, \$2,868,000,000); urban real property, \$5,944,000,000; stocks of raw materials and manufactured goods, \$1,316,000,000; household furnishings, clothing, carriages, motors, etc., \$1,144,000,000. These estimates were based on 1920 when money values of commodities reached their peak. The natural income of Canada was placed at between \$4,500,000,000 and \$5,000,000,000.

Foreign Investments. The *Financial Post* of Toronto calculated that foreign investments in Canada were worth \$4,796,500,000, of which \$1,425,000,000 was in railways; \$1,162,000,000 in public securities; \$691,000,000 in industry; \$425,000,000 in forests; \$354,000,000 in mining; \$278,000,000 in public services; \$175,000,000 in land; \$150,000,000 in mortgages; \$127,000,000 in banking and insurance; and \$9,500,000 in fisheries. Foreign investments in 1913 were placed at \$2,416,723,870. Of the foreign investments in Canada, the United States held a total of \$2,500,000,000 and the United Kingdom \$2,000,000,000.

History. Canada's loyalty in the War was unquestioned. Old party strifes were dropped and the imperial bonds, which many had seen loosened under dominion government, tightened, as Canada hastened to proffer aid to the mother country. Parliament assembled on August 18, passed immediately eight war bills, and appropriated \$50,000,000 for war expenditures. Now the Canadians sighed for the warships which had been refused in 1913; fortunately Canada was able to purchase two powerful submarines, just completed for Chile, and to offer, with them, the Canadian cruisers *Niobe* and *Rainbow*. The call to the colors was met with generous response. In three weeks there were 32,000 men in the Canadian training camp at Valcartier, and almost 10,000 others were under arms; while 150,000 had volunteered their services and were waiting only to be called. It is significant that 2400 French-Canadians joined the first contingent. The First Canadian Division arrived in England Oct. 14, 1914, and reached the war area, Feb. 11, 1915. The Second Division reached France in the fall of 1915; the Third and Fourth in 1916; the Canadian Army Corps was formed late in 1915. Up to the passage of the draft act in August, 1917, 465,984 men had voluntarily enlisted. By the act in 1917-18, 83,355 more men were obtained. In all services, 595,441 Canadians were under arms during the period of the War. Total casualties were 211,000, divided as follows: killed in action, 51,670; died of disease, etc., 5000; wounded, 149,700; prisoners of war, 3730. The more important battles in which Canadians were engaged follow: The Canadian Army Corps, as part of the First British Army, saw service at the second battle of Ypres (1915), the battle of the Somme (1916), the taking of Vimy Ridge, Arleux, Fresnoy, and Hill 70 (1917), the battle of Amiens, Arras, and Cambrai (1918). Canadians, too, saw service in Russia, Macedonia, and Palestine. To the ships above mentioned, there were added in the Canadian fleet a mother-ship for the submarines, a mine-sweeping service, and a large number of motor launches. The personnel of the navy at the War's conclusion consisted of 749 men and officers. To these must be added the 4500 volunteers in the reserve who were engaged in patrol duty. There were other war activities in which Canadians partook.

About 13,000 men were in the Royal Air Force; there were Canadians on British ships, and in the medical, engineering, forestry, radiotelegraph services. Canadian shipyards were employed for the turning out of vessels and factories were converted into munition plants for the manufacture of shells, shrapnel, and powder. The problem of the repatriated soldier was met with foresight. In 1916, provision was made for the vocational training of disabled soldiers; in 1918, a department was created for the care of veterans and their restoration to peace-time activities. Perhaps the most important single measure was the Soldier Settlement Act whose purpose was to settle the men on the land. Aside from the 160 acres they were entitled to as civilians, men might make application for an additional homestead. Funds were to be appropriated from which loans might be made for the purchase of the land, improvements, and live stock.

Throughout the War, the Unionist party, with Sir Robert Borden as premier, was in control of the government. Sir Wilfred Laurier's opposition was consistently stormy. His patriotism, of course, was not to be questioned, and his appeals to the French Canadians for the support of the War increased in fervor as the years progressed, but some of his party were more than lukewarm in their attitudes. Racial animosities brought the language question once more to the fore in 1916 and only the outspoken condemnation of Borden defeated a measure in the Parliament for the support of French schools in Ontario. On the eve of the general elections of 1917, Sir Robert Borden, regardless of the opposition of the Liberals, introduced a measure for compulsory military service. The bill was hotly opposed, 55 voting against it on its second reading, July 8. The vote was still closer in the Senate, standing 54 for and 39 against on the final reading. Feeling among the French Canadians ran high. There were anti-draft riots in Montreal in July, and pro-war speakers were attacked and newspaper buildings stormed. The Winnipeg convention of the western members of the Liberal party, held early in August, while it subscribed to a whole-hearted prosecution of the War, rejected by an overwhelming majority the idea of compulsion. Opposition increased as the elections drew near. Toward the end of August a general strike was called in Montreal, and though it failed, on August 29 a mass meeting of 5000 people was held in the city and the police were stoned when they attempted to break up processions. In Quebec the French press of all parties urged that the enforcement of conscription be deferred until after the polling. On October 12, Sir Robert Borden attempted to strengthen his government by including five Liberals in his cabinet. Another step, political in character, was the passage, in the closing days of the parliamentary session, of a group of laws "purifying" the electorate. The ballot was given to the troops in the Canadian Expeditionary Forces and to the female relations of soldiers, while it was taken away from natives of enemy countries who had been in Canada less than fifteen years, as well as from the pacifistic Mennonites and Doukhobors. The elections were held on December 17. The returns indicated that the balance of power was to be in the hands of the Liberal Unionists (i.e. supporters of Sir Robert Borden), for the Unionists had gained only a total of 108 seats of the 235. The senti-

ment in Quebec was clearly mirrored in the fact that 62 out of the 65 parliamentary districts were won by anti-draft Liberals. The election did not succeed in allaying discontent, for in January, 1918, the Quebec Parliament debated a secession resolution, while in March and April serious rioting took place. In April, police administration in the city was taken over by the military with the result that street fighting accounted for the death of four civilians and the wounding of 45 others. The labor elements, too, pressed for a hearing and demanded of the government, early in 1918, either the nationalization of the railways, or their unification under a central war board. Objection was made to the use of compulsory farm labor and the employment of Chinese and coolie workers. At the behest of their representatives, the government created a bureau for labor research and employment.

The transition to peace conditions after the Armistice was not easy. On Apr. 9, 1919, a Royal commission representing capital and labor was appointed for a consideration of the cost of living and the further participation of labor in industry. Official gestures were unavailing. In spite of the hostility of the Trades and Labor Congress, the "One Big Union" movement took on impetus and gained many adherents, particularly in the west, but also in Toronto. How far radical ideas had gone at once became manifest when a general strike broke out in Winnipeg in June, 1919. A local dispute between the ironworkers and the foundry owners over the question of unionization at once attracted the attention of all workers with the result that every union in the city, including firemen, police, postal employees, telegraph and telephone operators' organizations, ordered the cessation of work. Winnipeg was cut off from contact with the rest of the world. The returned soldiers expressed their sympathy with the strikers' cause and refused to countenance the establishment of martial law. The result was that the control of the city passed completely into the hands of the workers, the government being under the direction of a local council. The affair blew over, without bloodshed, fortunately, so that the end of the year saw the old conditions restored. New leaders, too, appeared after the War. Sir Wilfred Laurier died Feb. 17, 1919, and in August Mr. William Mackenzie King was elected as his successor to head the Liberal party. In July, 1920, Sir Robert Borden resigned from the premiership and was succeeded by Mr. Arthur Meighen. Mr. Meighen's cabinet, however, was in power only to December, 1921, for in the elections of that month the Conservatives went down to a disastrous defeat. Besides the National Liberal and Conservative parties, and the Liberal party, the National Progressives or Farmer's party and the Laborites also had candidates in the field. The contest was a heated one, revolving about the question of a high tariff. Interest was added to the campaign by the fact that women were to vote for the first time. The result, in its decisiveness, was unexpected. The Premier and ten members of his cabinet lost their seats, while the Liberals succeeded in gaining not only all Quebec, but many seats in the Maritime Provinces, and in the West. In Quebec, Nova Scotia, Prince Edward Island, Manitoba, and Saskatchewan not one government supporter was elected. More sur-

prising was the success of the farmers. Their party elected 65 members to 51 for the Conservatives. The Liberals in all had 117 seats and the Laborites, 2. Mr. William Mackenzie King now became premier. Throughout 1922-24, Liberals and Progressives, the latter led first by Mr. T. A. Crerar and later by Mr. R. Forbe, worked for the most part in harmony. The more important measures on which there was a common sentiment were a low tariff with reciprocity between Canada and the United States, unified control of all government railways under a single board of management, encouragement of immigration for the benefit of the rural districts. The last question continued to engross almost the complete attention of the 1923 Parliament. The serious decline in the immigration from the United States (only 22,000 Americans had entered in 1922-23 as compared with 139,000 in 1913), and the none too rapid development of the western provinces, compelled the government to apply itself to the formulation of an elaborate programme. Measures were brought up for the expenditure of large sums in propaganda and the establishment of foreign agencies, for the attraction of immigrants from Great Britain and Scandinavian countries, and for the removal of restrictions on the late enemy countries. The government's farmer supporters were alienated by the inadequacy of these plans as they were, too, by the failure of the finance ministry to reduce the existing tariff schedules. These considerations, principally, led to the refusal on the part of the Progressives to join Mr. King's cabinet, with the result that only Liberals constituted the government. They succeeded, however, in remaining at the head of affairs into 1924, though through defeats in by-elections Mr. King was in a paper minority of four. Among the more prominent ministers were Sir Lomer Gouin, former premier of Quebec, and Mr. W. S. Fielding, one of the authors of the reciprocity agreement of 1911. (Both quit the cabinet early in 1924.)

A question of great local interest during and after the War was the enactment of prohibition laws. Most of the provinces moved toward this end by provincial legislation. But the need for a more stringent regulation became evident when it was ascertained with what ease liquor could be smuggled into and out of the individual provinces. The result was an increasing demand for Dominion regulation. In British Columbia and Quebec in 1920, requests were made for such general control while in Manitoba, Alberta, Saskatchewan, Ontario, and Nova Scotia, referenda revealed a similar sentiment. (See PROHIBITION.)

It is doubtful whether the War brought Canada and the Empire closer together. While Sir Robert Borden sat at the Imperial War Cabinet and Canadian representatives signed the peace treaties and received seats in the League of Nations Assembly, the independent temper was revealed in the demands made in 1920 for the right to amend the Canadian Constitution without application to the British Parliament as well as for the appointment of a Canadian minister to the United States with independent status. An interesting sidelight on the earnestness with which Canadians were increasingly pressing the point was shown in the negotiations of 1923 with the United States over the signing of a convention for the preservation of the halibut fisheries in the northern Pacific. The

United States, in reply to the query raised by Canada, expressed itself as willing to conclude such a convention "between the United States and Great Britain." To the surprise of the Americans, the Canadian government replied with some tartness that it desired the words "Dominion of Canada" substituted for "Great Britain" (January 16). This action precipitated a lively discussion in Canada, where, in many quarters, it was regarded as an abortive attempt on the part of the ministry to arrogate the treaty-making power. Upon the insistence of the American Senate, whose purpose it was to include within the meaning of the treaty all British nationals, the Canadian commissioner signed the convention late in 1923 "as the duly accredited representative of the King." Other striking expressions of the Canadian spirit of independence were the declaration, by a member of the Canadian cabinet in March, 1924, that decisions of the Imperial Conference were not to be considered binding unless approved by the Canadian Parliament, and the refusal of MacKenzie King to recommend to the Parliament, in June, 1924, the ratification of the Lausanne Treaty. This last, of course, was merely a gesture, for the signing of the treaty by the British government was binding on Canada as well. Another indication of the new sentiment was the request made in 1921 by the Canadian Parliament, as the result of a universal demand, that the Crown desist from conferring hereditary titles on Canadian citizens. In the same year, too, the Conservative Premier, Mr. Meighen, indicated how much closer the ties were between Canada and the United States than between Canada and the Empire, by opposing the renewal of the Anglo-Japanese treaty. Nor was progress made in the formation of a naval programme. In 1919, Lord Jellicoe visited Canada for the purpose of advising the country on a possible plan but the government announced the next year that the pre-war policy was not to be relinquished. Relations with the United States continued amicable, though the Conservatives in the elections of 1921 made much of the hardships imposed upon Canadians by the Fordney Emergency Tariff. In 1922, great interest was centred in the project, originating in the United States, for a St. Lawrence-Great Lakes Canal. In the same year negotiations were under way for the limitation of frontier armaments and for the formulation of a new treaty regulating the naval strength on the Great Lakes. As regards the latter, an agreement was reached for the replacement of naval vessels with revenue cutters.

Canadian governors-general during the period were the Duke of Connaught (1911-16), the Duke of Devonshire (1916-21), Lord Byng of Vimy (1921-). In 1919, the Prince of Wales made an extended tour of Canada and was very cordially received. See separate articles on the provinces; also BAFFIN LAND; EXPLORATION; POLAR RESEARCH; NAVIES OF THE WORLD.

CANALS. In the period 1914-1924 the construction of new canals or the canalization of rivers was vigorously discussed but comparatively little actual construction of really great projects was executed. During the War with the great demands for transportation and the lack of fuel or its high cost attempts were made both in Europe and the United States to use the canals to an unprecedented degree. At the same

time plans were proposed for further construction, and in the years following the War were under consideration. Those actually put under way were of comparatively limited significance. The New York State Barge Canal which had been completed about 1917, except for terminal facilities, was utilized far below its carrying capacity, and even during the War when it was commandeered by the United States Government and operated as a through waterway with special barges, it was run far below its possibilities.

The United States Government sought to take over the Cape Cod Canal, completed in 1914, by purchase in 1924, and this waterway became increasingly used. The United States also extended its canal system at Sault Ste. Marie, Michigan, on Sept. 18, 1918, and completed the fourth lock of the American Canal, which was named Sabin Lock in honor of L. C. Sabin, the general manager of the canal.

Chesapeake and Delaware Canal. The Chesapeake and Delaware Canal, about 15 miles in length, extending from Delaware City on the Delaware River to Chesapeake City, Maryland, on a stream flowing into Chesapeake Bay, was formerly taken over by the Government the event being officially celebrated at Delaware City on Oct. 11, 1919. This canal was chartered in 1799, but was acquired by the National Government under an appropriation of \$2,514,290 by Congress, and an additional item of \$500,000 for deepening and widening. The improvement involved making this waterway a sea-level canal which would require an increased excavation of 10 feet for a considerable distance at the summit level. This did away with the three locks constructed in 1850 with a width of 24 feet and a length of 220 feet which had served to restrict navigation. The summit level of these locks was 15 feet above mean low tide, while the mean ranges of tide at Delaware City and Chesapeake City were respectively six feet and two feet. The project adopted for the improvement provided for a lockless tide level canal 12 feet deep and 90 feet wide on the bottom, estimated to cost \$12,000,000. This canal when enlarged will form part of an inland waterway from Philadelphia to Norfolk.

Cape Cod Canal. The Cape Cod Canal which had been under construction for a number of years was formally opened on Aug. 1, 1914, and established direct connection between Buzzard's Bay on the South and Cape Cod Bay on the north, shortening the distance between Vineyard Sound and Boston by about 70 miles, and eliminating considerable danger due to hidden reefs and banks along the coast of the Cape, not to mention fogs which are often prevalent in this region. The canal is a sea-level canal without locks and practically a straight line with a single curve. It is lighted by electricity at night and is crossed by railway and highway bridges which give a width of 150 feet in the clear between the piers. For the greater part of its length the canal has a bottom width of 100 feet and a depth of 25 feet at mean low water. At three points the bottom width is increased to 250 feet so as to make passing points for vessels, while in the approach channels a width of 250 to 350 feet is maintained to deep water at both ends of the canal.

A massive breakwater, 3000 feet in length to the shore line, protects the entrance to the canal from being filled in by the action of the waves. In addition to forming a shallow harbor for ship-

ping. The excavation of the canal for the most part was done by hydraulic dredges. By 1915 the canal was made passable for large steamers and deep draft barges. After the War it was proposed that the United States Government should acquire the Cape Cod Canal, and in 1921 Secretaries Weeks, Denby and Hoover made an investigation and recommended that the Federal Government should acquire the control of the canal at a price of \$11,500,000, for which sum the Boston, Cape Cod and New York Canal Company was willing to sell.

Marseilles-Rhone Canal. A notable European canal project executed during the War period was the Marseilles-Rhone canal, involving an artificial waterway 51 miles in length and extending from the Rhone River at Arles to the Bay of Marseilles. This canal was also notable in that it included a tunnel four and a half miles in length which pierced the mountain ridge north of the city, and affords direct access to the harbor. A typical section of this tunnel is square invert 59 feet wide and 15 feet deep with an approximately semicircular arch of 41 feet radius, affording an excavated section 79 feet wide and 50 feet high. (See TUNNELS.) In addition to the tunnel there was involved a breakwater construction between Marseilles and Port de Bonc, and in the Etang de Berre. At Arles where the canal had access to the Rhone a system of locks was built.

German Internal Waterways. In Continental Europe the various systems of canals which had been rather highly developed found advantageous use during the War. A notable instance was the river Main which was rendered navigable for vessels up to 1200 tons, and was employed as an internal route for general commerce and war supplies, particularly timber. The canalization of this river involved the construction of dams provided with ship sluices, so that it was possible to navigate with larger vessels than previously. A notable dam of this type was built at Mainkur which included a roller weir, a power plant and a raft chute 300 meters long and 12 meters wide, together with two side openings, each 30.6 meters wide, and a ship passage 40 meters wide.

The power plants at this dam were put in operation in 1921, but the sluices were completed and ready for use in 1917. The canalization of the Main was to extend from Frankfort to Werenfeld, and it was proposed to add open canal construction between Werenfeld and Schweinfurt, while from Schweinfurt to Bamberg it would be possible to canalize the river.

There was also set on foot an important waterway involving the canalization of the Neckar through Baden and Württemberg from Mannheim to Plochingen, using the river bed for large vessel traffic. The plan involved also special canalization from Plochingen to Ulm and from Ulm to Ravensburg and Fredrickshafen in order to supply the states of Baden and Württemberg with coal and other facilities. Such a canal system naturally involved a large number of locks, some of them of considerable height and the development of river basins.

The first portion of this work was to develop the canal along the river with a length of 212 kilometers between Mannheim and Plochingen. This involved the construction of 26 sluices, all of which, with the single exception of that near Heilbroun, in existence before the War, required new construction. These sluices and dams per-

mitted a descent of a grade of 160 meters, and as they were movable they could be removed and replaced rapidly during the times of flood water or rapid increase in level. They were absolutely water-tight, so that all unnecessary loss of water was obviated, and power available for operating the movable dams as well as for other purposes could be developed. It required about five minutes' time to fill each sluice and the project in addition to providing navigation also aimed at the development of considerable electric power.

As a result of this development the Neckar would be made a navigable waterway for all seasons of the year, for barges of 1200 tons, completely loaded, and the traffic which before the War amounted to 400,000 tons per year would naturally reach much larger figures with the improved waterway, being estimated by some at as much, or in excess of 5,000,000 tons. The various power plants situated on the banks of the river between Mannheim and Plochingen before the War represented an output of 15,000 horse power, but with the completion of the works undertaken would develop some 63,000 horse power.

The beginning of these German canal works was made during the War but at the close of hostilities comparatively little was done for a while except to afford labor to the unemployed. Work was begun again on a large scale during the autumn of 1921, and towards the end of the following year some 81,000,000 cubic feet of excavation had been accomplished. The construction of the bridges and dams also was started, but in 1923 the increase of costs led to the slowing down of the project. The undertaking was of unusual significance both in a political and in an engineering sense as it involved the linking up of various German states according to the original plan of "Mitteleuropa," while the various locks, movable and other dams, sluices, etc., represented in many cases novel engineering departures. See PANAMA CANAL; SAULT STE. MARIE CANALS; SUEZ CANAL.

CANBY, HENRY SEIDEL (1878—). An American professor and editor (see VOL. IV). In 1916, he became advisor in literary composition with professorial rank at Yale University. He resigned as assistant editor of the *Yale Review* in 1920, becoming editor of the *Literary Review* of the *New York Evening Post*. In 1918, he was on liaison work in England, Ireland and France for the British Ministry of Information. His works include: *College Sons and College Fathers* (1915); *Facts, Thought and Imagination* (in collaboration, 1917); *Good English* (in collaboration, 1918); *Education by Violence* (1919); *Our House* (1919); *Everyday Americans* (1920); *Saturday Papers: Essays on Literature from the Literary Review* (1921); and *Definitions: Essays in Contemporary Criticism* (1922). He is coeditor of: *Selections from John Masefield* (1917), *War Aims and Peace Ideals* (1919), *Anthony and Cleopatra* (1921), and editor of Stevenson's *Master of Ballantrae* (1922).

CANCER. Despite all organized effort to warn the public of the urgent need of early recognition and treatment of cancer, the mortality from the disease during the decade 1914-24 was apparently on the increase. The expression "apparently" is used because of the ease with which statistics can be assailed. There

was some evidence to show that cancer was not increasing, although none which shows any diminution. Granted that the death rate is a constant, improvements in diagnosis and increasing average duration of life, which result from modern sanitation, would still convey the illusion of an annual increase. If every death were followed by a skilled autopsy, the number of cancer deaths could be made to show an increase which would not be due to spread of the disease. The campaign of education conducted by the Association for Cancer Control cannot prevail against the innate fear of an examination, of the fear of an unfavorable diagnosis and of the fear of operation.

An increasing number of surgeons show pessimism, as in the statement by one that early operation can cure cancer although the diagnosis must be made at a stage in which successful diagnosis is seldom practicable. The favorable percentages obtained by surgeons of unusual attainments and experience operating under ideal conditions appear to show that early intervention can conquer the disease; but the average patient will be operated on by the local surgeon and under less favorable conditions. Some of these local men frankly admit that they have never cured a patient radically and some of them have finally refused to do operations. This statement may also be made concerning surgeons of more than local reputation.

What has been said of the knife applies with the same force to radium and Röntgen therapy. Under the most favorable auspices, individual operators obtain excellent results, but this does not benefit the average cancer victim. Hence many earnest workers are striving for a method of treatment which is applicable to the rank and file of cancer patients without the arbitrary selection of cases in which everything favors the patient.

CANDLE POWER. See **ELECTRIC LIGHTING**.

CANFIELD, DOROTHY. See **FISHER, DOROTHY CANFIELD**.

CANNAN, GILBERT (1884-). An English novelist and dramatist. He was educated at Cambridge, and became a dramatic critic on *The Star* in 1909-10. Among his books are: *The Anatomy of Society* (1919); *Time and Eternity* (1920); *Pigs and Peacocks* (1921); *Old Maid's Love* (1922), and the play, *The Release of the Soul* (1920).

CANNING. See **BOTULISM**.

CANNON. See **ARTILLERY; ORDNANCE**.

CANNON, JAMES, JR. (1864-). An American bishop, born at Salisbury, Md., and educated at Randolph-Macon College, Princeton University and Princeton Theological Seminary. Having been ordained to the ministry of the Methodist Episcopal Church, South, in 1888 he was named to different pastorates in Virginia. From 1894 to 1911, he was principal of the Blackstone Female Institute, and from 1914 to 1918, principal of the Blackstone College for Girls. In 1918, he became a bishop of the Methodist Episcopal Church, South. He was connected with numerous commissions and boards in connection with church, war and prohibition questions.

CANNON, JOSEPH GURNEY (1830-). An American lawyer and Congressman (see Vol. IV). He retired from Congress on Mar. 4, 1923, after serving for 46 years, during which he was

four times Speaker of the House of Representatives.

CANNON, WALTER BRADFORD (1871-). An American physiologist, born at Prairie du Chien, Wis., and educated at Harvard (A.B., 1896; M.D., 1900). In 1906 he was made Higginson Professor of Physiology. His works include: *Laboratory Course in Physiology* (1911); *Bodily Changes in Pain, Hunger, Fear*, etc. (published 1915; a valuable contribution to the literature of physiology); *Traumatic Shock* (1923). He was one of the editors of the periodical *Psychobiology* (1919-20). He has made many contributions to physiological periodical literature and is one of the most vigorous defenders of the value of animal experimentation.

CANTIGNY. See **WAR IN EUROPE, Western Front**.

CANTWELL, JOHN JOSEPH (1874-). An American bishop, born in Limerick, Ireland, and educated at the colleges of the Sacred Heart and Saint Patrick, Ireland. He was ordained to the Roman Catholic priesthood in 1899, and from that date until 1904 was curate in Berkeley, Cal. For the following 10 years he was secretary to the Archbishop of San Francisco, and from 1914 to 1917, vicar-general of the same diocese. He was made Bishop of Monterey and Los Angeles in 1917.

CAPE COD CANAL. See **CANALS**.

CAPE OF GOOD HOPE, PROVINCE OF THE. See **SOUTH AFRICA, UNION OF**.

CAPEK, JOSEF (?-). Czech artist and writer. He is joint author with his brother of the play *The World We Live In*, which was one of the outstanding plays of the 1922-23 season in New York. This play, often called "The Insect Drama," because all the characters except one are insects, is an arraignment of all phases of human life, and human characteristics represented by these insects are mercilessly satirized. See **CAPEK, KAREL**.

CAPEK, KAREL (1890-). A Czech journalist and playwright. He studied psychology at Prague, Berlin, and Paris, and made his debut in the theatrical world in Prague. He was art director of the national theatre, the Golden Temple, in Prague, but he soon established his own theatre, the Vinohradsky. He produced the dramas of Shakespeare, Byron, Molière, Ibsen, Strindberg, Goethe, Hauptmann and many Czech authors. His first attempt in writing drama was *The Robber*, a lyric comedy of love. This was followed by *R. U. R.*, a satiric melodrama which was played with great success by the Theatre Guild in New York City during the 1922-23 season. He was also joint author with his brother, Josef (q.v.) of the play, *The World We Live In*, played in New York City in 1922-23.

CAPEN, EDWARD WARREN (1870-). An American sociologist (see Vol. IV). He was again Thompson Lecturer on Missions at the Hartford Theological Seminary in 1914, 1917, 1918. He identified himself with the Kennedy School of Missions as secretary, instructor in sociology, and associate professor (1914 to 1917), becoming in 1917 full professor, and in 1919, dean. He was appointed Assistant Recording Secretary of the American Board of Commissioners for Foreign Missions in 1915. In 1919-20, he was chairman of the training school section of the Religious Education Association, and from 1920 to 1922, chairman of the Association of Institutions Engaged in

Missionary Training. He edited *Preparation for Missionary Work in Japan* (1915), and *Preparation for Presenting Christianity to the Hindus* (1917).

CAPERS, WILLIAM THEODOTUS (1867-). An American bishop, born at Greenville, S. C., and educated at South Carolina College, Furman University and the Theological Seminary of Virginia. Having been ordained to the ministry of the Protestant Episcopal Church, he was rector in churches in North and South Carolina and in Mississippi from 1895 to 1905. From the latter date until 1912 he was dean of Christ Church Cathedral, Lexington, Ky. From 1913 to 1916, he was bishop coadjutor in the diocese of West Texas, at which time he was made bishop of that diocese.

CAPITAL SHIP. See **VESSEL, NAVAL.**

CAPPON, JAMES (1854-). Professor Emeritus of English, and dean of the Arts Faculty at Queen's University, Canada (see VOL. IV). He is the author of various pamphlets, especially a series on the War: *What the Present War Means, German Politics and British Politics, Democracy and Monarchy in the Modern State, The Scandinavian Nations and the War, Bourgeois and Bolshevik*, etc.

CAPORETTO. See **WAR IN EUROPE, Italian Front.**

CAPPS, CHARLES R. (1871-). An American railway official, born in Norfolk, Va. He was educated at Roanoke College and began his railway career with the Seaboard and Roanoke Railway. He acted in important capacities with several railroads in the South, and in 1915 was appointed first vice-president of the Seaboard Air Line. He was president of the Marion Southern Railway and was director and vice-president of many other roads in the South.

CAPPS, EDWARD (1866-) (See VOL. IV.) An American philologist. He has been professor of Greek language and literature at the universities of Chicago and Princeton and lecturer at Johns Hopkins (1917). He was American Red Cross Commissioner to Greece, 1918-19, and Envoy Extraordinary and Minister Plenipotentiary, 1920-21.

CAPPS, WASHINGTON LEE (1864-). An American naval officer (see VOL. IV). He was president of the Navy Compensation Board and general manager of the Emergency Fleet Corporation in 1917. He was awarded the Navy Distinguished Service Medal for his work during the War.

CARBINOLS. See **CHEMISTRY, ORGANIC.**

CARBOHYDRATES. See **CHEMISTRY, ORGANIC.**

CARBON. See **CHEMISTRY, ORGANIC.**

CARBON COMPOUNDS. See **CHEMISTRY, ORGANIC.**

CARBURETOR. See **MOTOR VEHICLES.**

CARCHEMISH. See **ARCHAEOLOGY.**

CARCO, FRANCIS (1886-). A French author, born at Nouméa, New Caledonia. He is a poet, belonging to the *Fantaisiste* school, a novelist, a dramatist, and art critic for *L'Homme libre* and *Gil Blas*. During the War he became aviation pilot at Etampes, after studying at the aviation school there. His works are picturesque, painting as they do Montmartre and being written in the *argot* of Paris. He has been called the "romancier des apaches." He is the author of: *Instincts* (1911); *Jésus-la-Caille* (novel, 1914); *Les Innocents* (1917); *Au coin*

des rues (tales, 1918, 1922); *Les Malheurs de Fernande* (sequel to *Jésus-la-Caille* 1918); *Les Mystères de la Morgue ou les Fiancées du IV^e arrondissement*. Roman gai (1918); *L'Équipe* (1919); *La Poésie* (1919); *Francis Carco, raconté par lui-même* (1921; in the collection *Ceux dont on parle*, directed by Marc Saunier); *Promenades pittoresques à Montmartre* (1922), and *Vérotchka l'Étrangère ou le Gout du malheur* (1923). The last-named novel was sharply criticized by the French reviews. The author seems out of his element here. His works also include: *Petits airs* (poems), and *Maman Pettidroit*.

CARIBBEAN POLICY. See **UNITED STATES, History.**

CARINTHIA. A province of the Republic of Austria. Its area in 1910 was 3987 square miles; in 1923, 3688 square miles. Its population in 1910 was 396,200; in 1923, 370,432. See **AUSTRIAN REPUBLIC.**

CARLETON COLLEGE. An institution at Northfield, Minn., founded in 1866; under the auspices of the Congregational, Baptist and Protestant Episcopal churches. The number of students increased from 395 in 1913, of whom 37 were in the School of Music, to 880 in 1923, of whom 48 were music students. The ratio of teachers to students rose during the same time from approximately 1 to 15 to 1 to 12. Departments of art, biography, home economics and Spanish, were organized, and the number of individual courses increased from 200 to 340. The library increased from 25,000 to 70,000 volumes, and from 100 periodicals to over 600. The endowment rose from \$659,247 in 1913 to \$1,828,900 in 1923, and the annual expenditures from \$66,990 to \$338,395. The following buildings were constructed: Music Building (\$53,000), Skinner Memorial Chapel (\$145,000), Leighton Hall of Chemistry (\$315,000), four dormitories for men at a total cost of \$377,300, and six dormitories for women at a cost of \$205,700. The value of the college plant was increased from \$477,863 to about \$2,000,000. President, Donald John Cowling, D.D., LL.D., Ph.D.

CARLISLE, ALEXANDRA (MRS. J. COYNE) (1886-). An actress born in London, England, but well known in the United States from her appearances on the New York stage. Her first stage appearance was at Lowther Lodge, Kensington, in 1903 when she played Audrey in *As You Like It* with Patrick Kirwan. In 1908, she appeared at the Garrick in New York and from 1913 to 1920 played in America. Her best known characterizations in America include the name part in Masfield's *Nan* (Boston 1918, New York 1920) and Nancy Price in *The Country Cousin* (1917-19). She returned to London in 1921 as Marguerite in *Daniel* and also played Stella in *Three* (1921).

CARLSON, JOHN FABIAN (1875-). A landscape painter, born in Smaland, Sweden, who came to the United States in 1886. He studied art at the Art Students' League in New York and in Buffalo, and became head instructor of landscape painting at the Art Students' League School, Woodstock, N. Y. Carlson has been known particularly for his wonderfully toned and richly beautiful winter themes. His canvases are distinguished by the quality of light which invariably envelops and irradiates the scene, integrating all its rich colors in one full-toned harmony. In 1911, he was elected an

Associate of the National Academy, and in 1923 he received the Ranger fund purchase prize of the National Academy. He is well represented in the Corcoran Gallery, Washington, the Museums at Toledo, Ohio, Youngstown, Pa., and in other public collections.

CARLTON, NEWCOMB (1869-). An American engineer and business man, born at Elizabeth, N. J., and educated at Stevens Institute. From 1891 to 1919, he practiced as a mechanical engineer in Buffalo, N. Y., and was subsequently director of works of the Pan-American Exposition for three years. He was then connected with the Bell Telephone Company and the Westinghouse Electric & Manufacturing Company until 1910, when he became vice-president of the Western Union Telegraph Company. He was made president of this company in 1914.

CARMAN, WILLIAM BLISS (1861-). An American poet (see VOL. IV). His works published since 1913 include: *Earth Deities* (with Mary Perry King, 1914); a translation of C. A. Debussy's *Album of Six Songs* (1915); *Open Letter* (1920); *Later Poems* (with an appreciation by R. H. Hathaway, 1921, (1922)).

CARNARVON, GEORGE EDWARD STANHOPE MOLYNEUX HERBERT, EARL OF (1866-1923). A British peer, and co-discoverer of the tomb of Tutankhamen in Egypt. He was born June 26, 1866, and was educated at Eton and Trinity College, Cambridge. His interest in Egyptology was aroused by the collections of illuminated books and manuscripts which he had gathered, and in 1906 he applied for permission to excavate at Thebes. As he had obtained the assistance of Howard Carter, former inspector in the service of antiquities at Thebes, the permission was granted and the two undertook a series of excavations mostly on the northern side of Assasif Valley near the Temple of Derel Bahri. In 1908, they discovered the tomb of a prince of the Eighteenth Dynasty, containing precious caskets and a gaming board. In succeeding years, tombs were systematically discovered and cleared. Meanwhile Lord Carnarvon, with his family, took up his residence in the Valley of the Kings and worked on an account of the excavation, which appeared in 1912 under the title of *Five Years' Exploration at Thebes*. After the War he received a concession in the Valley of the Kings, and with Mr. Carter undertook to excavate down to bedrock. In November, 1922, after long labors, they uncovered the wall which finally pointed to the tomb of Tutankhamen. On Apr. 6, 1923, as the result of an insect bite, Lord Carnarvon died at Cairo. See TUTANKHAMEN; ARCHAEOLOGY.

CARNEGIE CORPORATION OF NEW YORK. See LIBRARY ASSOCIATION, AMERICAN AND LIBRARY PROGRAM.

CARNEGIE ENDOWMENT FOR INTERNATIONAL PEACE. See LIBRARY ASSOCIATION, AMERICAN.

CARNEGIE GEOPHYSICAL LABORATORY. See MINERALOGY.

CARNEGIE INSTITUTE OF TECHNOLOGY. A nonsectarian institution of technical education at Schenley Park, Pittsburgh, Pa., founded in 1900 by Andrew Carnegie. The student enrollment increased from 3285 in 1914 to 4282 in the year 1923-24, and 628 in the summer session of 1923; the faculty from 202 to 288 members. The productive funds in 1924

were \$8,000,000 and the income \$1,300,000. The \$400,000 gymnasium was completed in 1924. There were four colleges: College of Engineering, College of Industries, College of Fine Arts, and the Margaret Morrison College for Women. Evening classes were held in the Colleges of Engineering, Industries, and Fine Arts. President, Thomas Stockham Baker, Ph.D.

CARNEGIE INSTITUTION OF WASHINGTON. An institution established in 1902 for the purpose of encouraging research and investigation, and the application of knowledge to the improvement of mankind. The 100-inch reflecting Hooker telescope of the Mt. Wilson Observatory was completed in 1916; in 1921 it was announced that important new discoveries had been made by Dr. A. A. Michelson that furnished a new starting point for further investigations concerning the nature of the universe. By use of the interferometer the dimensions of Betelgeuse in Orion and many other stars were measured, and the way was opened for corresponding observations on a group of stars theretofore seemingly entirely out of range. The large ruling machine, for many years under construction, was successfully operated in the preparation of diffraction gratings. A new edition of *Ptolemy's Almagest*, Hipparchus's great catalogue of stellar positions, was issued in 1916 as a result of the researches of Dr. C. H. F. Peters and Edward B. Knobel, and a new and probably final edition of the *Catalogue of the Stars* by Ulugh Beg, the Arabian astronomer of the 15th century, was published in the following year. The Mt. Wilson Observatory and the California Institute of Technology (q.v.) in 1922-1923 jointly conducted researches in the structure of matter.

The department of terrestrial magnetism was engaged throughout the decade in making a magnetic survey of the earth. Its investigations included the phenomena of magnetism, electricity and gravitation. The non-magnetic ship *Carnegie* made a number of voyages in the Atlantic, Pacific and Indian Oceans, and in 1916 sailed around the Antarctic icepack in 118 days. This sea survey, begun in 1909, in which the *Carnegie* traveled 300,000 miles, was completed in 1921, and the regions visited were charted. Land observations were continued by the Institution. The geophysical laboratory was engaged in a study of the atomic structure of minerals, especially of the minerals emanating from the interior of the earth, such as the lavas of the Hawaiian Islands and the fumaroles of the Katmai region of Alaska (See GEOGRAPHIC SOCIETY, NATIONAL). Investigations were also conducted looking toward the solution of certain critical problems in earthquake study, and a representative was sent to Chile to study the problems arising from the earthquake of November, 1922.

As a direct result of archaeological investigations in Guatemala and Yucatan extending over the past decade, agreement was reached with the Mexican Government for a ten-year programme of investigation at the ancient Maya city of Chichen Itza in Yucatan. Along with the specifically archaeological investigations, the researches are to include a study of the physical characteristics of the Maya race and of the environment in which it developed. Through an advisory committee of eminent biologists a preliminary programme for studies on the physical

basis of human behavior was adopted in co-operation with the Department of Embryology and with other agencies. Ecological studies concerning environment relations of plants, which were undertaken at a number of stations in Colorado, Arizona, and other western States, led to a new interpretation of the development of vegetation. The department of genetics was established in 1920 at Cold Spring Harbor, L. I. with a section of experimental evolution, and a Eugenics record office. It carried on researches in variations in the elements of the cell recognized as bearers of characters transmitted to descendants. In 1921 a laboratory was built for the department of botanical research at Carmel, Calif., to be devoted to chemical and physical research with a view to obtaining additional information concerning the basis of plant activities. This department with laboratories at Tucson, Arizona and Carmel, California is now known as the laboratory for plant physiology.

Researches were also carried on in many other lines. In 1917 the eighth and last volume of Dr. H. Oskar Sommer's edition of the Vulgate Version of the Arthurian Romances was published, concordances to Spencer, Keats, and Horace, and a new edition of *The Old Yellow Book* were issued. Dr. Victor S. Clark wrote a *History of Manufactures in the United States (1607-1860)* and Dr. James Brown Scott edited eight volumes of *Classics of International Law*, a project which was assumed by the Carnegie Endowment for International Peace. The department of economics and sociology was discontinued in 1916. During the War two-thirds of the staff was devoted to work for the government.

Two hundred and twenty-five volumes were issued during the ten years between 1914 and 1924, and about \$13,000,000 was received by the Institution. A series of lectures on the recent researches, initiated in 1921, become an important personal means of interpreting to the scientific public some of the results of current investigations; and such work was supplemented by comprehensive exhibits in the Administration Building in Washington relative to current progress of work. See *EXPLORATION*.

CARNOTITE. See **RADIUM**.

CAROLINE AND PELEW ISLANDS. See **PACIFIC OCEAN ISLANDS**.

CARPENTER, EDWARD CHILDS (1871-). A dramatic author and novelist born at Philadelphia, Pa. His very well known plays include: *The Dragon-Fly* (with J. Luther Long); *Captain Courtesy*; *Remembrance*; *The Order of the Rose*; *The Barber of New Orleans*; *Bread upon the Waters*; *The Challenge*; *The Tongues of Men*; *The Cinderella Man* (1915); *The Pipes of Pan* (1917); *The Three Bears* (1917); *Bab* (1920); *Romeo and Jane* (1920); *The Girl and the Highways* (1920); and *Pot Luck*. Besides writing many novels, Mr. Carpenter edited the *Philadelphia Inquirer*.

CARPENTER, JOHN ALDEN (1876-). An American composer, born at Park Ridge, Ill., Feb. 28, 1876. Besides taking the regular courses at Harvard University, he at the same time completed the full course in music under Prof. J. K. Paine. In 1906, he studied composition with E. Elgar in Rome and later (1908-12) pursued the same subject with B. Ziehn in Chicago. Although he never followed music as a profession, his compositions show a thorough

mastery of all technical means and at the same time pronounced impressionistic tendencies. His works comprise: *The Birthday of the Infanta*, a ballet-pantomime (Chicago, 1919); for orchestra, a symphony, *A Sermon in Stones* (Norfolk Fest., 1917); *Adventures in a Perambulator*, *Krazy Kat*, *A Pilgrim Vision* (Mayflower Tercentenary, 1920); a *Concertino* for piano and orchestra; a violin-sonata; a song-cycle *Gitanjali* and about 30 detached songs.

CARPENTIER, GEORGES (1894-). French heavyweight boxer, born at Lens, France. He has engaged in more than one hundred matches, his most important battles having been with Jack Dempsey (q.v.), world's heavyweight champion in 1921, Battling Siki in 1922 and Tom Gibbons and Gene Tunney in 1924. Carpentier was knocked out by Dempsey in the fourth round of a scheduled fifteen-round contest at Boyle's Thirty Acres in New Jersey, was knocked out by Siki at Paris, France, in the sixth round, lost on a decision to Gibbons at Michigan City, Ind., and was knocked out by Tunney at the Polo Grounds, New York City in the fifteenth round.

CARPETS. See **TEXTILE MANUFACTURING, Wool**.

CARR, GENE (1881-). American illustrator and caricaturist born in New York and educated at the public schools, who contributed to New York newspapers after 1894. He is best known for his creation of the comic series "Metropolitan Movies," "Reddy and Caruso," "Dooley," "Flirting Flora," the "Jones Boys," "Bill," "Stepbrothers," "Willie Wise," "Father," the "Prodigal Son," "All the Comforts of Home" and "Lady Bountiful."

CARR, HARVEY (1873-). An American experimental psychologist, born at Morris, Ill. He was educated at the universities of Colorado and Chicago. After receiving his doctorate, he was an instructor of psychology at Pratt Institute. In 1908, he joined the faculty of the University of Chicago, becoming assistant professor in 1916. His professional contributions include papers on comparative psychology, visual space perception, and educational theory.

CARR, HERBERT WILDON (1857-). An English philosophical writer. He was educated at Oxford, and in his adult life combined the vocation of banker with the writing of semi-popular works on philosophy. He received the honorary degree of D.Litt. (Durham) in 1912, and from 1916 to 1918 was president of the Aristotelian Society. In 1918, he became professor of philosophy at the University of London, Kings College, and editor of the *Proceedings of the Aristotelian Society*.

In his works, Professor Carr shows the influence of the philosophy of Bergson and of Croce, for both of whom he became a popular torchbearer. His publications include: *The Problem of Truth* (1912); *Henri Bergson* (1912); *The Philosophy of Change* (1914); *The Philosophy of Benedetto Croce* (1918); *Bergson's Mind Energy* (Translation, 1920); *The Principle of Relativity* (1920); *Gentile's Theory of Mind as Pure Act* (Translation, 1921); and *A Theory of Monads* (1922).

CARREL, ALEXIS (1873-). An American biologist (see VOL. IV.) At the outbreak of the War, Dr. Carrel returned to France as a military surgeon and established a research laboratory in order to determine the most prac-

ticable antiseptics and technique for wound dressing. In collaboration with Dakin, he evolved the so-called Carrel-Dakin solution of sodium hyposulphite and this, with the technique devised, was used largely as a standardized method of wound care. In 1917, in collaboration (Carrel and Dehelly) was published the handbook *Le traitement des plaies infectées*, which appeared simultaneously in English. In collaboration with Professor Tuffier, Carrel also conducted researches on surgery of the orifices of the heart. In 1919, he returned to the Rockefeller Institute, New York City, to resume his original research into the growth and preservation of tissue outside the body and the implantation and grafting of tissues.

CARREL-DAKIN SOLUTION. See **CARREL, ALEXIS**.

CARRINGTON, FITZROY (1869-). An American editor (see VOL. IV). He resigned as editor of the *Print Collector's Quarterly* in 1917, but became American editor of the same periodical in 1921. He is the author of: *Engravers and Etchers* (Scammon Lectures, 1921).

CARROLL, EARL (?-). An American theatrical producer, and builder of a plastic and well appointed playhouse in New York City, the Earl Carroll Playhouse. One of his latest improvements in the theatre is a system of building raised platforms and steps by means of unit building-block construction whereby a long, wide flight of stairs can be built in a limited space, as well as platforms of any shape. The stairs are made in units of two steps each assembled on different sized blocks whose corners form intermediate steps. By means of this system scenes can be quickly and easily made up by four stage hands.

CARSON, EDWARD HENRY CARSON, BARON (1854-). British statesman and lawyer (see VOL. IV). When the War began he strongly urged Ulstermen to join the British army. He became attorney general in June, 1915, but resigned in October because he felt that the policy of Mr. Asquith's cabinet was to desert Serbia. In December, he joined Lloyd George's cabinet as First Lord of the Admiralty, in which position he endeavored to make good the losses suffered by the work of the German submarines. In July, 1916, he resigned from the Admiralty and accepted a place in the War cabinet without portfolio, but resigned this position in 1918. After the War he turned again to Irish affairs, and demanded the repeal of the Home Rule Act. He supported Lloyd George's proposal for the reform of the Government of Ireland by establishing parliaments in both Dublin and Belfast, and his efforts to make this plan a success were rewarded by the overwhelming majority in favor of it in the elections of May, 1921. Sir Edward Carson refused a seat in the new Parliament, and also declined to succeed Mr. Bonar Law as leader in the House of Commons. He quitted active politics in 1921, and accepted a life peerage as Baron Carson of Duncairn.

CARSON, HARRY ROBERT (1869-). An American Protestant Episcopal Bishop of Haiti, born at Norristown, Pa. He was educated at the University of the South. He studied theology, and was ordained as priest in 1896 by Bishop Sessums of Louisiana, in whose diocese he served as general missionary until 1898. During the Spanish-American War he was chap-

lain of the 2d Louisiana Infantry. After peace was declared in 1899, he held pastorates in Louisiana, and in 1910 was made Archdeacon of Louisiana. He was editor of *The Diocese of Louisiana*, the diocesan paper. He went to the Canal Zone as missionary in 1912, and founded the Holy Comforter Mission for lepers. At the General Convention of 1892 he was elected Missionary Bishop of Haiti, and was consecrated in the Cathedral of St. John the Divine, New York City, on Jan. 10, 1923.

CARSO PLATEAU. See **WAR IN EUROPE, Italian Front**.

CARTELLIERI, G. M. ALEXANDER (1867-). A German writer born at Odessa. He studied at the universities of Paris, Tübingen, Leipzig, Berlin, and was professor at Heidelberg and Jena. His principal works are: *Philip II Aug. König von Frankreich* (1899); *Regesten des Bischofs von Konstanz* (1894-5); *Philip II Aug. und der Zusammenbruch des angevinischen Reiches* (1913); *Die Schlacht von Bouvines im Rahmen der europäischen Politik* (1914); *Weimar und Jena* (1913); *Deutschland und Frankreich in Wandel der Jahrhunderte* (1914); *Frankreichs politische Beziehungen zu Deutschland von Frankfurter Frieden bis zum Ausbruch des Weltkriegs* (1918); *Gobineau* (1917); and *Grundzüge der Weltgeschichte 378-1914* (1919).

CARTER, HOWARD (1873-). An English archaeologist, born at Swaffham, Norfolk. He was trained as an artist, and began his work as an archaeologist in Egypt in 1891 under Professor Flinders Petrie, assisting in the excavation of Tel-el-Amarna in 1892. He was Government Inspector-in-Chief of Egyptian Antiquities in Upper Egypt from 1900 to 1905. He made many discoveries, and in 1917 began with Lord Carnarvon the work leading to the finding of the tomb of Tutankhamen in 1923, which disclosed objects of marvelous design and greatly increased the world's knowledge of ancient Egyptian art and life. He visited the United States in 1924, and gave a series of illustrated lectures in New York City on the finding of the tomb of Tutankhamen which were attended by very large and enthusiastic audiences. See **TUTANKHAMEN**; **ARCHAEOLOGY**; **CARNARVON, EARL OF**.

CARTER, WILLIAM HARDING (1851-). An American army officer, born at Nashville, Tenn. He was educated at the Kentucky Military Institute at Frankfort, and served in the Civil War. In 1913 he commanded the 2d Division of the United States Army, and of the Hawaiian Department in 1914-15, and retired in 1915. Upon being recalled to active service in 1917-18, he commanded the Central Department at Chicago. He wrote: *From Yorktown to Santiago with the Sixth Cavalry* (1900); *Old Army Sketches* (1906); *Giles Carter of Virginia* (1909); *The American Army* (1915); *Life and Services of Lieutenant Chaffee* (1917); *Horses, Saddles and Bridles*, 4th ed. (1918).

CARTHAGE COLLEGE. An institution at Carthage, Ill., founded in 1872. The student enrollment increased from approximately 80 in 1914 to 368 in 1923-24 and the endowment increased from \$250,000 to \$850,000. The teaching force was enlarged, until there were 35 members of the faculty in 1923-24. A domestic science department was added to the curriculum. President, Harvey D. Hoover, Ph.D.

CARTY, JOHN JOSEPH (1861-). An American electrical engineer, born at Cambridge,

Mass. He was educated in the Cambridge Latin School, and began his active work in telephony in 1879 with the Bell Telephone Company in Boston. In 1887, he was called to the charge of the cable department of the Western Electric Company in New York City and two years later became chief engineer of the New York Telephone Company. In 1908 he became chief engineer of the American Telephone and Telegraph Company and in 1919 vice-president of the company. As a pioneer in the development of the telephone he has invented many improvements, including telephone signaling apparatus, various switchboard and telephone exchange apparatus, as well as the telephone transmitter from secondary batteries. Among the important achievements accomplished under his direction were the underground telephone cable between Boston and Washington, transcontinental telephone lines, and telephoning without wires from Washington to Hawaii, and from Washington to Paris. During the War he was a member of the National Research Council and during 1918-19 he served in France with the rank of colonel. The Distinguished Service Medal of his own country and the Japanese orders of the Rising Sun and Sacred Treasure were conferred on him, and he was made an officer of the Legion of Honor. He received the Longstreth medal (1903) and the Franklin medal (1916) from the Franklin Institute, and the Edison medal (1918) of the American Institute of Electrical Engineers.

CARUSO, ENRICO (1873-1921). An Italian dramatic tenor (see VOL. IV). He died at Naples, August 2, 1921. During the last decade of his life his position as the greatest living dramatic tenor was unchallenged. His last appearance was as Eleazar in *La Juive* at the Metropolitan Opera House (Dec. 24, 1920).—Consult P. V. R. Key and B. Zirato, *Enrico Caruso* (Boston, 1923).

CARVER, THOMAS NIXON (1865-). An American economist (see VOL. IV). Among his later writings are: *Essays in Social Justice* (1915); *The Conservation of Human Resources* (1917); *Government Control of the Liquor Business in Great Britain and the United States* (1917); *War Thrift* (1919); *Principles of Political Economy* (1919); *Principles of National Economy* (1921).

CASE, SHIRLEY JACKSON (1872-). An American educator and theologian born at Hatfield Point, New Brunswick, Canada. He was educated at Acadia University (Nova Scotia), Yale and the University of Marburg. He instructed in mathematics and Greek, and, 1906-08, was professor of the history and philosophy of religion at Bates College, Me. In the latter year he went to the University of Chicago where he subsequently (1917) became professor of early church history and New Testament interpretations. He was editor of the *American Journal of Theology* (1912-20) and published: *The Historicity of Jesus* (1912); *The Evolution of Early Christianity* (1914); *The Millennial Hope* (1918); and *The Revelation of John* (1919).

CASELLA, ALFREDO (1883-). An Italian composer, one of the leaders of Futurism, born at Turin, July 25, 1883. He was taught by his mother until 1896, when he entered the Paris Conservatoire, studying under L. Diémer (piano, first prize, 1899) and G. Fauré (composition). He then made extensive tours of Europe as pianist and conductor. From 1912

to 1915 he was professor of advanced piano playing at the Conservatoire, and then accepted a similar position, as Sgambati's successor, at the Liceo Musicale di S. Cecilia in Rome. In 1921-22, he made a tour of the United States, where the public acclaimed him as an excellent interpreter of the classics, but declined his own futuristic works, which include *Le Couvent sur l'eau*, a choreographic comedy; two symphonies; *Italia*; *Prologue pour une tragédie*; *Notte di maggio* (with chorus); *Suite in C*; *Pagine di Guerra*; *Elegia eroica* for orchestra; chamber music and many songs. He published numerous articles making propaganda for Futurism and also a book, *The Evolution of Music* (London, 1924).

CASEMENT, SIR ROGER DAVIS (1864-1916). Irish revolutionist. From 1895 to 1913, he was in the British consular service, distinguishing himself for his efforts to suppress cruelty to the natives in the Congo Free State and in Brazil. In 1916, he aided in the Sinn Fein revolt. After passing some months in Germany, where he was believed to have engaged in a treasonable plot, he was captured in Ireland, Apr. 21, 1916, on landing from a German submarine, was convicted of high treason, June 29, and hanged on August 3.

CASE SCHOOL OF APPLIED SCIENCE. An engineering college in Cleveland, Ohio, founded in 1880. The student enrollment in 1923 was 538, approximately the same as in 1913, while the faculty was increased during the decade from 45 to 61 members, the library from 13,505 to 16,215 volumes, and the endowment from \$2,458,788 to \$3,008,439. The school received, by gift from Worcester R. Warner and Ambrose Swasey, a student observatory equipped with an object glass of 10 inches aperture, two astronomical transits of 3 and 4 inches aperture, a 4-inch zenith telescope, a 2-inch theodolite, and two Riefler clocks. Prof. Dayton C. Miller of the school devised a method of photographing sound waves, a thing never attempted before. Through this invention it is possible to make a complete analysis up to 30 different components of any musical sound, and thus tell exactly what tones and overtones any musical instrument gives out; and to compare any two musical sounds, as, for example, the notes of two pianos with each other, to determine which is the finer instrument. President, Charles Sumner Howe, Ph.D., LL.D.

CASSEL, GUSTAV (1866-). A Swedish economist and student of mathematics who studied at Stockholm and abroad. Early in his career he instructed in national economy at the high school in Stockholm, and about the same time published *Das Recht auf den vollen Arbeitsertrag* (1900), and *The Nature and Necessity of Interest* (1903). Many times in the period, 1905-21, he was identified with state financial matters in Sweden, and in 1921, he was one of the Swedish representatives who assembled in London for the meeting of the International Chamber of Commerce. He published *Theoretische Sozialökonomie* in 1919, and his *Memo-randum on the World's Monetary Problems* was published by the League of Nations for the International Financial Conference in Brussels in 1920. Cassel became a member of Svenska Vetenskapsakademien and a corresponding member of the Royal Economic Society.

CASSIRER, ERNST (1874-). A German philosopher of the neo-Kantian school. His

work has been made available in English through the translation of *Substanz und Funktion*, to which has been added in the same volume some chapters on Einstein's theory of relativity. His more recent works include *Freiheit und Form* (1918), *Heinrich von Kleist und die Kantische Philosophie* (1917), and *Zur Einstein'schen Relativitätstheorie* (1921). The English translation of *Substanz und Funktion* in 1923 under the title *Substance and Function and Einstein's Theory of Relativity*. Professor Cassirer edited a new edition of Kant's works in 11 volumes, and wrote the concluding biographical volume (1912-18).

CASTELLANI, ALDO (1875-). An Italo-British physician, authority on tropical medicine, born at Florence and educated at the University of Florence (M.D., 1899). His earlier years of practice were occupied in part by the study of tropical diseases, notably African sleeping sickness and yaws. In this research he represented in part a special commission from the Royal Society of England. For some time he was a professor of tropical medicine in the Ceylon Medical School. On the outbreak of the War he at once entered the service of his native country and was made a lieutenant-colonel of the Royal Italian Medical Service. He is best known by his exhaustive work, written in collaboration (Castellani and Chalmers), *A Manual of Tropical Medicine*. This was first published in 1910 but was greatly enlarged in subsequent editions, the fourth, which appeared in 1923, containing nearly 2500 pages.

CASTELNAU, EDOUARD DE CURIÈRES DE (1851-). A French general, born at Saint-Affrique. He served in the Franco-Prussian War, in Cochinchina and Algeria, and the outbreak of war in 1914 found him in command of the French 2d Army. He early distinguished himself as the "Savior of Nancy" with the result that in December, 1915, he was made chief of the general staff. In this capacity he went to Greece and helped plan the defenses of Saloniki. In 1916, he did yeoman work in holding Verdun against the German onslaughts. Once again he was sent on a mission, this time to Russia early in 1917, and on his return he was placed in command of the group of armies of the East. A remarkable soldier, it was said in his favor that only political enmities prevented his rise to the highest military post France had at her disposal.

CASTLE, ECERTON (1858-1920). An English novelist (see VOL. IV). His latest novels, written for the most part in collaboration with his wife, Agnes Castle, include: *The Ways of Miss Barbara* (1914); *The Hope of the House* (1915); *The Black Office* (1917); *Wolf Lure* (1917); *Minniglen* (1918); *New Wine* (1919); *Little Hours in Great Days* (1919); *John Henschal's Margaret* (1920).

CASTRO, MATILDE (1879-). An American educator born in Chicago. She was educated at the University of Chicago and taught philosophy as a member of the faculties of Mount Holyoke College, Vassar College, and Rockford College. In 1913, she was called to Bryn Mawr. She is the author of *The Respective Standpoints of Psychology and Logic* (1912).

CATALAN MOVEMENT. See SPAIN, HISTORY.

CATALYSIS. See CHEMISTRY; and CHEMISTRY, PHYSICAL.

CATALYSTS, USE OF. See CHEMISTRY, ORGANIC.

CATERPILLAR TRACTOR. See FARM TRACTOR.

CATHER, WILLA SIBERT (1876-). An American author born at Winchester, Va. She was educated at the University of Nebraska, and shortly after her graduation went into journalistic work. In 1906-12, she was associate editor of *McClure's Magazine*. Miss Cather is a writer who deals simply and profoundly with the problems of life, presenting them in a direct style. Among her works are: *April Twilight* (1903), a book of verse; *The Troll Garden* (1905), which attracted considerable attention; *Alexander's Bridge* (1912); *The Bohemian Girl* (1912); *O Pioneers* (1913); *The Song of the Lark* (1915); *My Antonia* (1918); *Youth and the Bright Medusa* (1920); *One of Ours* (1922); and *The Lost Lady* (1923). *One of Ours* won the Pulitzer Prize as the best novel published in that year.

CATHOLIC CHURCH. See ROMAN CATHOLIC CHURCH.

CATHOLIC UNIVERSITY OF AMERICA. An institution of higher learning located at Washington, D. C., established in 1887 by the Hierarchy of the United States. It included the Schools of Theology, Canon Law, Law, Philosophy, Letters, and Sciences. The affiliated institutions were the Catholic Sisters College for the training of teachers; Trinity College for the higher education of Catholic young women; and the houses of study of 16 religious orders. The student body increased in numbers from 1394 in 1914 to 2021 in 1924, the faculty from 75 to 103, and the library from 89,000 to 200,000 volumes. There were 86 scholarships in 1914 and 102 in 1924. The number of degrees conferred in the period was 1757. The principal advance in the way of organization was the establishment (1923) of the School of Canon Law; in the way of equipment, the building of the Martin Maloney Chemical Laboratory. The laboratory was placed at the disposal of the government during the War. The university also organized a unit of the Students Army Training Corps; conducted a school for paymasters of the navy and a rehabilitation school for ex-service men; and administered the Knights of Columbus scholarships for ex-service men. A gymnasium was built with a floor space of 44,000 square feet, and a stadium was in process of construction in 1924. Periodical publications of the university were: *The Catholic Educational Review*; *The Catholic Historical Review*; *The Catholic Charities Review*; and the *Corpus Scriptorum Orientalium*. Rector of the University, Rt. Rev. Thomas J. Shahan, D.D.

CATT, CARRIE CHAPMAN (?-). An American suffrage leader (see VOL. IV). In 1920, she had the pleasure of seeing the work of a lifetime crowned with success when the women of America went to the presidential polls for the first time. In June, 1920, she was reflected president of the International Woman Suffrage Alliance, and in 1923 she was made honorary president on her announcement that thereafter all her activities were to be devoted to the newly formed Pan-American Union. Her extensive travels during the years 1920-24, in Europe and South America, influenced greatly the progress of woman suffrage. In 1923, she was authority for the statement that Mussolini

was committed to the extension of the ballot to the Italian women.

CATTELL, JAMES MCKEEN (1860-). Psychologist and educator (see VOL. IV). He was dismissed from Columbia University under war conditions (1917) but in the course of a legal battle with the university was able to recover the amount of his pension. In 1919, he published a volume attacking the administration of the Carnegie pensions for university professors. Retired from active teaching, he continued his educational work as editor of *The Scientific Monthly, School and Society and Science and Education*. He published his third edition of *American Men of Science* in 1921. He was elected president of the American Association on the Advancement of Science.

CATTLE. See DAIRYING; LIVE STOCK; VETERINARY MEDICINE.

CAVALRY. See ARMIES AND ARMY ORGANIZATION; STRATEGY AND TACTICS.

CAVE, GEORGE, VISCOUNT (1856-). An English jurist, born in London. He was educated at St. Johns College, Oxford, and began the practice of law in 1880. He filled many important posts and was standing counsel of Oxford University from 1913 to 1915. In 1914-15, he was attorney-general to the Prince of Wales. In 1915-16, he was solicitor-general, and from 1916 to 1919, Home Secretary. He was chairman of the South Rhodesia Commission, 1919-20, and in 1921 was chairman of the Munitions Inquiry Tribunal. From 1906 to 1918 he was a member of Parliament. He created a viscount in 1918. He edited several legal treatises.

CAVELL, EDITH (1865-1915). A British nurse born at Swardeston, Norfolk, England. She was educated in England and Belgium and in 1895 entered a London hospital as probationer. For several years she held various positions as superintendent and matron and in 1907 was appointed the first matron of the Berkendael medical institute at Brussels. In the War, the institute became a Red Cross hospital. According to the account of the affair sent by the American minister, Brand Whitlock, to London, and published by the British government, Miss Edith Cavell, an English woman who had been in charge of a training school in Brussels, was accused of utilizing her position as a nurse to assist in the escape of British, Belgian, and French soldiers from Belgium. She was arrested August 5; October 11, she was condemned to be executed by a firing squad of German soldiers. The carrying out of the execution was done in the deepest secrecy; the American minister learning of it on the evening of the 10th. Disliking to kill a woman in cold blood, the firing squad had aimed so inaccurately that Miss Cavell was not killed, but only wounded by a single bullet. Thereupon—and this was the circumstance that particularly infuriated the British press—the German officer in charge of the firing squad drew his revolver, put it up to the woman's ear, and pulled the trigger. In England, Miss Cavell was henceforth regarded as a martyr. A memorial service at Westminster Abbey, attended by Mr. Asquith as well as by representatives of the Royal Family, was thronged by a vast multitude anxious to do her honor. A statue, by Sir G. Frampton, was erected to her memory opposite the National Portrait Gallery, London.

CAWTHORN, JOSEPH (1869-). An

American actor born in New York City. He was educated at home by his mother and appeared on the stage as a child in Robinson's Music Hall, New York, in 1871, then with Haverly's Minstrels. He was taken to England at the age of nine, and was comedian in several musical plays. In 1910, he appeared as Oscar Spiel in *Girlies* at the New Amsterdam Theatre, New York. This was followed by his appearance as Louis von Schloppenhauer in *The Slim Princess* in 1911. He played in *Sybil* during 1916-17, in *Rambler Rose* in 1918, and as Timothy in *The Canary* during 1919-20. He also took the part of the Hon. Hudson Hobson in *The Half-Moon* in 1920.

CECIL, LORD (EDGAR ALGERNON) ROBERT (1864-). English statesman, third son of the Marquis of Salisbury. He was educated at Eton and University College, Oxford, and read for the bar. He devoted himself to the law until 1906, when he was elected to Parliament as a Conservative member. Like his younger brother, Lord Hugh, he became a staunch advocate of the Conservative doctrine, and while not so brilliant in debate, his sound sense and the frank honesty with which he held his position, earned him at once, too, a respectful attention. He fought against disestablishment, social legislation, and tariff reform, and it was the last that brought on his defeat in 1910. He was reelected in a by-election in 1912 and sat after that for the Hitchin division, Herts. During the War he displayed his great abilities in the difficult offices of Undersecretary for Foreign Affairs (1915-16) and Minister of Blockade (1916-18). In 1918, he was called upon to carry on the negotiations with the United States. His subsequent career took on something of the nature of a Crusade. He early became convinced of the necessity for some such instrumentality as the League of Nations to preserve international peace and together with General Smuts, among the British, threw himself whole-heartedly into the movement. With Smuts, he was British representative on the League of Nations' Commission, and it was as a result of Smuts's intercession that South Africa tendered him her seat in the League Assembly, when Lloyd George passed him over. He continued on the Assembly for South Africa into 1923. In April, 1923, he came to the United States in the interests of the League. His reception was cordial, Americans in particular being taken with his honesty and nobility, but it is unlikely that his plea carried much weight at the time. As the head of the League of Nations Union, he worked untiringly in the interest of universal peace to the neglect of his political career, in this instance resembling the conduct of the Frenchman Bourgeois and the American Clarke. In 1923, he entered the short-lived Baldwin Cabinet with the portfolio of Lord Privy Seal.

CECIL, LORD HUGH RICHARD HEATHCOTE (1869-). An English politician, fifth son of the Marquis of Salisbury. He received his education at Eton and University College, Oxford, and for a time was a Fellow of Hertford. He entered politics in 1895 as a Conservative and served in Parliament continuously to 1906. He was among the young Conservatives to take a stand against Chamberlain's tariff programme, and as such, gained an excellent reputation. He was defeated in 1906 and not returned

again until he was sent up by Oxford in 1910. Possibly too much of a scholar, and a political philosopher rather than a politician, his subsequent career was marked by a growing inactivity. He served in the War for a time; defended conscientious objectors in 1917; and in 1921 followed his brother, Lord Robert, (q.v.) in the break from Lloyd George. His book *Conservatism* was the best expression of the philosophical implications of the doctrine in his generation. Like the other Conservative, Disraeli, he finds the only sound position is a reversion to Burke.

CELESTIAL MECHANICS. See ASTRONOMY.

CELLULOSE. See CHEMISTRY, ORGANIC; EXPLOSIVES; SILK, ARTIFICIAL.

CEMENT. An important development of the decade 1914-24 was the larger use of concrete for many forms of construction of widely different types. This naturally led to an increased demand for cement, and with it came various improvements in the scientific proportioning of the constituents and control over the manufacturing processes so as to obtain a uniform and standard material of carefully specified characteristics. In the United States, Portland cement made up the bulk of the cement output. It is manufactured by calcining to incin-

throughout the country. The most important area of production is Eastern Pennsylvania, in the Lehigh district, where is found a valuable raw material known as cement rock. This region is not only the greatest producer but has the largest number of plants, and is followed in order of importance by California and a district comprising Illinois, Indiana, and Michigan. The general tendency in cement manufacturing was to install large plant units and to exercise greater care in the process of manufacture. Notwithstanding the increased production the number of plants in 1922 was 118 as compared with 133 in 1914 and 135 in 1909. More economical utilization of waste steam reduced production costs in many plants. The Portland cement industry grew steadily, as shown in the tables. It appears that consumption in 1923 was 1.21 barrels per capita, as compared with .77 barrel per capita in 1914. Cement was increasingly employed for general construction, particularly on account of its fire resisting qualities, and for the manufacture of durable highways. More cement was consumed than was produced in the United States in 1922. Consumption grew considerably during the War, except for 1918 and 1919, when it was checked by lack of construction.

Production and consumption rose again in

PRODUCTION

Principal hydraulic cements produced in the United States, 1918-1923

Year	Masonry (natural) and puzzolan cements		Portland cement		Total	
	Barrels	Value	Barrels	Value	Barrels	Value
1918	432,966	\$401,341	71,081,663	\$113,730,661	71,514,629	\$114,132,002
1919	528,589	583,554	80,777,935	138,130,269	81,306,524	138,713,823
1920	767,481	1,150,890	100,023,245	202,046,955	100,790,726	203,197,845
1921	539,402	897,025	98,842,049	186,811,473	99,381,451	187,708,498
1922	889,428	1,293,598	114,789,984	202,030,372	115,679,412	203,323,970
1923	1,271,674	1,947,352	137,460,238	.....	138,731,912	.....

SUPPLY

Supplies of Portland cement in the United States, 1918-1923

Year	Domestic shipments		Imports		Exports		Apparent consumption *	
	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value
1918	70,915,508	\$113,316,275	305	\$1,200	2,252,446	\$5,912,166	68,663,367	\$107,405,309
1919	85,612,899	146,734,844	8,931	52,636	2,403,573	7,513,389	83,158,257	139,274,091
1920	96,311,719	191,139,025	524,604	1,254,729	2,985,807	10,045,369	93,850,516	185,648,385
1921	95,507,147	180,778,415	122,322	388,842	1,181,014	4,276,986	94,448,455	176,890,271
1922	117,791,216	207,170,430	323,823	628,846	1,127,845	3,206,201	116,897,194	204,593,075
1923	135,912,118	257,684,424	1,678,636	2,964,098	1,001,688	2,944,174	136,589,066	257,704,348

* Domestic shipments plus imports minus exports.

pient vitrification a mixture of limestone and clay marl, or blast furnace slag in the approximate proportions of one part of clay or shale to three of limestone. In the United States 125 plants were engaged in the production of cement in 1921, according to the census of manufactures for that year. The industry gave employment to only 30,891, for machinery is extensively used in the preparation, handling, and packing of the material. The consumption of fuel and power is unusually heavy, and the production of 114,789,984 barrels in 1922 required 8,500,000 tons of coal, 4,400,000 barrels of fuel oil, and 3,400,000,000 cubic feet of gas. In 1919 the industry employed 488,808 primary horse power and was exceeded by only 9 manufacturing industries in power demand.

The value of Portland cement produced in 1923 in the United States was \$257,684,424. About one-half of this value was added to the raw materials in the course of manufacture. The average factory price per barrel in 1923 was \$1.90. The cement industry is well distributed

1920; conditions were more stable, and the demand increased consistently with the greater demand for building. As illustrating the use and distribution of cement in 1922 in the United States the following tabulation of the consumption of Portland cement by use was made by engineers of the Portland Cement Association from statistics covering the year 1922:

	Barrels	Per cent
Public and commercial buildings ..	29,000,000	24.9
Dwellings	11,000,000	9.5
Sidewalks and private driveways ..	8,000,000	6.9
Miscellaneous farm uses	24,000,000	20.6
Concrete pipe for water, sewers, irrigations and culverts	5,000,000	4.3
Paving and highways	28,000,000	24.0
Railways	6,000,000	5.1
Bridges, river and harbor work, dams and water power projects, storage tanks, and reservoirs ..	3,500,000	3.0
Miscellaneous uses	2,000,000	1.7
Estimated consumption in 1922, in barrels	116,500,000	100

Cement manufacturing in Europe was naturally interfered with by the War but was gradually resumed as the reconstruction progressed. France in particular soon placed this industry on a prosperous basis and by 1922 had a production of some 4,633,150 tons. Not only was France using considerable amounts of cement in reconstruction work, but she also was able to restore the other countries. In Belgium the annual pre-war output of 1,500,000 barrels was gradually approached again as conditions returned to normality. In England the industry suffered considerably after the War on account of high coal and labor costs and the large amount of foreign imports. In Germany activity was restricted after the War, and the loss of coal fields and the consequent necessity of importing fuel restricted production, though in Westphalia pre-war conditions had been reached by 1922. Subsequent to the War was the establishment of a cement industry in China; Japan was already productive.

Besides Portland cement higher aluminium cements were developed in France and latterly in the United States. These cements, while they do not set more rapidly, show a greater strength after 24 hours than that of Portland cement after 28 days. A greater resistance to the chemical attacks of sea water and sulphate-bearing ground waters was also claimed for them. Aluminium cement was more costly, as high grade aluminium ore, such as bauxite, was largely required in the manufacture. The chemical composition of aluminium cement manufactured in the United States in 1924 was as follows:

Silica	magnesium, insoluble, loss, etc.	5 per cent
Aluminium (Al_2O_3)	40	" "
Lime (CaO)	40	" "
Iron oxides	15	" "

The method of using aluminium cement is much the same as that for Portland cement, except that wetter mixtures are used, and it must be used alone, not mixed with Portland cement. The cement, though not quick in setting, so that ample time must be afforded for mixing, setting, transporting and placing, nevertheless develops very rapidly, after setting, the high strength which is its principal advantage. During the War aluminium cement was used by the French Army in the construction of concrete foundations for big guns which were ready for operation within 24 hours. To offset its higher cost, aluminium cement possesses or was thought to possess many superior properties.

CENSUS. June 30, 1924, marked the close of a 10-year period during which were published returns of two decennial censuses covering the subjects of population, including the blind and the deaf; manufactures; forest products; mining; agriculture; mortgages on farms and homes; irrigation; and drainage. These two investigations were taken as of Apr. 15, 1910, and Jan. 1, 1920, respectively. Although the final reports for censuses of such scope are not usually available until the third or fourth year after the date of enumeration, statistics were given to the public piecemeal in press release and preliminary bulletin form almost daily, commencing within a few months from each date.

The decennial censuses although of great magnitude, involving the employment of approxi-

mately 100,000 clerks, supervisors, enumerators, and agents, are only a part of the many activities of the Bureau. The Bureau operates at full speed at all times. During the 10 years statistics were collected and published yearly concerning births and deaths; financial statistics of States and cities; marriage and divorce (decennially until 1922); and forest products, including the production of lumber, lath, shingles, wood pulp, and the consumption of pulpwood. Quinquennially the Bureau takes a census of electrical industries, including electric railways, telegraphs, telephones, and central electric light and power stations. Commencing with 1925, a census of agriculture was to be taken quinquennially also. Decennially, but not always during the three-year regular decennial census periods, the Bureau publishes life tables; information relating to institutional population, that is, prisoners and juvenile delinquents, insane in hospitals, feeble-minded and epileptics, paupers in almshouses; religious bodies; transportation by water; and wealth, debt, and taxation.

During the latter three years the Bureau issued a Monthly Survey of Current Business containing important current statistics on domestic, industrial, and commercial movements. The Bureau collected and published also, either semi-monthly, monthly, quarterly, or semi-annually, statistics of production, stocks, and consumption, covering various key commodities, such as cotton; hides, skins, and leather; boots and shoes; clothing; hosiery; wool consumption and stocks; tobacco; sugar; etc. For the use of various interested organizations, it made estimates from time to time, between the decennial announcements, of the population of States, counties, and cities, by color, sex, age, groups, and marital condition, for use during intercensal years. At two-year intervals the Bureau issued an Official Register or directory of persons in the service of the United States, exclusive of the army and navy. Commencing in 1921 and biennially thereafter the Fourteenth Census Act provided for a census of manufactures. Such a census had previously been taken at five-year intervals.

CENSUS OF AGRICULTURE. See AGRICULTURE.

CENTRAL AMERICAN UNION. In 1917, Salvador, as the Central American Court of Justice established by the treaty of 1907 drew near its end, called for a conference of Central American republics to renew the court and consider a scheme for lasting coöperation, but the conference was never held because of Nicaragua's refusal to coöperate. In 1920, Salvador once more issued her invitation. Representatives of the five countries met at San José, Costa Rica, and on Jan. 19, 1921, a treaty of union was ready which all but Nicaragua signed. The Costa Rican National Assembly refused to ratify the pact with the result that only three countries, Salvador, Honduras, and Guatemala, remained. The treaty of union contained the following provisions: establishment of a federal republic in which the constituent states were to have local autonomy; the creation of a federal council as executive, a bicameral house, and a judiciary system; a common army and a single federal code, budget, customs' tariff, monetary system, and communications' system. Free trade was to exist among the states; existing treaties with foreign powers

were to be observed; foreign loans made by the states were to have the approval first of the federal government; the states were to continue their individual debt services. The temporary federal council, representing the three states which had ratified the pact, began meeting on Oct. 10, 1921, at Tegucigalpa, Honduras, and it thus seemed that Central American aspirations toward union would at last be satisfied, after more than 80 years of disunion. However, President Herrera of Guatemala, who had consistently championed the Union, was overthrown by a military coup on Dec. 5, 1921, and General Orellana, who succeeded to the presidency, announced that Guatemala had decided to withdraw from the federation. It meant the end of the Union and on Jan. 29, 1922, three days before the Union was to have become permanently effective, the provisional federal council declared the federation dissolved.

This failure of the countries concerned to come to an understanding among themselves led to an attempt on the part of the United States to effect an arrangement. On the proposal of the President of Nicaragua, who was known to be under the influence of the Washington government, a conference of the presidents and cabinets of Nicaragua, Honduras and Salvador, with the United States ministers to those republics, was held on board the United States cruiser *Tacoma*, in Fonseca Bay. The three states agreed to suppress revolutionary agreements directed against each other, to keep alien revolutionary leaders under surveillance and deport them if requested by the imperiled government, and to call a further conference for the discussion of additional measures of unification. Thus were renewed some of the features of the treaty which Central American states had made in 1907 under Secretary Root's guidance, and which had been practically demolished, or at any rate disregarded, by Nicaragua's refusal, with the support of Washington, to accept the decree of the Central American Court relative to the dispute over Fonseca Bay (see SALVADOR and NICARAGUA). When Guatemala and Costa Rica were invited to adhere to the *Tacoma* agreement, they declined, on the ground that they considered the treaty of 1907 still in force. Nevertheless, Secretary Hughes in October, 1922, called a conference of the five republics to meet in Washington for the purpose of reinforcing the 1907 pact, limiting armaments, and other matters. The sittings commenced on Dec. 4, 1922, and terminated on Feb. 7, 1923. Possibly the most important plan proposed—that of a Central American Union—was voted down by Guatemala, Nicaragua, and Costa Rica. Positive achievements were the signing of 14 conventions and one treaty which included: the treaty of peace and amity to supplement the treaty of 1907; a convention for the establishment of an international Central American tribunal on which 15 American citizens were to serve; a convention for the establishment of international commissions of inquiry; a convention for the limitation of armaments; a convention for the establishment of free trade (from which Costa Rica dissented). Each nation promised to limit its standing army, for five years, to 16,400 men, to prohibit the export of arms to other states, to acquire no warships, and not more than 10 war airplanes. Unfortunately the treaty contained no guarantees against war and by Central

Americans was hardly considered an adequate substitute for a federal union. After the conference Secretary Hughes announced it as his intention to negotiate a treaty with Costa Rica for the recognition of her rights in the disputed question of the use of the San Juan River in the Nicaraguan canal project. See NICARAGUA.

CENTRAL STATIONS. See ELECTRIC POWER STATIONS AND GENERATING APPARATUS; STEAM ENGINES AND TURBINES.

CENTRAL UNIVERSITY OF KENTUCKY. See CENTRE COLLEGE.

CENTRE COLLEGE. An institution at Danville, Ky., founded in 1819. The student enrollment increased from 107 in 1914 to 308 in 1923-24, the endowment increased from \$380,000 to \$917,000, and the total assets from \$801,241 to \$1,435,887. There were 18 professors on the faculty and 30,000 volumes in the library in 1923. In 1918, the name of the institution was changed from Central University of Kentucky, which it had been called since 1901, to its original name, Centre College. A stadium seating 8500 people was completed in September, 1923. President, R. Ames Montgomery, D.D., LL.D.

CÉSPEDES, CARLOS MANUEL DE (1871-). A Cuban diplomat, born in New York City, and educated in the United States and in Europe. In 1895, he became governor of the Province of Santiago de Cuba, and from that time on was active in the military and political affairs of Cuba. From 1902 to 1908, he sat in the House of Representatives. From 1909 until 1914, he represented Cuba in Italy, Greece and Argentina, successively. In 1914, he was named Envoy Extraordinary and Minister Plenipotentiary from Cuba to the United States.

CEYLON. An island and British crown colony situated in the Indian Ocean off the coast of Hindustan. In 1921, its resident population was 4,497,854, an increase of 9.6 per cent over the last decennial census. Of these, the Europeans totaled 8099 (8524 in 1911); Burghers 29,403 (26,673 in 1911); Singhalese 3,015,970; Tamils 1,119,699; "Moors" 284,848, others 26,440. The nonresident population, i.e. military, shipping, etc., was 6695. The principal towns had the following populations in 1921: Colombo, 244,000 (213,396 in 1911); Galle, 39,100 (40,187 in 1911); Jaffna, 42,400; Kandy, 32,000. Agriculture continued as the leading activity, 3,337,000 acres out of the total 16,213,000 acres being under cultivation in 1922. In 1922, the distribution was as follows: paddy, 850,400 acres; other grain, 56,000 acres; cacao, 29,500 acres; cinnamon, 26,000 acres; tea 413,000 acres; coconuts, 820,000 acres; rubber, 390,000 acres (215,000 in 1911). In 1922, export of tea totaled 171,808,000 pounds (186,594,000 pounds in 1911); the export of rubber, 37,779,000 pounds of which 25,690,000 pounds went to the United States. The commercial record showed a continual improvement, in 1922 the imports being worth Rupees (Rs.) 281,741,000 and the exports (including re-exports) Rs. 306,615,000 as against Rs. 181,000,991 and Rs. 198,954,902 for 1912. Principal exports in 1922 were: copra, Rs. 28,804,000; coconut oil, Rs. 14,925,000; tea, Rs. 146,037,000 (Rs. 84,000,300 in 1911); coconuts, Rs. 21,984,000 (Rs. 38,086,242 in 1911 for total coconut products); rubber, Rs. 59,537,000 (Rs. 36,427,290 in 1911). The principal imports included cotton goods, rice,

coal and coke, and sugar. In 1921, total tonnage entered and cleared was 13,329,000 tons (14,926,764 in 1911) of which 9,069,000 tons were British (9,571,159 in 1911). In the same year, 731 miles of railway were open which was an increase of about 100 miles over the 10 years. For 1920-21, the budget contained the charges: for revenue, Rs. 70,619,000; for expenditures, Rs. 91,768,000. In 1911, these had been Rs. 47,264,222 and Rs. 48,643,687. The public debt at the end of 1922 amounted to £12,800,000. By an Order in Council of August, 1920, certain changes in Ceylon's administrative machinery were effected. The size of the legislative council was increased, the unofficial members being placed in the majority; but there was no advance toward a scheme of more popular government for which a large section of the native population had long agitated.

CHAFFEE, ZEPHARIAH, JR. (1885-). American law professor, born at Providence, R. I. He was educated at Brown University and the Harvard Law School and for a time engaged in the private practice of law. In 1916, he went to the Harvard Law School where he was made a professor in 1919. He was among the first to protest against the violation of the constitutional liberties of American citizens in the years following the War, being, in particular, a severe critic of the practices of the Department of Justice under A. Mitchell Palmer. In company with Dean Pound and Felix Frankfurter of the Harvard Law faculty, among others, he helped evolve a sociological point of view toward the law. He wrote: *Cases on Negotiable Instruments; Freedom of Speech.*

CHALIAPINE. French transliteration for SHALIAPIN (q.v.).

CHAMBERLAIN, CLARK WELLS (1870-). An American physicist, born at Litchfield, Ohio. He was graduated at Denison in 1894 and then studied as a fellow at Chicago, and at Columbia. In 1900-01, he was professor of physics and astronomy at Colby, then held the chair of physics at Denison (1901-08), and a similar chair at Vassar (1908-13). He was then called to the presidency of Denison. His original investigations have included studies on the radius of molecular attraction, achromatization of interference, and the relative motion of the earth and ether; he devised a compound interferometer, a diffractometer, and a spectroscope of high resolving power.

CHAMBERLAIN, GEORGE EARLE (1854-). An American senator (see VOL. V). He was reelected senator for the term of 1915-21, and became a member of the United States Shipping Board for the term 1921-25. He was the author of the Chamberlain Military Preparedness Bill of 1918.

CHAMBERLAIN, HOUSTON STEWART (1855-). A German writer (see VOL. V). Since 1914, his works include: *Lebenswege meines Denkens* (1919); *Mensch und Gott; Betrachtungen über Religion und Christentum* (1921).

CHAMBERLAIN, JOHN LOOMIS (1858-). An American army officer, born in New York. He was graduated at the United States Military Academy in 1880, entered the army as second lieutenant in the First Artillery, and continued in the military service until his retirement in 1921 as a major-general. He served in the Spanish-American War of 1898-99 as chief ordnance officer with the rank of

major of volunteers; in the campaign against the Sioux Indians in 1900-01; in the campaign against the Moros in the Philippines in 1903; and after his transfer to the Inspector-General's Department continued in that service until his appointment in 1921 as Inspector-General in which capacity he served during the War, inspecting the American Expeditionary Forces in France in 1918. For "exceptional meritorious service" he received the Distinguished Service Medal. General Chamberlain was a graduate of the Artillery School in 1890 and of the Army War College in 1913, and was military attaché to Austria in 1897-98.

CHAMBERLAIN, (JOSEPH) AUSTEN (1863-). A British statesman (see VOL. V), son of Joseph Chamberlain. In the Coalition government after the outbreak of the War, he was Secretary of State for India. Because of criticism of the lack of medical preparation for the advance on Bagdad, he resigned, although he knew nothing about the matter until too late for it to be remedied. He again took office in 1918 under Lloyd George as minister without portfolio, and later was appointed for the second time Chancellor of the Exchequer. The budget he introduced in 1919 reduced by one-sixth the duties on articles from the colonies, thus making the principle of Imperial Preference, which had been in his father's programme fifteen years before, a regular part of the British financial system. Later in the year he issued the Victory Loan. By increasing the excess profits duty to 60 per cent, and introducing a corporation tax, he was able to balance the budget in his second year and to make a large payment on the national debt. On account of commercial depression, this debt payment was criticized. When Mr. Bonar Law resigned the Unionist leadership on Mar. 17, 1921, Mr. Chamberlain was unanimously chosen leader of the party. He became leader of the House of Commons and was given the office of Lord Privy Seal, Sir Robert Horne succeeding him as Chancellor of the Exchequer.

CHAMBERLIN, THOMAS CROWDER (1843-). An American geologist (see VOL. V). From 1898 to 1914, he was president of the Chicago Academy of Sciences. His later books include *The Origin of the Earth*, 1916. He was for many years editor of the *Journal of Geology*. **CHAMBER MUSIC.** See MUSIC, *Chamber Music*.

CHAMBERS, EDWARD (1859), an American railway official, born in Waukegan, Ill. He began his railway service with the Atchison, Topeka and Santa Fé Railroad in 1878. He served in many important capacities with that road. He was assistant freight traffic manager for the coast lines and vice-president of the road from 1905 to 1917, when he resigned to become director of transportation of the United States Food Administration and the United States Grain Corporation. He was director of the Division of Traffic for the Federal Railway Administration from 1918 to 1920, and was also a member of the War Industries Board. He was appointed vice-president in charge of traffic for the Atchison, Topeka and Santa Fé Railroad in 1920.

CHAMBERS, ERNEST JOHN (1862-). A Canadian journalist and author (see VOL. V). In 1914, he was appointed censor at military headquarters in Ottawa, and the following year became Chief Press Censor for Canada. In the

latter year he was also made a lieutenant-colonel in the Canadian Army.

CHAMBERS, ROBERT WILLIAM (1865-). An American author (see VOL. V). His later books include: *The Dark Star* (1915); *The Restless Sex* (1917); *In Secret* (1918); *The Crimson Tide* (1919); *Slayer of Souls* (1920); *Little Red Foot* (1921); *America* (1921). He was a member of the National Institute of Arts and Letters.

CHAMBERS, WILL GRANT (1867-). An American psychologist born in Westmoreland Co., Pa. He was educated at Lafayette, Clark, and Chicago Universities. After his graduation, he was professor of mathematics in the State normal schools of Pennsylvania and Minnesota. In 1909, he became professor of education at the University of Pittsburgh, and in 1910, dean of the School of Education at that institution. His professional contributions included papers on genetic psychology, the evolution of ideas, memory types, individual differences, and correlation of character traits.

CHANDLER, WILLIAM HENRY (1878-). An American pomologist, born at Butler, Mo. He was graduated from the University of Missouri in 1905 and took postgraduate courses in that institution. Until 1910, he was assistant horticulturist at the University of Missouri, instructor in 1910-11, and assistant professor from 1911 to 1913. In the latter year he became professor of pomology at Cornell University, and in 1920, vice-director of research. Professor Chandler wrote on plant tissues and temperature, fruit and fertilizers, pruning, etc.

CHANLER, AMÉLIE RIVES (See RIVES, AMÉLIE).

CHANNEL ISLANDS. See GREAT BRITAIN.

CHANNEL TUNNEL. See TUNNELS.

CHANTEPLEURE, GUY (MADAME EDGAR DUSSAP, née JEANNE VIOLET) (1875-). A French author, born in Paris. Three of her works have been crowned by the French Academy. She is the author of: *Ma Conscience en robe rose* (crowned by the Academy; published in 1895, and subsequently); *Le Château de la Virgillesse* (1900, and subsequently); *Fiancée d'Avril* (crowned by the Academy, 1900); *Mon Ami l'oiseau bleu* (1900); *Les Ruines en Fleurs* (1901, etc.); *Amea féminines* (1902); *Le Sphinx blanc* (1903); *Le Théâtre de la Primevère* (1904); *L'Aventure d'Huguette* (1904); *Le Baiser au clair de lune* (1908); *La Folle histoire de Fridoline* (1908); *Malencontre* (1910); *La Passagère* (1911); *Le Hasard et l'Amour* (1911); and *La Ville assiégée. Janina, octobre, 1912—mars, 1913* (crowned by the Academy, 1913).

CHAPLIN, CHARLES SPENCER (1889-). Leading comedian on the motion picture stage. He was born in London, England, and after varied experience in the theatre, made his début as a film performer in the United States in 1914, where he soon became the most familiar figure in screen productions. He starred in many pieces of his own creation, including *The Kid* (1920-21), which was highly popular with all classes. In 1921, he visited Europe, where he received a popular welcome almost without precedent. He established a motion-picture plant at Hollywood, Cal.

CHAPMAN, CHARLES EDWARD (1880-). An American historian, born at Franklin, N. H., and educated at Princeton University, Tufts College, Harvard University, and at the

Universities of California and Seville (Spain). He was admitted to the bar in 1906, and thereafter was connected with the United Railways Company, San Francisco, and with the Western Electric Company, until 1909, when he became a teacher of history, first in the Riverside (Cal.) High School and afterwards in the University of California. In 1919, he was made associate professor of history in the University of California. His works include: *The Founding of Spanish California* (1916); *A Californian in South America* (1917); *A History of Spain* (1918); *A Catalogue of Materials in the "Archivo general de Indias" for the History of the Pacific Coast and the American Southwest* (1919); and *A History of California; the Spanish Period* (1921).

CHAPMAN, CHARLES SHEPARD (1879-). An American artist born at Morristown, N. Y., who studied with Chase and W. Appleton Clark. He was elected Associate Member of the National Academy in 1919. Among his awards were the Saltus gold medal from the National Academy in 1917 and the Carnegie prize from the Academy in 1921. Chapman's work as a painter and illustrator has been on exhibition in various parts of the country and one of his best known canvases, "In the Deep Woods," is in the Metropolitan Museum, New York.

CHAPMAN, HERMAN HAUPT (1874-). An American forester, born at Cambridge, Mass. He graduated from the University of Minnesota in 1896 and took postgraduate courses at the Yale Forest School. From 1898 to 1903 he was superintendent of the United States Agricultural Experiment Station at Grand Rapids, Minn., and after a year in the United States Forest Service was, from 1906 to 1911, instructor and assistant professor at the Yale Forestry School. From the latter date he was Harriman professor of forest management at Yale. From 1913 to 1924, Professor Chapman was a member of the State Park and Forest Commission of Connecticut. He wrote *Forest Valuation* (1914), and *Forest Mensuration* (1921).

CHAPMAN, JOHN JAY (1862-). An American author (see VOL. V). He is the author of: *Homeric Scenes* (verse, 1914); *Memoirs and Milestones* (1915); *Deutschland über Alles* (1915); *Notes on Religion* (1915); *Greek Genius and Other Essays* (1915); *The Letters of Victor Chapman, with Memoirs* (1917); *Songs and Poems* (1919); *William Lloyd Garrison* (2d ed., revised and enlarged, 1921); and *Glance toward Shakespeare* (1922).

CHARCOT, JEAN MARTIN. See PSYCHOLOGY, ABNORMAL.

CHARDONNE, JACQUES (pseudonym of Boutelleau) (1884-). A French novelist. In his novel *L'Épithalame*, he tries to get away from the subjectivism, the "moi," of many of the psychological novels of the twentieth century, by describing the psychological reactions of a couple. His novel shows some influence of George Eliot's *Middlemarch* and of Tolstoi's *Anna Karenina*.

CHARITIES. During the decade under review (1914-24) was evidenced a decided change in the form, purpose, and organization of public relief. Up to the beginning of this period hundreds of societies, organizations, churches, etc., scattered throughout the various States and cities were doing their best to aid unfortunates. This resulted, in many cases, in confusion, duplication of effort, friction, and an

extremely high ratio between the cost of administration and the relief afforded. With the War came a concentration of effort in the distribution of charities. The various governments, national, State and local, adopted a paternalistic attitude in this field of endeavor just as that attitude was taken in such war enterprises as shipbuilding, munitions manufacturing, food control, daylight saving, fuel conservation, railway administration, etc. Bureaus were rapidly organized to carry on in a centralized and more efficient manner the work previously done by the many unrelated charitable organizations. The undoubted increase in efficiency, in results obtained, and in administration, caused the continuance and rapid growth of government aid after the war period ended. Generally speaking, it may be said that public relief was carried on by three distinct agencies, governmental and private organizations, and foundations. The first mentioned, as stated above, was becoming more and more important. For the various phases of organized public relief, in which the idea of "charity" had been supplanted by a theory of community protection, see CHILD WELFARE, MOTHERS' PENSIONS, JUVENILE COURTS, PENOLOGY, WORKMEN'S COMPENSATION, SOCIAL INSURANCE, OLD AGE PENSIONS, MINIMUM WAGE, HOUSING, WOMEN IN INDUSTRY, etc. It should be mentioned that many cities throughout the United States added charities bureaus to their governmental agencies, which supervised and correlated all the relief work carried on in the community. Huge foundations, privately endowed or supported, such as the Rockefeller Foundation, the American Society for the Control of Cancer, and the National Tuberculosis Society, continued to perform an important work in the advancement of public welfare. The subject of charities in its broadest sense cannot be closed without a reference to the activities of private organizations, depending on public contributions for existence, such as the Salvation Army, Y. M. C. A., Y. W. C. A., Red Cross, Knights of Columbus (q.v.). Receiving a tremendous impetus during the War, they continued to function on a much larger scale in the post-war period than before 1914.

CHARLES, ROBERT HENRY (1855—). A British divine and author (see Vol. V). In 1919, he was made Archdeacon. In the same year, he was Warburton Lecturer in Lincoln's Inn Chapel, and Schweich Lecturer in 1919-20. His more recent works include: *Religious Development Between the Old and New Testaments* (1914); *The Chronicle of John of Nikin, translated from the Ethiopic* (1916); *Sermons Preached in Westminster Abbey* (1917); *The Apocalypse, edited with Text, Translation, and Commentary* (2 vols., 1920); *The Teaching of the New Testament on Divorce* (1921); *Lectures on the Apocalypse* (Schweich Lectures, 1919, 1922).

CHARLES I, EMPEROR OF AUSTRIA AND KING OF HUNGARY (1887-1922). The last of the Habsburg rulers, successor of the Emperor Francis Joseph, was born Aug. 17, 1887, the eldest son of the Archduke Otto. He was little known until after his marriage with Princess Zita of Parma, in 1911. It is said that his parents endeavored to keep him away from harmful court influences and therefore sent him first to one of the large Viennese boys' schools. His military life had been spent not in the

capital but in distant garrison towns of the empire until the War, in which nominally he commanded the army that invaded Rumania. On the death of the Emperor Francis Joseph on Nov. 21, 1916, Charles proclaimed himself supreme war lord, and he and his consort were crowned King and Queen of Hungary in Budapest, December 30. During the War, he addressed a letter to his brother-in-law, Prince Sixte of Bourbon-Parma, which was published in April, 1918, and caused a great sensation. In it he asked the Prince to inform the French president secretly that Charles would support by all means the just claims of France on Alsace-Lorraine. The letter also proposed the restoration of both Belgium and Serbia. Before its publication its purport had been made known to the Berlin authorities, who naturally took great offense, and Charles publicly disavowed it. Count Czernin asserted that the text had been falsified. Among the Allies generally it was believed to be genuine. After the political and military collapse of Austria-Hungary on Nov. 11, 1918, Charles in a manifesto declared that he relinquished all part in the administration of Austria and recognized the decision of German Austria to form henceforth a separate state. Two days later he gave up the throne of Hungary. In March, 1919, he left Austria under British protection and took up his abode in Switzerland. The Austrian Parliament formally deposed him in April, 1919, and annulled all the sovereign rights and other prerogatives of the House of Habsburg in Austria. Charles made no attempt to regain the Austrian throne but was drawn into movements for the recovery of his Hungarian kingdom, where a strong Habsburg party remained. In March, 1921, he suddenly reappeared in Budapest; he was coldly received and he soon returned to Switzerland. Though carefully watched by the Swiss authorities, he succeeded in escaping by airplane in the autumn of 1921 for another adventure in Hungary. At this time the movement had arisen in the Burgenland owing to dissatisfaction over the transfer of that region to Austria. A fragmentary army gathered about him but again the attempt completely failed. These attempts made it evident that Switzerland was no longer a safe place for him and, with his wife, he was put on board a British warship on the Danube and taken to Madeira, where he arrived Nov. 19, 1921. He died at Funchal on the island of Madeira, Apr. 1, 1922.

CHARNWOOD, GODFREY RATHBONE BENSON, first BARON (1864—). An English historian, educated at Balliol College, Oxford. He was a member of Parliament from 1892 to 1895 and Mayor of Litchfield from 1909 to 1911. In 1916 he published a biography of Abraham Lincoln which was very favorably received in the United States and was considered an important addition to Lincoln literature. In 1923 he published an interpretative biography of Theodore Roosevelt.

CHARTERS FOR CITIES. See MUNICIPAL GOVERNMENT.

CHARTERS, WERRETT WALLACE (1875—). An American educator, born at Hartford, Ont., Canada. He graduated from McMaster University, Toronto, in 1898, and took postgraduate courses at Columbia University and at the University of Chicago. After teaching for several years in Canada, he joined the faculty of the State Normal School at Winona, Minn. From

1907 to 1917, he was professor of the theory of teaching at the University of Missouri, and was dean of the School of Education at that university from 1910 to 1917. He was professor of education at the University of Illinois from 1917 to 1919, and from the latter date was professor of education and director of the research bureau for retail training at the Carnegie Institute of Technology. From 1920, he was also research director at Stephens College. He was the author of *Methods of Teaching* (1910), *Teaching the Common Branches* (1913), and also contributed numerous bulletins and articles to educational journals. He edited many series of educational books.

CHATTERTON, EDWARD KERLE (1878-). An English author and journalist (see Vol. V). He entered the Royal Naval Volunteer Reserve as Temporary Lieutenant in 1914, and was promoted to the rank of Acting Lieutenant-Commander in 1918. He was in the Auxiliary Patrol Service in command of various ships (1914-17), and was on the staff of the historical section of the Committee for Imperial Defense (1917-21). His works during the decade include: *The Old East Indiamen* (1914); *The Romance of Piracy* (1914); *Q-Ships and their Story* (1922); and *Fore and Aft Craft and their Story* (1922).

CHATTERTON, RUTH (1893-). An American actress born in New York City. She made her stage debut in Washington, D. C., in 1909, as Polly Trippett in *Merely Mary Ann*. She came to New York, in 1911 and three years later first played Judy Abbott in *Daddy Long Legs* a part which made her famous throughout the United States. Other of her well known characterizations include: Olivia Dangerfield in *Come Out of the Kitchen* (1916); Mrs. Calthorpe in *Perkins* (1918); Comtesse de Candale with Henry Miller in *A Marriage of Convenience*; Judith Baldwin in *Moonlight and Honey-suckle* (1919); Mary Rose in the play of that name (1920).

CHÂTEAU-THIERRY. See WAR IN EUROPE, *Western Front*.

CHAUTAUQUA INSTITUTION. An organization founded in 1874 at Chautauqua, N. Y., conducting an annual series of lectures and entertainments called the general assembly, a six weeks' summer school and home reading circle. A campaign in 1919-20 to clear the Institution of debt raised \$400,000. A golf clubhouse was built in 1921. By an arrangement made in 1923 the department of education of the summer school was carried on by New York University and credit given in the University to all students successfully completing the work. From 50,000 to 60,000 persons attended the general assembly each year throughout the decade 1914-24; about 3500 attended the summer school, which had 18 departments offering 225 courses; and 12,000 subscribed to the home reading courses. The jubilee year 1924 witnessed the construction and dedication of a new Hall of Missions, a new dormitory for the summer school students, and the A. M. Smith-Wilkes Memorial Lecture Hall.

CHEESE. See DAIRYING.

CHELMSFORD, FREDERIC JOHN NAPIER THURLOW, VISCOUNT (1868-). A British public official. He was educated at Oxford. He became a member of the London County Council, 1904-05. He was governor of Queensland from 1905 to 1909, and of New South Wales

from 1909 to 1913. In 1916, he was made Viceroy of India, retiring from that office in 1921. He was a Conservative in politics, and much surprise was felt when he was asked to take the place of First Lord of the Admiralty in Ramsay MacDonald's Labor cabinet early in 1924. He accepted the post, however, as he found himself in accord with the new premier's policies.

CHEMICAL AFFINITY. See CHEMISTRY, PHYSICAL.

CHEMICAL WARFARE. The active beginning of the use of toxic gas in the World War dated from Apr. 22, 1915, when chlorine was released by the Germans in an attack against the French and British lines in the northeastern portion of the upper Ypres salient (see WAR IN EUROPE). This was indeed a momentous step for the Germans, as it introduced into civilized warfare a new weapon which led to new tactics of offense and defense.

The importance of the use of toxic gas in modern warfare is shown by the fact that during the year 1918, from 20 to 30 per cent of all the American battle casualties were due to it, but there was the compensating feature that where armies were supplied with masks and other defensive equipment only about 3 or 4 per cent of the gas casualties were fatal as compared with 20 to 25 per cent for those wounded by high explosive shells, shrapnel, bullets, etc. By far the greater part of the gas casualties resulted from the gas projectiles fired by field artillery, which in the British Army reached the great total of 170,000. In fact it was estimated that 90 per cent of the total gas casualties could be thus accounted for, notwithstanding the heavy losses at the first attacks in 1915 among troops quite unprepared when cloud gas was released from cylinders. But trusting to air currents to carry the gas was not satisfactory, and it was charged into projectiles which could be fired from guns, howitzers or mortars.

The use of lethal shells began in 1916 and these projectiles charged with deadly gases were used in addition to the lachrymatory gases. The three main killing gases used in chemical warfare were phosgene, diposgene, and chlorpicrin. Their use made improved masks or respirators essential, and it was a constant contest between developing new toxic gases and finding adequate protection against them.

Chlorine was the first gas to be used and after it had been allowed to escape from cylinders, it was found that in its liquid form it could be filled into shells, which, discharged from regular field pieces, would be detonated in the usual way by a fuse and booster charge and small bursting charge of high explosive. Chlorine is a greenish yellow gas of strong suffocating odor which commercially is used for bleaching and purification of water supplies. By cold and pressure it is liquefied for storage and transport. At Ypres the Germans permitted this gas to float out but they were insufficiently supplied with it, and also with means of protecting themselves so that they were afraid to advance through it.

Phosgene, a gas formed by the combination of chlorine and carbon monoxide in the presence of a catalyzer, is a colorless gas that liquefies at 8° C. It was one of the deadliest gases used during the war and was employed not merely to annoy or to compel the wearing of masks but to kill as many as possible. It was often used in

an attack as it did not persist long in the air or on the ground after the explosion of the shell, and as a result it would clear away by the time that the oncoming troops reached the place of gas concentration.

Chlorpicrin, a gas that is an active poison and in addition a lachrymator or tear producer, is made by the reaction between picric acid or calcium picrate and chlorine. It is a colorless liquid that boils at a temperature of approximately 112° C, and the gas while not so poisonous as some of the toxic gases nevertheless was quite efficient. This after chlorine was the first war gas to be made on a large scale in the United States.

Mustard Gas, *Dichlorethyl Sulphide*, was introduced by the Germans in July, 1917, at Ypres and immediately became a most effective agent in gas warfare. It also proved a boomerang for the Germans, as they never were able to improve their original facilities for manufacture which could not produce more than 6 tons per day at the end of the war. At that time France and England had improved methods and quantity production, while the United States had 10 times the German capacity at the time of the Armistice. This gas, it is interesting to note, was prepared by the Germans by the method originally described by Victor Meyer and later developed in Emil Fischer's laboratory. Mustard gas is a colorless, slightly oily liquid boiling at 220° C. with some decomposition and freezing at 14° C. or below, the former temperature applying to the pure liquid. Mustard Gas was not necessarily fatal except in sufficient amounts and it acted on the skin like a deep burn. It attacked the lungs, the eyes, the skin and even the intestines. It blistered the skin and produced nausea thus requiring the removal of the mask. It had a delayed action and often a man might be gassed even fatally before he was aware of it, and then he was beyond the reach of treatment. Ground soaked with mustard gas remains impregnated for days continually giving off the vapor.

Diphosgene, or *Superpalite*, *Perchlormethyl formate*, was extensively employed by the Germans as was *Diphenylchlorarsine*, their blue cross gas, which produced sneezing and a disagreeable temporary sickness. The latter gas was not considered by the Allies very efficient though made by the Germans in large amounts. *Diphenylcyanarsine* and *Ethyl Dichlorarsine* were also employed by the Germans.

Lachrymatory or tear gases were extensively used during the World War by both sides in order to annoy and cut down the efficiency of the enemy and most of all to compel him to keep masked continually. This form of gassing was cheaper than the use of poison gas and even a trace of tear gas in the air would blind a man temporarily. In fact a single tear gas shell could distribute its charge so widely as to require the wearing of masks over an area so wide that from 500 to 1000 phosgene shells would be needed for the same effect. The tear gas was irritating to the membranes of the eye, and so far as it alone was concerned goggles might suffice for protection, but the usual practice was to mix it with deadlier gases. Most tear gases had bromine as a base, the bromine being derived from subterranean brines, and the gas could be used alone, but such combinations as brombenzyl cyanide were made, the one speci-

fied being extensively produced in the United States.

In addition to the gases mentioned others were employed and new toxic materials were developed during the war by organic and physiological chemists. Much was accomplished that was never revealed, and had the war continued another year the annihilation of the Central Powers by the discharge from aircraft of deadly gases produced in the United States and elsewhere was predicted.

Gas Masks. Naturally the use of gas immediately resulted in defensive measures. After the first attack by the Germans in 1915, extemporized masks and impregnated fabric helmets were rapidly developed in England and hurried to the Continent consisting merely of gauze pads soaked with neutralizing chemicals. Then came masks or helmets of a box respirator type first introduced by the British in August, 1916, where absorbing and neutralizing chemicals purified the air before it was inhaled by the wearer. An essential element of these respirators was the charcoal which had to be prepared with great care. Gradually the British and the Americans developed double protection masks which were efficient under all conditions. There were also protective suits and gloves to resist mustard gas.

Tactical Use of Gas. By 1917 the extensive and effective use of gas led to the development of special tactics both for attack and defense. Shells filled with gas and appropriately painted or striped to indicate the charge were issued along with shrapnel and high explosive. The kind of gas selected was determined by the nature of the plan or the military objective, all carefully considered especially with regard to the target and terrain. For example, in case of an advance, a gas that would disperse readily would be employed, or it might be that lanes would be left for the troops going up to seize or contest an objective. It must be remembered that while an ordinary high explosive or shrapnel shell exerts its effect immediately after the burst, that of a chemical shell has just begun and may even persist in the case of some of the chemical charges for a week or ten days. Furthermore, a bomb-proof shelter, safe against flying fragments, is no protection against a chemical shell whose fumes can pass around corners or sink into the ground.

The artillery during the War made a distinction between "lethal" and "neutralizing" projectiles and fire and this was the basis of the marking of the shell. The lethal shell is used to produce casualties and was employed against occupied positions for surprise effect, the object being to concentrate the greatest possible number of shell on the target in the smallest time, which should not exceed two or three minutes, as in that time gas masks can be adjusted and no further casualties should develop. In attacks of this kind phosgene is employed. With neutralizing shell or those filled with chemicals which are persistent and vaporize slowly, a slow searching fire is maintained scattered over the area to be neutralized. In other words the aim is to develop an atmosphere intolerable for unprotected troops, so that the artillerist seeks to find lines of communication, camps, rest billets, trench systems, cross roads, battery positions, and in short any point where troops are likely to be concentrated. The aim is to make them wear respirators, thus cutting

down their efficiency in using field or machine guns, in construction or supply work or the bringing up of transport. See CHEMISTRY, ORGANIC; STRATEGY AND TACTICS.

CHEMISTRY. Chemistry by the year 1924 had become a very different science from what it was ten years previously. It was realized that matter and energy no longer could be considered indestructible entities but are interchangeable. All matter is now regarded as of electrical nature and the atoms as more or less complex systems of electrons attached to very asymmetric associations of proton or helium ion. The various atoms with the same number of planetary electrons constitute a group which we know as a chemical element. These elements show varying chemical characteristics as they lie near or far, in atomic number, from a noble gas. Chemical theory, instead of being limited to the explanation of salts, acids and bases, is now widened to include the nonpolar compounds of electropositive elements with electropositive elements and of electronegative elements with electronegative elements. These are recognized as approaching the more absolute nonpolar characteristics of the compounds of the central elements, carbon, silicon, etc. The theory and use of catalysts and solvents was greatly extended and the existence of the enormous number of addition compounds in chemical reactions was recognized. Chemistry, instead of being a simple science of simple atoms and molecules is now recognized as a very complex science of very complex atoms and molecules, in which fields of force and radiation phenomena play a decisive part.

Matter and Energy. The great exponents of natural science in the nineteenth century attempted to work out the sciences of chemistry and physics in two separate compartments, chemistry as the science of matter and its transformations, physics as the science of energy and its transformations. This division was epitomized in the two great conservation laws, that of the conservation of matter and that of the conservation of energy. It was the task of the decade 1914-24 to disprove this supposed conservation of separate entities, and to show that matter and energy are not separate but interchangeable, that energy can be converted into mass and mass into energy. It was estimated by Aston that energy liberated by the change of the hydrogen in a glass of water into helium with consequent loss of mass would be sufficient to supply energy enough to run all the steam engines now in existence for 100 years.

The Difference in Energy, in Matter and Free State. The essential characteristic of matter is its mass. This is usually determined by its weight, or the attraction of the earth for a given substance compared with its attraction for an arbitrary unit of mass. It was shown by Kauffmann that the mass of an electron is purely its electrical mass, on account of the inertia of its electrical field. The same was shown true of the mass of a positive ion, the helium ion, as far as measurements can at present go. As all matter is made up of positive nuclei and electrons, the mass of a substance can therefore be taken as solely the summation of the electrical inertias of the electrical fields of its electrons and positive nuclei.

Electrical Constitution of Matter. The nineteenth century had attempted to explain the material phenomena of the visible universe

by an application of the laws of classical mechanics, founded on the spatial geometry of Euclid. More and more, this proved unsatisfactory. Particularly in radiation phenomena and the domain of chemical reaction, the mechanistic explanation was extremely unsatisfactory. Hence it was the task of science in the decade 1914-24 to rewrite the explanation of natural phenomena in terms of electrical concepts instead of those of mechanistic concepts. The reason for this change of basic concept of material science was twofold. First, the older mechanistic theory was shown to be inadequate in many important aspects; secondly, the electrical theory accounted for all the phenomena for which the mechanistic theory held good and in many cases where it failed. Not that the electrical theory did not bring with it problems of its own; to elucidate these will be the problem of the rest of the twentieth century.

Atoms and Molecules. Chemistry was the first of the sciences to discuss its subject matter as discontinuous. For many years the only supporting evidence as to the existence of discontinuous molecules was the kinetic theory of gases. But this kinetic theory was unable to account for the rapid increase in reaction velocity with increase of temperature. Hence in the first decade of the twentieth century arose a wave of skepticism as to the atomic theory. Evidence as to the existence of discrete molecules in gases and of atoms in liquids and solids arose rapidly from a number of various sources, so that we can now count and measure with a high degree of accuracy the atoms in the simpler compounds. Laue, Bragg and others demonstrated how the light waves of very short wave length and quite high frequency (X-rays) can be used to show the position of atoms in the spatial structure of a crystal and in pure liquids. Their work proved that chemical compounds have a definite spatial arrangement of the atoms, so that chemical combinations are primarily spatial arrangements of electrical fields of force.

Two Types of Chemical Compounds. The work of the decade under review emphasized the marked contrast between two types of chemical compounds, the polar and the nonpolar compounds. The polar compounds are those in which atoms of markedly different electrical characteristics are present. Each of these compounds at some temperature is a conductor of electricity. The nonpolar compounds are those of atoms of no great electrical dissimilarity and show extremely high resistance to the passage of an electrical current.

The Periodic System. It was early realized that the various elements distinguished by the analytical chemist had groups of marked similarities and dissimilarities. This led to many attempts to place the known elements into a consistent table or system which would satisfactorily arrange and contrast these varying characteristics. This whole endeavor was summed up by the periodic system of Mendeléeve, and his dictum that the properties of the elements are periodic functions of their atomic weights. But this periodicity is no simple function of the atomic weight, for successive elements of very nearly the same atomic weights, such as potassium 39.1, argon 39.88, calcium 40.07, show enormous differences chemically and physically, whereas other elements of quite different atomic weights, such as

praseodymium 140.9, and neodymium 144.3, are so nearly alike in all their chemical properties as to be of incredible difficulty in separation. Then again, in several instances, such as argon and potassium, nickel and cobalt, iodine and tellurium, the atomic weight arrangement is definitely wrong.

It began to be realized, therefore, that the position of the element in the periodic system is more important than its atomic weight. In 1913, Moseley, an English physicist, discovered that the various elements when struck by an electron with great velocity gave off two series of X-rays of high intensity. Each of these series has definite wave lengths such that certain whole numbers are inversely proportional to the square roots of these wave lengths. Assigning aluminium the number 12, the other elements all possess whole numbers corresponding to their position in the periodic table, with the weight anomalies connected. This number is therefore called the atomic number and is a more important property of elements than the atomic weight.

Isotopes. Prout, 100 years ago, attempted to account for the elements as polymers of hydrogen. But the irregularities in the atomic weights of a number of the elements seemed to disprove this theory. After it had been discovered that lead from two radioactive substances had a different atomic weight from that of ordinary lead, though it was of identical chemical and physical properties, Aston set to work to measure accurately the mass of individual atoms or ions. A number of charged atoms or ions moving at the same rate were subjected to magnetic and electrical fields, and then allowed to strike a photographic plate. If one element be taken as standard, say oxygen, the other charged atoms will strike the plate from short distances away in direct proportion to their masses. In this way it was discovered that the elements which support the Prout hypothesis, having atomic weights very nearly whole numbers, carbon, oxygen, nitrogen, all have atoms of only one atomic weight.

But the elements whose analytical atomic weights deviate markedly from a whole number are all mixtures of atoms of whole number atomic weights. The true atomic weights are therefore all whole numbers referred to proton as 1. Thus chlorine (35.46) is a mixture of three different chlorines of atomic weights 35, 37 and 39. These three chlorines have identical chemical properties and are therefore called isotopes, meaning "in the same place in the periodic system." Thus is confirmed what was indicated by Moseley, that the atomic weight of an element is a minor and variable factor in the chemical properties of an element, and that the atomic number is the true criterion of its properties.

Transformation of Elements. Aston's work showed that all atoms have atomic weights which are multiples of the weight of a proton or hydrogen ion. The conclusion to be drawn, that the elements are polymers of proton or hydrogen ion, was tested by Rutherford. He bombarded the elements with charged bodies moving at extremely high speeds, the alpha particles of radium C. The mass of the products of this impact can be measured by known methods. Rutherford has shown that the elements whose atomic weight is $(3+n \times 4)$ or $(2+n \times 4)$ all give hydrogen ions as products

of the disintegration of the atom. Hence it is definitely shown that some of the elements at least contain hydrogen ion in their positive nucleus. The others appear to contain an isotope of the helium ion with atomic weight of three.

Shape of the Positive Nucleus of the Atoms. From the ratio of the number of impacts which disrupt atoms to the number of alpha particles used, Rutherford showed that the positive nucleus must be a very thin disk, not a round sphere. The atoms are therefore quite asymmetrical, not at all the spherical, symmetrical, inert particles postulated in the kinetic theory. This extreme lack of symmetry in the atom probably accounts for many of the discrepancies between the kinetic theory and actual fact.

The Electronic Theory of the Atom. Two theories based on the above data have attracted great attention as possible explanations of the electronic structures of the atom. One was proposed by Bohr, a pupil of Rutherford, the other by the American chemists Lewis and Langmuir. In the Bohr theory the electrons are whirling about the positive nucleus, as the earth and the planets circle in ellipses about the sun. These electrons, contrary to classical mechanics, emit no energy in their elliptical orbits. But when the system absorbs or emits energy, it does so by an electron jumping at once to a new elliptical orbit, and in so doing emitting or absorbing a definite unit or quantum of energy.

In the Lewis-Langmuir theory, the electrons are taken as approximating some position away from the nucleus and not encircling it. They are held away from the nucleus by a repulsive force. These attending electrons, for some unknown reason, show a great tendency to assume a cubical character by borrowing or losing one or more electrons. The electrons can be received in two ways; first, by taking them wholly into the cubical system of the electronegative atom, so as to give the electronegative atom a negative charge; and correspondingly, by loss from an electropositive element to leave a cubical electronic structure with a positive charge. In this way the polar compounds originate by the union of the electropositive and electronegative ions thus formed. Secondly, two electrons can be shared by two atomic cubes, so that these pairs of electrons are integral parts of two atoms at the same time. In this way the nonpolar chemical compounds are formed.

Both of these theories of atomic structure have their successes and their failures in interpreting the complete phenomena of matter. The Bohr theory has worked almost entirely on the separate atoms of pure elements at high temperatures and has been a success mainly with the simpler elements, hydrogen and helium. The Lewis-Langmuir theory has been worked out mostly with chemical compounds at ordinary temperatures. It is probable that both theories are more or less correct in their own special fields. Angarde has called attention to the fact that electrons moving rapidly in extreme elliptical orbits around a nucleus at one focus will act in many ways as if they were stationary at the other focus of the ellipse.

Polar and Nonpolar Compounds. If the visible universe were made up of uncombined elements, it would be a very simple and easily analyzable order of natural phenomena. In-

stead, an almost infinitesimal part of the world consists of simple elements; the rest is made up of compounds, which, as was said, fall into two general types, the polar and the nonpolar compounds. The polar compounds are primarily those of elements lying near the noble gases but on opposite sides of these gases in the periodic system. The nonpolar compounds are primarily of the elements which, lying midway between the noble gases, are therefore neither highly electronegative nor highly electropositive. The most important of these central elements are carbon and silicon. Carbon compounds are the skeleton on which the chemistry of life is built. (See ORGANIC CHEMISTRY.) Silicon complexes are the basis of geology and will be discussed under that heading. The chemistry of the other central elements, such as titanium, is too little known to warrant discussion. The compounds made up of elements of like electrical character as well as those of the central elements are also probably nonpolar in character.

The Compounds of Electropositive Elements with Electropositive Elements. These include the intermetallic compounds or the alloys. These compounds have been enormously developed for special purposes in the last ten years. The success of the automobile is mainly due to the increased efficiency and consequent cheapening of automobile parts by the use of special alloys. Magnesium alloys, lighter than wood, are used for pistons; aluminum-bronze alloys replace steel in countless ways with saving of weight and increase in strength. The aeroplane engine has increased its efficiency mainly by increasing the ratio of horse power to engine weight by the use of special alloys. See AÉRONAUTICS.

The War gave great impetus to the use of special alloys. The enormous production of war material would have been impossible without the use of high temperature steels, most of whose improved formulas have been developed in the last decade. Noncorroding alloys are the basis of the electrical heating apparatus industry.

The Compounds of Electropositive Elements with Electronegative Elements. These compounds form the main corpus of inorganic chemistry. They comprise the acids, the salts and the bases. The work of Laué, Bragg, and others during this decade has demonstrated the spatial configurations of these compounds when crystalline. The results in general confirm the postulates deduced from chemical reactions. Every solid crystal or fragment of a crystal is a single molecule made up of repetition of the type-molecule or crystal cell. The position of the atoms in many of the simpler compounds is now quite accurately known through X-ray measurements.

Many improvements in the preparation of this polar type of compound were worked out during the decade by the application of improved scientific methods, such as the phase rule, to industry. The utilization of steel mill slag for the production of high-grade cement is a characteristic example of the utilization of by-products, hitherto useless, for the preparation of a valuable new product. The use of thorium oxide on the filament of a radio tube is an instance of the utilization of the newly discovered properties of a well known compound.

Compounds of Electronegative Elements with Electronegative Elements. It is said

that the German authorities were unwilling to risk a major war until Haber had demonstrated that nitrogen oxide compounds could be successfully produced in large quantities within the confines of the German Empire, from the nitrogen of the air. This so-called fixation of nitrogen has proceeded along two lines, the formation of nitrogen oxide and the formation of ammonia. The enormous development of the water power of the Tennessee River at Muscle Shoals, Ala., was to be devoted largely to the production of nitrogen compounds for use as soil fertilizer for the American farmer. Twenty years ago Crookes uttered his warning that the world's food was being seriously threatened by the shortage of nitrogen compounds. Developments of the decade 1914-24 definitely removed forever this possibility of a nitrogen famine.

The rival cyanide process by which calcium carbide is allowed to absorb pure nitrogen held promise mainly in the development of cyanide products and similar compounds of carbon and nitrogen. It was developed largely in America, at Niagara Falls.

The oxidation of sulphur dioxide to sulphur trioxide by atmospheric oxygen in the presence of a platinum catalyst has been one of the triumphs of catalytic chemistry. During the last decade this process almost entirely superseded the old chamber acid process.

Solution and Catalysis. An enormous development of the use of catalysts was brought about. The most important catalyst is still water. It has been shown that the removal of the last traces of water after years of patient dehydration materially changes the physical properties of many well known substances. The formation of most polar compounds is inhibited by the absence of water. But the formation of nonpolar compounds is generally promoted by the absence of water. Thus water is both a catalyst and an anticatalyst. Both in water-present and water-absent systems, many new catalysts have been found which promote the reaction desired. For instance, secondary propyl alcohol, formerly a laboratory curiosity, is now being produced in ton lots by the action of sulphuric acid on the gas propene from the cracking of crude petroleum, in the manufacture of gasoline by pressure distillation.

Poisoning of Catalysts. The greatest obstacle to the effective use of catalysts is the ease with which they are poisoned or rendered ineffective. Much research was done in the mechanism and prevention of poisoning. Langmuir showed that a layer of oxygen one molecule deep is absorbed on the surface of a metal so firmly that it remains even when the metal is heated red hot. Poisoning thus probably consists of the absorption of molecules on the surface of the catalyst too firmly to be removed, with consequent decreasing in the effective surface of the catalyst. By finding out and removing beforehand the poisoning substances, the life of a catalyst can be indefinitely prolonged.

Compound Formation with Catalysts and Solvents. The mechanism of compound formation in the presence of catalysts and solvents engaged the attention of many investigators. In many cases the formation of compounds between the reacting substances and the catalyst or solvent can be demonstrated, but whether these be essential or detrimental to the desired

reaction was not settled. Much was done in determining the energy threshold of reactions and its relation to absorbed radiation, but the many questions are not settled as yet.

The Radio-active Elements. If the elements are structures of associated proton and planetary electrons, each group being of increasing complexity as atomic number increases, it would be expected that the point would soon be reached where the atomic structure would be unstable and would slowly or rapidly break down. That this is a fact with regard to the most complex element, uranium, was discovered by Becquerel and Rutherford. Mme. Curie discovered the element radium and its emanation. Soddy, Rutherford and others have explored this field until the path of the degeneration of atoms by the loss of electrons or helium ions from uranium or thorium to lead was accurately known. See RADIUM AND RADIO-ACTIVITY.

The Inert Gases. Production of Helium. The production of helium by liquefaction of natural gas has now assumed commercial proportions, since some natural gas, as from the Texas field, contains as much as 2 per cent of helium. One volume of helium will prevent the ignition of over five volumes of hydrogen, so that a mixture of 85 per cent hydrogen and 15 per cent helium is noninflammable. The new American dirigible *Shenandoah* has proved under trying conditions the reliability of this balloon gas. (See AERONAUTICS.)

Neon. Neon is now used in the preparation of display lighting tubes. These lamps give a very brilliant crimson colored light and are used extensively in theatre advertising, etc. Astor recently examined the last fractions from the distillation of 800,000 pounds of liquid air for possible new inert gases. By means of his "mass spectrograph" he determined that any new inert gas cannot be present in the atmosphere to an extent greater than 1 part in 2,000,000,000,000.

The Alkali Metals. Hydrogen. An immense amount of work has been done on hydrogen in connection with the electronic structure theories of Rutherford, Bohr, Lewis, and Langmuir. The kinetic theory of Bohr is very successful in many ways with the hydrogen atom but does rather poorly with the hydrogen molecule.

Activated Hydrogen. Hydrogen prepared by the decomposition of a metallic hydride, such as sodium hydride, appears to be in an activated condition, as it combines directly with nitrogen to form ammonia and with cold sulphur to form hydrogen sulphide, reactions which do not occur with ordinary hydrogen gas. This unusually reactive type of hydrogen opens up possibilities of more direct syntheses of these important hydrogen compounds, such as ammonia.

Hydrogen Anion. Bardwell succeeded in electrolyzing a solution of calcium hydride in a molten eutectic mixture of lithium chloride and potassium chloride. He proved that the hydrogen was obtained at the anion. In these hydrides hydrogen is thus a negatively charged ion, the first member of the seventh group rather than the first. X-ray diffraction photographs show that crystals of lithium hydride contain lithium cations and hydrogen anions. Such crystals are completely analogous to sodium chloride. Thus the capacity of hydrogen to act as a member of the chlorine group has been completely demonstrated.

Potassium Salts. The world needs a con-

tinuous supply of these salts for the maintenance of soil fertility. Heretofore the supply of these salts has been mainly derived from the enormous deposits in Alsace. In 1922 no less than 1,326,727 tons of potash were produced from them. A serious competitor of the Alsatian fields has been developed in the leucite industry in Southern Italy. This material is a large constituent of the lava from Italian volcanoes and contains 21.5 per cent of potash. It is estimated that these Italian deposits contain no less than 8,786,000,000 long tons of potash; this makes them the greatest accumulation of potassium silicates known.

The Alkali Earth Metals. Calcium Phosphate. The second requirement for maintenance of soil fertility is an abundant supply of phosphoric acid and to a lesser extent of calcium salts. In the United States large deposits are being worked in the southern States, especially in Florida. In the Pacific Ocean a number of the South Sea islands have been found to contain large deposits of this valuable material. These are being worked by both Australian and Japanese interests. (See PHOSPHATE.)

Lithopone. This mixed pigment of zinc sulphite and barium sulphate is being used in enormous quantities in the paint and other industries. Microscopic examination has shown that the particle of this material is not mixed crystals but rather crystalline agglomerates. Their most typical form is a thin diametrical cross similar to that of the "jacks" with which children play. (See ZINC.)

Magnesium in Industry. The use of cast magnesium is spreading rapidly in industries where lightness is an important factor. For instance, cast magnesium piston-rods are an accepted practice in automotive gasoline engines.

Calcium Deficiency in Disease. It is being realized more and more that many diseases, particularly of the rickets type, are traceable in large part to a calcium deficiency in the body. Yet the administration of calcium salts, such as calcium lactate, is useless unless at the same time the skin of the whole body is exposed to the full action of the sun's rays. Then and then only is the calcium assimilated.

The Trivalent Elements. The use of boron compounds as mild antiseptics has spread largely, particularly in the form of the perborates. These have been shown to contain linkages quite analogous to hydrogen peroxide.

Aluminum Alloys. The use of aluminum alloys is an important factor in the automobile industry. The use of cast or open aluminum for household and kitchen utensils has spread widely in the 10 years from 1914 to 1924. The use of light aluminum-magnesium alloys is of great promise in the aeroplane field. They have not so far realized the high hopes raised for them, but continued research will obviate in time their drawbacks and intensify their strong points. Many of these alloys are lighter than water. See AERONAUTICS and ALUMINIUM.

Aluminum Salts. The clarification of water is now almost universally accomplished by the precipitation of aluminum hydroxide by the addition of a calculated amount of aluminum sulphate. Much work has been done in aluminum hydroxide, and the hydrogen concentration most favorable to complete precipitation has been carefully studied. It has also been shown that there are probably many aluminum hydroxides. These vary considerably both in physical and

chemical characteristics according to their method of preparation. The salt, ammonium aluminate, has been prepared. This salt, of a very weak base and a very weak acid, would be expected to be hydrolyzed almost completely in water solution. Instead it is surprising to note that Heyrovsky found it quite stable in solution.

The Quadrivalent Elements. The development of carbon compounds is discussed elsewhere. See CHEMISTRY, ORGANIC.

Silica Gels. The finely divided silica gels have shown wide usefulness in industry. Traces of ether, alcohol, and sulphur dioxide will be completely absorbed by this reactive colloid. It is also being used in the purification of gasoline from the cracking processes and in the removal of sulphur from petroleum products.

Titanium in Glass. Much work has been done recently on the use of titanium oxide in glass. It makes a glass superior to either the lime or the magnesia glasses. At the same time it gives a high thermal endurance, and consequently it is being used largely in the production of heat-resisting glasses.

Diffusion of Gases through Fused Silica. R. C. Burt, J. Johnsen, G. A. Williams, and others have recently studied the diffusion of gases through transparent silica. Hydrogen diffuses through fused silica even at room temperature at high vacuum. At 500° C. the diffusion of helium through fused silica is 22 times that of hydrogen.

The Quinivalent Elements. Ammonia. About 1910 the most serious problem before the world was the rapid exhaustion of the mundane supply of combined nitrogen. The work of the last 10 years has solved this problem. The names of Haber and Nernst will always be linked with this effective attack on an important problem by advanced thermodynamic investigations. Schulback and Ballauf (*Berichte*, vol. iv, 1921) have prepared free ammonium, NH_4 , in about 50 per cent yield by the addition of a 1.8 per cent solution of potassium in liquid ammonia to a 1 per cent solution of ammonium chloride in liquid ammonia at -70° C. Much work has been done on the selection of the proper catalyst for the oxidation of ammonia to nitric acid. Manganese, platinum, iridium, etc., have been chiefly used as catalysts, giving efficiency well over 90 per cent. Hydrogen phosphide is a serious poison for the platinum catalyst. As little as 0.00002 per cent will reduce the oxidation 30 per cent and is very difficult to remove.

Phosphorus. Much attention has been given to the fine grinding of phosphatic slags for fertilizer purposes. It is realized more and more that the more surface is exposed to the action of soil agents, the more available will the slag constituents be, so that even a very low phosphate slag can be made available if ground sufficiently fine.

The Oxygen Group. Pure Hydrogen Peroxide. Maass and Hatcher (*Journal of the American Chemical Society*, vol. xlii), have prepared chemically pure hydrogen peroxide. When free from water it is quite a stable substance. Electrolytes dissolve in it quite readily and ionize to approximately the same degree. It is much more diamagnetic than water and hence does not contain the molecular linking characteristics of molecular oxygen.

Ozone. Liquid ozone is only partly unstable

with liquid oxygen and can be separated from it by fractional distillation. The pure ozone so obtained does not appear to contain any other polymer of oxygen. Ozone oxidizes nitrogen tetroxide instantly to the pentoxide, the end of this reaction being indicated sharply by the disappearance of color, so that a true titration of one gas by another can be performed. Ionized air is now being exclusively used in many industries; for instance, it is being used to kill molds and yeasts in the preservation of food stuffs. It is also being used in the manufacture of linoxyn for linoleum from linseed oil.

Sulphur. The use of molecular sulphur as an insecticide has increased of late years. When the soil is inoculated with a bacterium which can oxidize sulphur, the addition of sulphur is effective in controlling a number of plant diseases.

Vulcanization of Rubber. The vulcanization of rubber by heating it with molecular sulphur is still being studied with the greatest diligence. The evolution of "accelerators" which markedly hasten vulcanization has transformed the whole rubber industry. Twiss has studied the effect of various forms of molecular sulphur and finds they all vulcanize rubber equally well. Molecular selenium has been tried as a vulcanizing agent and acts rather poorly.

Selenium Oxychloride. This remarkable compound is a solvent for the most diverse types of material. Most of the metals are attracted by it with the formation of the corresponding metal chloride. The solution of molybdenum trioxide in selenium oxychloride shows a striking photochemical reaction. On exposure to bright light it rapidly becomes blue. On removing the light the solution regains its original pale yellow color in a few hours. Selenium oxychloride activates retorted carbon, markedly increasing its absorptive power.

Halogen Group. Chlorine. Liquid chlorine is now used in enormous quantities in the sterilization of water supplies. No other method has been found so reliable and certain. To-day the water supply of practically every large city is chlorinated before delivery to the user.

Iodine. The abundant fresh water of the Great Lakes District of the United States has succeeded in removing practically all the iodine from this territory. Hence it was found that practically whole communities in Wisconsin, Michigan, etc., were afflicted with goitre. This has been obviated by adding small amounts of iodine salts to the drinking water supply, to the salt sold in such districts, etc. In this way an alarming situation has been remedied. See CHEMISTRY, ORGANIC; CHEMISTRY, PHYSICAL.

CHEMISTRY, ORGANIC. Organic chemistry is that part of the science dealing with the chemical constituents of living matter and its products, actual or potential. As far as can be known, life processes always depend on the presence of a carbon skeleton. Just as the chemistry of geology is largely the chemistry of the symmetrical element silicon, so life chemistry is the chemistry of the symmetrical element carbon. The organic chemist has been separated from his inorganic confrère by two characteristic convictions: first, that the molecules he dealt with had a definite discoverable spatial arrangement of the constituent atoms, and secondly, that his reactions were the interaction of molecules, not, apparently, of charged ions.

The recent work in many separate branches of natural science has shown that the organic chemist's convictions were justified. The work of Langmuir on thin films of organic substances and of Laué, Bragg, and others on crystal structure have shown that there is ample first hand evidence for the spatial chemistry of carbon compounds. The work of the physicists on the resonance potentials of molecules has shown that there are all types of activation of atoms between the charged ion and the inert state of molecules. Hence there is no reason to limit chemical interactions solely to this extreme state of the charged ion.

But even in this less definite activation of organic complexes, the physical chemical laws deduced from ionic systems seem to hold to a large degree. Nelson and Conant both have found that oxidation and reduction potentials are just as definite in organic equilibria as in inorganic. In the same way, the phase rule, the law of mass action and other generalizations of physical chemistry (q.v.) have been shown to hold largely in organic equilibria. But it should be remembered that conditions which obtain in water systems do not necessarily dominate likewise in organic equilibria. For instance, it has been shown by the work of Reed, Norris, and others that in the esterification of organic acids, the carboxylic acid acts definitely as a base, losing hydroxyl rather than hydrogen. The same reversal of electrical character is to be noted even with so strong an acid as sulphuric acid in the sulphonation of benzene. Thus it is demonstrated that no chemical compound is exclusively an acid or a base; all are amphoteric, and the basic or acidic character depends on the system surrounding the molecule in question.

Then again it is seen very strikingly that the capacity of an atomic complex to become a stably charged ion depends on the degree to which the charged atom is loaded with heavy substituting groups. Thus NH_4^+ is a very instable and sensitive ion, whereas the corresponding tetramethyl ammonium ion $(\text{CH}_3)_4\text{N}^+$ is quite stable. NH_4OH is a very instable compound and a comparatively weak base. $(\text{CH}_3)_4\text{NOH}$ is a stable compound and as strong a base as potassium hydroxide itself. The same phenomenon is seen in the ion triphenylmethyl. The ion CH_3^+ is so instable as to be undetectable, whereas the substituted ion $(\text{C}_6\text{H}_5)_3\text{C}^+$ is quite stable as ions go. The same phenomenon has been discovered in other heavily substituted complexes, such as $(\text{C}_6\text{H}_5)_3\text{N}$ and $(\text{C}_6\text{H}_5)_3\text{P}$.

Purely organic research can thus throw light on the mechanism of ion formations and the vexed question of strong electrolytes. It was in carbon complexes that the celebrated quantum theory of Planck received its first notable confirmation. Einstein, the author of the celebrated relativity theory, showed that the specific heat curve of carbon agreed remarkably well with the relationship predicted by the quantum relationship $K = SL - hv$. It was found that this agreement was limited to carbon and a few other elements; for most of the elements the more complicated emendations of Lindemann and others were in better agreement with experimental data. It is for this reason that carbon, etc., are known as Einstein (heat) bodies.

It follows from the agreement of carbon with the simpler quantum expression that its energy relationships must be comparatively simple.

And this has been borne out by experimental work on many of the physical properties of carbon compounds: the specific rotation, the specific heats, the magnetic susceptibility, etc. In many of these properties the numerical value can be predicted by a summation of the atomic values. It follows that the molecular effects are in many carbon structures merely the summation of the atomic effects.

If the Einstein expression for the specific heat be solved for average temperature, it will be found that only one atom in 96 is emitting heat energy. The other 95 are not emitting heat energy. This would explain the simplicity of the energy relations of carbon compounds. Only one per cent of the carbon atoms are distorting their electrical fields of force by emission of an electromagnetic pulse; hence the electrical stresses surrounding the other 99 per cent are comparatively at rest; therefore the spatial equilibrium is simple and stable.

The Quantum Explanation of the Stability of Carbon Compounds. The stability of carbon structures on the quantum hypothesis would therefore be explained by the symmetrical electron structure of the carbon skeleton and hence the minimizing of asymmetrical sub-molecular stresses in the molecular fields of force; the lack of disturbance of the atomic fields of force, since 99 per cent of the carbon atoms are absolutely quiescent, from an energy emission standpoint, and the small cascade of energy involved in carbon rearrangements because of this symmetry and inertness. Since the carbon atoms are quite symmetrical electronically and practically quiescent as to energy emission, it is immaterial how they are arranged. It is found by experiment that most of the usual types of organic reactions show very little energy change. It follows that the equilibria are never very far to the right or the left and that many simultaneous reactions can be expected to occur alongside of each other. When water trickles down a very slightly tipped plane it tends to run a great many ways at once. So it is with organic reactions.

Contrast between the Polar Reactions of the Asymmetrical Atoms. Thus is seen the marked contrast between the formation of polar compounds of the ions of the non-central elements, the salts, acids and bases of inorganic chemistry and the nonpolar compounds of organic chemistry. G. H. Lewis and others have called attention to the importance of the magnetic field in nonpolar molecular compounds. Bragg found that the crystal cells of organic compounds were built up of two or more organic molecules, as opposed to the simpler ion structure of the polar cells, and furthermore that the crystal cell of even-numbered carbon compounds is, as far as investigation has shown, quite different from the crystal cell of odd-numbered carbon compounds. This would emphasize the importance of the magnetic fields of nonpolar compounds.

The Cubical Atom in Organic Compounds. The Lewis-Langmuir cubical atom has found its most successful application in carbon molecules. Andrade has called attention to the fact that in a very eccentric elliptical orbit, an electron can for many energy expressions be regarded as at rest at the second focus of the ellipse. Lewis has called attention to the fact that in the cubical atom the term "electron" is taken to include the electrical electron and its orbit.

It is probable that the work on stable carbon structures will in the future bring about the synthesis of these two views of atomic structure.

Synthetic Work in Organic Chemistry. *The Use of Catalysts.* The work of the famous French organic chemists Sabatier and Senderens called attention to the immense possibilities of catalysts in organic preparations. To-day the most important commercial applications of organic processes are bound up with the use of catalysts; the hardening of fats, the cracking of petroleum, preparation of dyes, and hundreds of other processes are intimately linked with the use of the proper catalysts. Molinari, Morgan, and others have worked on the influence of energy catalysts, such as the electromagnetic pulsations which we know as light, in the rearrangement of organic compounds.

Photosynthesis. The most important chemical in the whole world is chlorophyll. Without it, the existence of the ordinary vegetable or animal life on this planet would be impossible. Willstätter and other investigators have made available some knowledge of the constitution of chlorophyll. Mainly, it appears to be an aggregation of substituted pyrroles linked very stably with magnesium. Much work regarding the synthetic action of chlorophyll on carbon dioxide has recently been done. Other catalysts such as an uranium sol have been shown to bring about the same type of photosynthesis by the aid of sunlight. See BOTANY.

Hæmoglobin. Much work has been done on the blood pigment hæmoglobin by Willstätter and others. It has been shown to be closely allied to chlorophyll in its constitution, except that the pyrrole nuclei are linked up with iron instead of magnesium.

Organo-metallic Compounds. The whole subject of the metallic compounds of carbon complexes has assumed great importance. The alkyl metallo-halides, such as the magnesium and zinc compounds, have been of the greatest importance in synthetic work. Nelson and his pupils have shown that this type of compound is polar rather than of the usual nonpolar type. The aluminium complexes present in the Friedel-Craft reaction have also been shown to be polar. In fact, from a complex of aluminium chloride with benzene, metallic aluminium can be deposited by the passing of an electrical current through the benzene solution.

The nonpolar metallo-organic compounds have also shown great interest. Every one is familiar with the arsenic carbon compounds used by Ehrlich under the names of salvarsan and neosalvarsan. Other metallo-organic compounds showed promise in chemotherapy, such as silver salvarsan and copper salvarsan. Metallo-organic complex ions, such as the bismutiotartrate, have shown surprising efficiency in attacking bacterial invasions of the blood stream.

Tetraethyl lead has a surprising effect as an "anti-knock" material in gasoline engines. One part in 200,000 is quite effective in preventing knocking. See MOTOR VEHICLES.

Carbon Compounds. The effect of a carbon compound on living matter is quite frequently localized to one small part of the carbon structure. The synthetic chemist has therefore been busy in eliminating that part of the molecular structure which is unimportant and increasing the physiological action of the remainder by appropriate mutations. Thus ethylene, which contains the carbon skeleton of ethyl alcohol and

ethyl ether, has been shown to be quite an efficient anæsthetic and to minimize the unfortunate after effects of etherization. From the complicated alkaloids have been evolved simpler structures which do the work wanted without unpleasant concurrent effects. For instance, from the habit-forming local anæsthetic cocaine has been developed the far more effective novocaine with no habit-forming properties.

Dyes. Innumerable new dyes were prepared. Many of these new dyes have other interesting properties. One, kryptocyanine, is the most powerful sensitizer known for rendering photographic silver emulsions sensitive to red and green light. Other dyes have been shown to be powerful bactericidal agents. For instance, trythan red is an excellent tryphanocide and is used in combating the dreadful sleeping sickness of Middle Africa. Acriflavine and fluoresein have proved excellent agents in aborting infections of the urethral passages.

Carbohydrates. Much work has been carried out on the polysaccharides, and fields that were formerly unknown have been successfully explored. Fischer showed that the natural tannins are the glucose esters of the tannic acids. Taylor has shown that the starches naturally occurring are characterized by the presence of various fatty acid esters of the glucose complex. The work on fibre silk from cellulose has necessitated an intense exploration of the cellulose and hydrocellulose field.

Stereo-chemistry. Progress was made in the study and synthesis of stereo-isomers. The importance of stereo configuration in biochemistry is now realized. Emil Fischer, Abderhalden, and their students did a great deal of work in the syntheses of the polypeptides, approximating the natural proteins. Chains that contain over a hundred atoms have been prepared, and such compounds have been shown to give practically all the characteristic reactions of the simpler proteins. There seems no structure of carbon complexes, short of the living cell, that the organic chemist cannot attempt to duplicate with some reasonable hope of success.

The Disintegration of Organic Compounds. Carbon compounds are important not only for their own characteristics, but also for the power, heat, etc., that can be generated by their disintegration. Thus the main importance of the paraffin and polymethylene compounds to-day is their fuel value, regrettable though this may be. In the same way the great coal and peat deposits are utilized mainly as fuel; only the by-products are conserved for chemical utilization.

Explosives. The necessities of the War developed greatly the technique of explosives. These are mainly nitrates of carbohydrate compounds. The Americans and the Allies were to a great extent quite unprepared for the large scale production of high power explosives, but the chemical industries rose to the needs of the nations. At the end of the War, the Allies were in a much better position as to high power ammunition than the Germanic nations. See EXPLOSIVES.

Chemical Warfare. A closely allied field in organic chemistry was the development of military attack by means of chemicals. This new branch of warfare took advantage of the marked effect on human beings of many organic compounds. Poison gases, tear gases, "sneezing" gases, all were developed in number. The most

successful and important of these was "mustard gas." This material, made by the action of sulphur chloride on ethylene chlorhydrate became one of the most important agents in aggressive warfare. In peace time, the use of the tear gases has continued in the dispersion of dangerous mobs and the capture of reckless criminals at bay. See **CHEMICAL WARFARE**.

Combustion of Carbon Compounds. All carbon compounds, in the presence of an excess of oxygen at high enough temperature, are turned to carbon dioxide; water and the oxygen compounds of other elements are present. This is the standard method for the ultimate analysis of carbon compounds. The material is converted in a combustion furnace to carbon dioxide and water and these two substances collected separately and weighed. H. L. Fisher and others have brought these ultimate analyses to a high degree of accuracy, through the proper control of the methods used.

Production of Energy and Heat by Combustion. To-day most of our artificial heat, and to a large extent, our greatest power, comes from the oxidation of such carbon compounds as paraffin, coal, etc.

Prevention of Combustion. Experience has shown that the most inert carbon compounds, without any exception, can be made to explode if in fine enough a powder. It has been realized, particularly of late years, that all processes producing dust should be controlled by the use of dust collectors, forced draft and the like, so as to minimize the accumulation of dust. The modern chemical plant rivals the kitchen of a famous chef in its scrupulous cleanliness and absence of dirt and dust.

The Coking of Coal. The War brought the distillation products of coal to the front. These products had been greatly neglected in the United States and ignored in the United Kingdom because of the abundant standardized supply of these materials from German sources. The War changed this abruptly. It is now well realized that the older method of the carbonization of coal without the recovery of ammonia, benzene, and other by-products, is a criminal waste of national resources. See **COKE**.

It has been gradually realized that the most useful method of carbonizing coal is that at a high temperature. A high gas yield is obtained at the same time as a high yield of liquid products. The maximum yield of ammonia is obtained, as well as a hard dense coke of the quality most desirable in blast furnace operations. More and more the coal resources of the world will have to be conserved by scientific coking at the mine and the distribution of the products to appropriate industries. More and more the use of coal for industrial power will revert to the electrical generation of power at the coal mine, combined with the water power that is available in the vicinity.

Petroleum and Natural Gas. The motor industries are wasting one of the most valuable natural resources in the generation of power by the combustion of petroleum products in automotive engines on land and sea. The logical fuel for such purposes is ethyl alcohol from plant carbohydrates. The plant world every year makes many millions of tons of carbohydrates which are allowed to be disintegrated into carbon-dioxide by the actions of molds and yeasts. This material ought to be converted to the intermediate carbinol, ethyl alcohol, and

this used for the fuel needs of the automotive industry. Ultimately, when the world has exhausted most of its petroleum resources, it will be forced to turn to this easily replenishable source of energy. But in the meantime, the valuable reservoirs of paraffin and polymethylene derivations in the petroleum resources of the world will have been dissipated and lost.

Already agitation has begun to save the natural gas resources for their proper utilization in industry. The only mundane source for any large supply of the valuable gas helium lies in our natural gas wells. The valuable chemicals methyl chloride, carbon tetrachloride, etc., can be made from natural gas. Soon our supplies of methyl alcohol, formaldehyde and the like will come from this same source. To-day we are wasting them as a mere cheap fuel source.

Shale Oil. The world's oil resources in oil shales are enormously larger than its supply of petroleum oil. McKee has shown that these oil shales are to a great extent the calcium salts of complex oily acids. On distillation these salts break down with an absorption of about 160 British thermal units per pound of shale. Further heating causes dry distillation of the compound found with the production of shale oil. One field alone has been shown capable of producing 80 times more oil than all the petroleum wells of America have yielded in the whole history of petroleum production.

Cracking of Petroleum. The urgent demand produced by the increased use in automobile vehicles has compelled the petroleum industry to convert, as far as possible, its crude material into the lighter, more volatile hydrocarbons. The first process which proved successful on a large scale was the Burton process. This consisted of the direct firing of petroleum stills under greatly increased pressure. In this way the yield of the lower fraction is much increased. Other methods such as the Ellis, Cross, and Dubbs processes have more or less superseded the Burton process. They are directed toward the maintenance of the liquid state during the "cracking" period. The carbon necessarily formed in the decomposition is removed in special settling chambers.

The liquid-phase cracking processes possess many advantages over the older vapor-phase processes. They can deal with much heavier petroleum, such as the California and Mexican crudes. They produce much smaller proportions of uncondensable gas. The lighter fraction is of much better quality and more easily refined.

Transformation of Natural Organic Products. The immense amount of technical work on cellulose and artificial silk has steadily increased the quality of these textiles. In 1922, 75,000,000 pounds of artificial silk was produced, and even this quantity was insufficient for the demand. At first the artificial silk filaments were poor in strength and were not resistant to wetting, etc. By improvement in technical methods, such as the proper aging of the solutions at low temperatures, the properties of artificial silk have been much improved. It has also been possible to make much finer filaments than before, by elimination of minute gas bubbles in the threads, etc. See **SILK, ARTIFICIAL**.

Constitution of Cellulose. J. C. Irvin and E. L. Hirst have at last been able to obtain

definite evidence pointing to the probable constitution of cellulose. Their formula is a tri-anhydro-glucose of the butylene oxide type. Their formula will account for all the known reactions of cellulose, whereas the older suggestions have all failed in one respect or another. (*Transactions of the Chemical Society*, vol. cxxiii, 1923, pp. 123, 518.)

Relation of Cotton Cellulose to Wood Cellulose. L. E. Wise (*Industrial Engineering Chemistry*, vol. xv, 1923, p. 711) has investigated the relationship of cotton cellulose to wood cellulose. He finds that the balance of evidence is in favor of a more variable complexity for wood cellulose as compared with cotton cellulose. The most resistant part of wood cellulose is almost identical with cotton cellulose, but the wood cellulose complex as a whole is different from cotton cellulose in containing other and less stable groupings.

Paper. The most notable innovation in the paper field has been the introduction of rubber latex papers, in which rubber latex is added to the paper pulp. These papers are noticeably tough and resistant when properly made. So far the main difficulty has been the prevention of the perishing of the rubber due to its extruded surface and the consequent deleterious action on it of oxygen from the air.

Lignin. Extensive work has been carried out on this important constituent of the natural woods, straw, and other fibres. The evidence has accumulated that it is somewhat the oxygen analogue of chlorophyll, being built up of furane ring condensations as chlorophyll is of pyrrole aggregations. It also contains aldehydic linkages and phenol radicals more or less methylated. These methoxy groups are the source of the methyl alcohol obtained in this dry distillation of wood.

Simpler Carbohydrates. The starches are the typical storage carbohydrates of plant life. As energy-giving substances they are one of the principal constituents of food for both animals and human beings. In the preparation of pure starch from vegetable grains, the proteolytic power of enzymes has been recently utilized. Pepsin or trypsin is used to render soluble and remove the insoluble nitrogen constituents of the crude starch. The starch granules are then centrifugated out.

Dextrin and Vegetable Gums. These are invariably prepared by the partial hydrolysis of the natural starches. The methods used are mostly empirical and have been developed by haphazard experiments. Kunz-Krause has isolated a cyclic ester of myristic acid from dextrin, which is the source of its characteristic odor.

Sugars. An immense amount of work on the monose, biase, and triase sugars has demonstrated more completely each year the soundness of the Fischer theories and methods of attack. The various sugars have been shown to have interesting properties. Thus lactose has been shown to have the power of killing off the tryptophan attacking bacteria of the upper intestine. If this sugar could only be produced cheaply enough, it would be a great aid to the health of human beings.

Sucrose. The most important of all sugars is the biase sucrose. The technique of the production of this material both from sugar beets and from sugar cane has been carefully studied year by year. From sugar cane, as high as

99.42 per cent of the sucrose in the crude cane has been recovered in commercial operations.

Bleaching and Clarifying. The extracted sucrose is accompanied by colloidal gummy matter and by coloring substances. The first is removed by liming and the second by treatment with a decolorizing carbon. C. Müller and M. Bird have shown that much of the colloidal matter is a complex silica compound from the sheath of the sugar cane and can be removed by superheating.

High Power Decoloring Carbons. The introduction of high power decoloring carbons such as norit or carbox has had an important effect on the sugar industry. The tendency appears to be to remove, as far as possible, the colloidal impurities by preliminary treatment and then to rely on a small quantity of high-power bleach to remove the color. As little as 12 ounces of high-power bleach will decolorize the juice from one ton of sugar cane.

Carbinols. Glycerol. The production of glycerol from sucrose has been brought about by means of a special yeast acting in the presence of sodium sulphite. The sulphite removes the aldehyde formed and thus allows the concentration of glycerol to increase. During the War considerable glycerol for war purposes was made by this method.

Isopropyl Alcohol. This, the simplest of the secondary alcohols, was long a laboratory curiosity. Now it is produced and sold in carload lots under the name of "petrolol." It is a by-product of the cracking of petroleum. The gas propense is found, and this is led into cooled sulphuric acid. The acid sulphate found is diluted and distilled, with the production of isopropyl alcohol.

Thus is seen the progress of chemical work on the carbohydrates from the most complex cellulose to the simplest carbinols. In the same way similar advances have been recorded in the proteins, the tannins, the caoutchoucs, the hydrocarbons, the vegetable oil fields. Slowly and surely the organic chemist is linking up the most complicated products observed in nature to the simplest products of organic laboratory preparations. See CHEMISTRY.

CHEMISTRY, PHYSICAL. Physical chemistry is not a separate science but a group of methods whereby the conditions preceding and succeeding chemical reactions can be studied. It should be remembered that chemistry and physics are inseparable. All the operations surrounding chemical reactions are physical in nature, while all the manifestations of force occur in the electrical field surrounding electrons and proton or the groupings of these two types of electricity which we call ordinary substances. Hence the application of well tested physical methods to chemical investigation has been of immense aid to the chemist. In the same way much chemical work has been of aid in investigating physical phenomena.

The Simple Functions for Chemical Phenomena. The physicist is often able to express the relations of cause and effect in physical phenomena by means of comparatively simple mathematical expressions. Thus the relationship of volume, pressure and temperature of most gases can be shown to a surprising degree of accuracy by the simple relationship, called the gas law, $PV = RT$, when P is the pressure, V the volume of the gas (in molar volumes), T the absolute temperature and R the gas con-

stant. Hence physical chemists have been attempting to find simple expressions that would in like manner satisfactorily account for the operations of chemical reactions. Many of these expressions show high promise. The important law of mass action of Guldberg and Waage has been applied to a number of chemical phenomena with surprisingly good results. But increasing accumulation of more accurate data has in nearly every case shown that this agreement is only approximate and that in general the simpler the expression, the more limited is agreement with data of increasing accuracy.

To minimize the discrepancy between actual fact and simple mathematical theory, the physical chemist has been driven to the creation of ideal substances, imaginary liquids, gases and solids, whose characteristics would correspond exactly to those indicated by simple mathematical functions. The discrepancies between actual experimental results and the theory adopted are then discussed as mere departures from an ideal state.

This procedure is excellent as a method of teaching, but it is dangerous as a view of natural phenomena. There is no distinction between the normal and the abnormal in nature. Conditions in a few selected systems may be somewhat simpler than in others, but rarely are the relationships so simple as to be expressible over a wide area by a function containing only one constant.

Conditions of Chemical and Physical Experiment. It should be remembered that physical experimentation to-day can generally be disentangled from interfering phenomena much more easily than the usual type of chemical experimentation. Take as an example the familiar physical experiment of the pendulum. Here the physicist can easily do away with the friction of the air by conducting the experiment in a vacuum. He can use as support a quartz filament so fine as to be seen only through a microscope. He can make very accurate corrections for temperature differences. The investigator of chemical phenomena is not so fortunate. To illustrate the complexity of most chemical experiments we may imagine the physicist attempting to study the action of an iron pendulum suspended by a stiff spring and swinging in a bath of cold molasses while subjected to a varying magnetic field. This imaginary comparison will help show why physical chemists have had such poor success in gaining accurate agreement between experimental data and the simple mathematical relationships we call laws. The attempt is being made to express a complex system by means of a simple mathematical expression. The more complex the situation, the more striking become the discrepancies as the data available becomes more accurate and more abundant.

We ordinarily write our chemical equilibria as if we were observing the interaction of a few molecules or atoms with each other. But the actual fact is that even the simplest chemical experiment involves trillions and quadrillions and quintillions of atoms and molecules, with electric potentials and charges, the formation of complex aggregates, the segregation into colloidal dispersates, and other effects to increase the complexity. To say nothing of energy differences, threshold values, and various activation phenomena that have their effect on the system. Hence it is surprising, not that the

simpler generalizations of physical chemistry show many discrepancies as more abundant and more accurate data becomes available, but that the agreement is as good as it is.

Take, for instance, the extremely important Moseley experiment on the characteristic X-ray radiations of elements. Further and more accurate measurements show that the Moseley relationship is not quite valid but is rather in the nature of a good approximation. But no one doubts that the theory of atomic numbers is true. It is only realized that the conditions existing around the nucleus and the innermost ring of electrons are not as simple as Moseley imagined they were when he formulated the simple mathematical expression or law known by his name.

X-Ray Study of Pure Crystals and Liquids. The X-ray method of studying the structure of pure chemical compounds has yielded an immense amount of valuable information regarding the spatial structure of such compounds. With solid solutions, for instance, it has been shown that the atoms of the two metals simply substitute in each other's lattice with only slight disarrangement of the lattice, instead of having two interlacing lattices. Of most of the simpler molecular structures we can now give accurate dimensions and spatial arrangement.

The Phase Rule. This important generalization by an American scientist, Willard Gibbs, has been of the greatest aid in studying the reactions in metallography and the like. During the War it was used to study the characteristics of explosives and so prevent the premature explosion of high power ballistics. The extraction of potash salts on the Pacific Coast was worked out by means of this same phase rule. This rule states that for N components and R phases the degree of freedom, or possible variation in the conditions, is $N - R + 2$.

Catalysis. When a system, or mixture of substances, is heterogeneous (not all of a kind), one component is very apt to influence chemical reactions in the other. This property of influencing a chemical reaction without apparent change is called catalysis. Thus many chemical changes that occur exceedingly slow can be brought to equilibrium quickly by the addition of a catalyst. In the same way reactions may be slowed down or stopped by means of other substances called anticatalysts. Modern chemical work is therefore greatly concerned with catalysts and anticatalysts, to see that the type desired is present and the detrimental type eliminated. The work done by the immense water power development at Muscle Shoals in the South will be intimately linked up with catalysis.

Adsorption. The atoms in the surface of a solid have their electrical fields only partially satisfied. Thus they are able to attract and hold the atoms of many other substances, liquid or gaseous. In fact, nearly all solids have adsorbed onto them layers or films of other substances. In such layers chemical reactions go on quite differently from what they do in ordinary mixtures. This is thought to be the reason for the capacity of catalysts to influence a chemical reaction. Not only solids but also liquids possess this power of attracting and holding others. This attraction is called the interfacial tension. Nearly all ordinary substances have a film of water on them which in-

fluences greatly their chemical characteristics. More and more it has been found how markedly these small matters influence chemical action.

Colloidal Dispersion. This interfacial tension is not noticed in ordinary solids, but when a material is very finely subdivided its surface greatly increases. Thus a little button of silver as big as a shoe button has a very small surface, but if reduced to a fine enough powder it will have a total surface as great as a city lot. In this condition, called the colloidal state, silver has a great power to kill germs and is so used in many infections of the throat and other passages.

It has been shown that a great many of the simple salts are really very fine solid particles floating in water and can be filtered out by a very efficient filter. In this way the yellow solution of potassium dichromate can be completely removed from a water solution and ink can be filtered water-white.

Removal of Smoke and Fumes from Air. The fumes accompanying many chemical operations, such as the burning of carbon or coal with insufficient air, are colloidal dispersions of tiny solid particles in a gas, in this case the ordinary atmosphere. Like most colloidal dispersions, these tiny solid fragments have on them an electrical charge which keeps them apart by making the particles repel each other.

It has been found that an electrode charged at 10,000 volts or more will attract these tiny charged particles out of the gas and so prevent their being carried into the outer air. In this way fumes from smelters have been prevented from polluting the air and the material so saved becomes a profit instead of a nuisance. This recovery of solids from gas dispersions has found many applications in industry, as, for example, in the manufacture of the pigment carbon black from the partial combustion of natural gas. A recent development has been the use of a quartz mercury lamp to ionize more effectively the dispersed particles. Similar tiny charged particles in a liquid are called sols. It has been found more and more that a great many of the systems we have regarded as molecular solutions are in reality sols. This has radically affected much of our thinking about solutions.

Dr. H. S. Hele-Shaw has devised a very effective new filtering apparatus. This consists of a large number of sheets of hardened paper perforated with holes and pressed together under an adjustable pressure so that the holes in register form tubes. Half the tubes are inlet tubes; half, outlet tubes. On pumping the liquids to be filtered into the inlet tubes, the liquid in continuous phase passes between the paper layers and out into the outlet tubes, leaving the discontinuous phase behind. By suitable pressure any degree of separation can be obtained. Even such strong electrolytes as potassium bichromate and sodium sulphate can be removed from solution by this streamline filter. It is also excellent for clarifying liquids difficult to filter, such as glues and varnishes.

When sols, such as have been referred to, cool or are treated with a coagulating agent they set to a jelly-like mass or "coagulate into a gel." These relationships of sols and gels are most important to human beings, as life, as far as we know, occurs only in sols and gels. Hence an immense amount of work has been done in biological chemistry, with the accumula-

tion of information of increasing complexity. Particular progress has been made in research on the action of certain sols on gels. Donnan, in his work on membrane equilibrium, has shown the results that will occur when one part of a sol can diffuse or wander into a gel and another part cannot. By his investigations the technique of whole industries, such as the tanning of leather, has been radically changed. Loeb has likewise shown how one condition, such as the hydrogen-ion concentration, can radically affect the characteristics of a sol.

Enzyme Actions. Certain complex organic substances seem to have a remarkable catalytic action in sols and gels. These are called enzymes. In many cases their action extends into the solutions of complex substances that border on the colloid dispersals, such as sugar solutions. Here the work of Sorensen, Nelson and others has accumulated an immense amount of data which will help us understand the complexities of chemical change in these important systems. The action of bacteria, yeasts, molds, and the like organic substances is mainly through enzymes, and these too seem closely bound up with physical chemical laws.

Liquids. Langmuir has shown that liquids can be spread into a film one molecule thick. In such thin films the volume of the individual molecule is always the same, no matter what the interface. He has therefore suggested that a liquid is really like a crumpled piece of paper which can be smoothed out to a definite thinness as a limiting value or be wadded up into any shape desired. In liquids many investigators have shown that compounds exist. First of all the liquid may be combined with itself. Then it is called an associated liquid. The non-associated liquids are few in number and comprise the more inert organic compounds such as the paraffins, the ethers, etc.

Compound Formation in Liquids. If a liquid can form stable compounds with itself, it is probable that it can form stable compounds with other substances. For instance, water, which is highly associated in its liquid state, enters into combination with a large number of substances; many of these compounds are crystalline. Such crystals in the past were thought of as containing "water of crystallization." But such compounds with water are not a whit different in kind from the material formed by the action of water on SO_3 to make sulphuric acid. In liquid systems compounds are also found. By observing the abrupt changes in physical characteristics during a continuous variation of constituents, the existence of numerous compounds has been demonstrated in such systems.

Ionization. Kendall has called attention to the fact that such compound formation always appears to precede ionization. Other investigators appear to regard the formation of charged ions in a solution as merely the action of the solvent on the solute. The ionization of weak electrolytes has been shown to follow the law of mass action by Ostwald and other workers. Recent work has cast increasing doubt on the value of conductivity measurement of ionic concentrations, and the Ostwald dilution law is regarded as approximate rather than as a rigorous expression of fact. Strong electrolytes do not follow this law. Many physical chemists, such as Noyes, Ghosh, Lewis, and others, have come to regard strong electrolytes as wholly

ionized, so that the molecular species has entirely disappeared. So far the controversy has not been settled. The simple ionic theory that Arrhenius thought would solve all our difficulties in the field of solutions is thus seen to have given rise to more and more complications. An American physical chemist, Kraus, has shown that ordinary metallic conduction by the movement of unattached electrons and electrolytic conduction by the movement of charged ions may occur simultaneously. Such conditions do exist, for instance, in solutions of metallic sodium in liquid ammonia.

Electrolytic Solution Pressure. In the phenomena of oxidation and reduction, Ostwald has shown definitely that there is the same electronic transfer as in the deposition of one equivalent of a metal on a cathode. He formulated a very interesting theory of the electrical relations between metals and their ions, called the electrical solution pressure theory. He and other investigators have shown that very definite electrical potentials exist between metals and the concentrations of their ions. Likewise definite potentials exist between oxidized and reduced forms of the same ion in solutions. Conant and others have shown that in the same way quite definite potentials exist between oxidized and reduced forms of organic compounds, and that these potentials follow physical chemical laws even though the phenomena of ionization seem to be absent or exceedingly slight. Sanford has called in question the whole electrolytic solution pressure theory. He shows that the pressures calculated ought to make many metals explode in the presence of a trace of water, whereas they do not. Sanford also showed that the potential between a metal and a solution appears to be a function of the dielectric constant. Substances which raise the dielectric constant, such as alcohol, increase the electromotive force, whereas substances which decrease it, like urea, decrease the electromotive force.

Importance of Hydrogen-ion Concentration. One fact seems to tower above all this work on solutions of the years 1914-24; this is the importance in all such chemical reactions of the concentration of hydrogen-ion present. This has become apparent in the most diverse systems, from the purification of water to the suppression of malignant bacteria in the small intestine. Gas reactions, as the simplest systems available for chemical study, have received much attention from physical chemists. The results have been strikingly good.

Ionization and Resonance Potentials. As chemical reactions bring about the exchange of rearrangement of electrons, the necessary force to remove an electron from an atom, to either a short distance or a great, becomes of high importance in the study of gas reactions. Many of these potentials have been studied attentively. For the hydrogen molecule, no less than eight such potentials have been observed and can be explained. Other molecules show even greater complexity.

Radiation Theory of Reaction Velocity. The kinetic theory failed lamentably to explain the enormous change of reaction rate with change of temperature. The attempt has been made by Lewis, Langmuir, Dushmann, and others to show that S in the relativity equation $K = SL - \frac{h\nu}{kt}$ can be taken as a radiation frequency. Dushmann and Lewis have worked out

radiation equations for gaseous reactions which agree fairly well with experimental data. This would bring chemical changes into line with the general reasoning of the important relativity theory.

The Principle of Le Chatelier. This is one of the most important generalizations in natural science. It depends on the Second Law of Thermodynamics and so is universal in its application. It may be stated thus: when a factor determining the equilibrium of a system is altered, the system readjusts itself to oppose and annul the alteration in the factor. For example, consider the case of a gas occupying a certain volume at a given pressure and temperature. Suppose the pressure is increased. The volume is therefore decreased. By Le Chatelier's principle, the system should do something to oppose this volume decrease. It does so by rising in temperature, for a rise in temperature tends to increase the volume, that is, to oppose the decrease in volume. This principle governs, therefore, the reactions of all sorts of systems to a change in equilibrium.

The Van't Hoff Isochore. This is simply the application of the Le Chatelier principle to the change of equilibrium constant with the temperature. It states that the rate of change of this constant in relation to the change in the temperature is the decrease in total energy divided by the gas constant multiplied by the square of the temperature. This equation is of fundamental importance in studying the equilibrium conditions at widely differing temperatures.

Nernst's Distribution Law. This law governs the distribution of a substance between two immiscible solvents. It states that the ratios of the concentrations in the two solvents will always be the same. That is, if a greater or smaller amount of solute be added, it will always distribute itself between the two phases, so that the constant ratio be maintained. This refers only to the molecular species, as ionization of most substances occurs markedly only in the water phase. In this way, the molecular and ionized species of electrolytes can be distinguished.

Chemical Affinity. This is measured by the maximum external work done by the system in passing from the first uncombined state to the final combined state. Van't Hoff has shown this to be equal to the logarithm of the equilibrium constant multiplied by the absolute temperature by the gas constant. This mathematical expression enables us to calculate the affinity of anhydrous salts for water of crystallization, the affinity of oxygen for metals, or the affinity of carbon dioxide for lime.

Nernst's Heat Theorem. This important generalization has come to be called the third law of thermodynamics. In time it will come to have as important a bearing on chemical equilibrium as the first and second laws. Nernst made the assumption that at the absolute zero and for short distances above it, the change in free energy, dA , is equal to the change in heat evolved, dU . If this be true, Nernst showed that the following equation was true:

$$A = U_0 - \beta T^2 \frac{\gamma}{2} T^3 \dots$$

A is the free energy of the reaction, U_0 is the heat evolved when the reaction occurs at absolute zero, and T is the absolute temperature. β , γ , etc., are appropriate constants varying for

each system. This can be generally condensed to the simplest form: $A = U_0 - \beta T^2$. This equation can be used to calculate the transition temperatures of allotropic elements, the temperatures of fusion of single substances, etc. Haber made extensive use of it in his study of the reactions between molecular hydrogen and molecular nitrogen to form ammonia. Thus we see the marriage of the most abstruse mathematical reasoning with the fundamental experiments in chemical syntheses which has become more and more the symbol of modern scientific research.

CHEMIN DES DAMES. See WAR IN EUROPE, *Western Front*.

CHENEY, SHELDON WARREN (1886-). An American author born at Berkeley, Cal., who founded the *Theatre Arts Magazine* in 1916 and edited it until 1921. He was associated with the Equity Players, 1922-23. His most important recent books on the theatre include *The New Movement in the Theatre* (1914), *The Art Theatre* (1917), *The Open Air Theatre* (1918), *Modern Art and the Theatre* (1921), and *A Primer of Modern Art* (1923).

CHENOWETH, CATHERINE RICHARDSON (?-). An American philanthropical worker, born in New York. She was privately educated in France and for many years traveled in Europe, studying its history and people. She founded the Society of the Daughters of Holland Dames, and was a member of the Red Cross Society and a delegate to many international meetings and conferences. She was a member of the Commission on Training Camp Activities of the War and Navy Departments in 1917, and was a delegate to the Eugenic Congress in 1921.

CHÉRAU, GASTON (1872-). A French writer, born at Niort (Deux-Sèvres), France. He is the author of realistic novels in the manner of Flaubert, but his treatment, while characterized by the same minute observation, is less convincing than that of his model. His works have the atmosphere of Vendée. In *Champi-Tortu* (1906), he attempted a novel of childhood, but succeeded less well than some of his contemporaries in creating a type. His works include: *Les Grandes époques de M. Thébault, Essai de psychologie bourgeoise I* (1902); *La Saison balnéaire de M. Thébault, Essai de psychologie bourgeoise II* (1902, 1919); *Monseigneur voyage* (1903, 1910); *Le Part du feu* (1909); *La Prison de verre* (1911, 1912); *Le Monstre* (1913); *L'Oiseau de proie* (1913); *Le Remous* (sequel to the preceding novel, 1914).

CHERRY, CHARLES (1874-). An actor born in Greenwich, Kent, England. He made his début at 18 and played for several years in England with John Hare, then in the United States with Henrietta Crosman, Elsie de Wolfe and Mary Mannering and for five years with Maxine Elliott. He starred in: *The Bachelor*; *The Spitfire*; *The Seven Sisters*; *Thy Neighbor's Wife*; *Scandal* (1920-21); *The Tyranny of Love* (1921).

CHESAPEAKE AND DELAWARE CANAL. See CANALS.

CHESE. See SPORTS.

CHESTER, COLBY MITCHELL (1844-). An American naval officer (see VOL. V). In 1917, he became professor of naval science at Yale University, and was superintendent of the naval units of Yale and Brown Universities un-

til April, 1919. He was president of the Inter-Ocean Engineering Company and negotiated concessions for the construction of railroads and the development of mines and oil wells in Turkey. See CHESTER CONCESSION.

CHESTER, GEORGE RANDOLPH (1869-1924). An American writer (see VOL. V). In collaboration with his wife, Lillian De Rimo Chester, he wrote: *The Ball of Fire* (1914); *Cordelia Blossom* (1914); *Runaway June* (1915); *The Enemy* (1915); and a dramatization of *Cordelia Blossom* (1914). He was a frequent contributor to the *Saturday Evening Post*.

CHESTER CONCESSION. A concession for the construction of 2800 miles of railways; and for the exploitation of mineral resources in Anatolia, granted to an American syndicate, the Ottoman-American Development Company, headed by Rear-Admiral Colby M. Chester (retired) (q.v.) on Apr. 10, 1923, by the Angora (Turkish) government. The railroad grant applied to an extension of the old Anatolian Railway from Angora to Sivas, with a branch to the port of Samsun on the Black Sea; a line from Sivas to Erzerum and thence on to the Persian and Russian frontiers, with branches to the Black Sea ports of Trebolli and Trebizond; a line from Oulu Kishla on the Bagdad Railway to Sivas via Kaisarieh; a trans-Armenian railway from Sivas to Kharput and thence to Mosul with branches to Bitlis and Van; and a railway from Kharput to Youmourtalik, a port on the Gulf of Alexandretta. As an inducement toward the carrying out of the work, the American promoters were granted the right to exploit all the mineral resources, including oil, lying within a 20-kilometer zone on each side of the railway lines, as well as the privilege of carrying on such subsidiary activities as the laying of pipe lines, the utilization of water power for construction, and the building of port and terminal facilities on the Black Sea and the Gulf of Alexandretta. The Company might utilize the resources of the public lands, including sand pits, gravel pits, quarries, and timber, without compensation and was granted exemption from taxation. Economically, the concession meant the right to exploit some of the richest oil fields in the world—those of Erzerum, Bitlis, Van, and Mosul—and the development of the mineral resources of Armenia. It was an award of the first importance and marked the introduction of American capital for the first time on a large scale into the Near East. Whether it was to have political implications, as did the Bagdad Railway concession (q.v.), it was too early to say, though it is significant that the French Foreign Office, on behalf of its nationals with whose claims the Chester grant conflicted, despatched a note to the Angora government in which it characterized the whole procedure as being deliberately unfriendly. Moreover, the oil-exploitation rights in the Mosul district granted to the Chester concern conflicted with the claims of the British-controlled Turkish Petroleum Company. In 1923, the Angora Assembly abruptly declared that the concession had lapsed, owing to failure of the concessionaires to fulfill in the allotted time certain conditions of the grant; but Mr. Clayton Kennedy, as the representative of the syndicate, went to Angora in person and, it was reported in 1924, succeeded in reopening the question. It was estimated by promoters that \$300,000,000 would be needed to

carry the plan through, and, while it might involve some risks for the capital invested, the returns, directly and indirectly, would be immeasurable.

CHESTERTON, GILBERT KEITH (1874-). An English author (see VOL. V). He made a lecture tour of the United States in 1921. His works since 1914 include: *The Flying Inn* (1914); *The Wisdom of Father Brown* (1914, 1921); *Poems* (1915); *The Crimes of England* (1915); *A Shilling for My Thoughts* (1916); *A Short History of England* (1917); *Irish Impressions* (1919); *The Superstition of Divorce* (1920); *The New Jerusalem* (1920); *The Uses of Diversity* (1921); *The Evils of Eugenics* (1922); *What I Saw in America* (1922); *The Ballad of St. Barbara, and Other Verses* (1922); *The Man Who Knew too Much, and Other Stories* (1922).

CHESTNUT BLIGHT. See PLANTS, DISEASES OF.

CHEVALIER, ALBERT (1861-). An actor and dramatic author (See VOL. V). In 1916, in London, Mr. Chevalier played Eccles in *Caste*. His best recent characterization was Joe Brown in *My Old Dutch*, a production which he wrote with Arthur Shirley in 1916 and with which he toured repeatedly, from 1916 to 1920. He also wrote a book of reminiscences, *Before I Forget*.

CHEVRILLON, ANDRÉ (1864-). A French writer, a nephew of Taine, who chose England and the Orient as objects of study. He was born at Ruelle (Charente), and educated at the University College School (London), the Ecole Alsacienne (Paris), the Lycée Louis-le-Grand, and the University of Paris. He was professor of English at the Ecole Navale of Brest in 1887-88, and from 1889 to 1894 was *maître de conférences* at the Faculty of Letters of the University of Lille. He was with the British army at the front during the War, and afterward (1921) was received in the French Academy. His writings fall into two distinct classes: impressions of travel, and critical essays on England and English literature. Besides many articles in the *Revue de Paris* and the *Revue des deux mondes* his works include: *Dans l'Inde* (1891; English translation, *Roman-tio India*); *Sydney Smith et la renaissance des idées libérales en Angleterre au 19e siècle* (thesis, 1894); *Terres mortes* (1897); *Etudes anglaises* (1901); *Un Crépuscule d'Islam* (1906); *Nouvelles études anglaises* (1910); *L'Angleterre et la guerre* (1917; English translation, *Britain and the War*, with a preface by Rudyard Kipling); *Près des combattants* (1919); *Marrakech dans les palmes* (1920); *Les Américains à Brest* (1920); *Trois études de littérature anglaise* (Kipling, Shakespeare, Galsworthy) (1921; English translation, 1923).

CHICAGO. The second city of the United States and the railroad centre of the West. The population rose from 2,189,520 in 1910 to 2,701,705 in 1920, an increase of approximately 23 per cent. The negro population of the city increased 155 per cent, from 44,103 in 1910 to 112,536 in 1920. The total population according to the estimate of the Bureau of the Census for 1923 was 2,886,121.

The process of developing the city according to the plan laid out at the beginning of the century continued. In the ten years between 1909 and 1920 twelve major city planning improvements were got under way. The estimated cost

of the improvements totaled \$230,000,000 including bonds voted to the amount of \$61,500,000, and \$8,000,000 of special assessments on property directly benefited and \$162,000,000 to be provided by the railroads for electrification and the improvement of the terminals. The Roosevelt Road improvement was completed from Ashland Avenue to Michigan Avenue; the street was widened for two miles of its length from 66 to 108 feet, at a total cost of \$4,500,000. Michigan Avenue, which was 130 feet wide from Roosevelt Road to Randolph Street, was widened to 130 feet its entire length to the river, and carried on in a straight line via a new drawbridge supplanting the narrow Rush Street bridge, into Lake Shore Drive, north of the river. The Bridge and approaches were built on two levels. The cost of this improvement was \$13,115,558, of which amount about \$8,000,000 was for the bridge. The south shore lake front development was rapidly approaching completion in 1924. It comprised the widening of several south side streets and their extension northward to connect with a projected outer boulevard; and the construction of an enclosed lagoon extending from Grant to Jackson Parks, and an athletic stadium seating 65,000 south of the Field Museum. South Water Street, the traditional food and produce market along the river front, was in process of condemnation and vacation, to be converted into a cross-town boulevard from the new Michigan Avenue bridge westward, to be called Wacker Drive in honor of the chairman of the Plan Commission, Charles E. Wacker. Union Station was built in 1923-4 at a cost of \$65,000,000. The rooms actually used for the trains were surmounted by a large office building. The Illinois Central station was under construction in 1924. In 1921 a zoning commission was appointed, headed by the city commissioner of buildings. Two years later the city adopted four classes of use and five of volume-districts; the latter type was a combination of the more usual height and area districts. The commission attempted in 1923 to arrange to plan the whole metropolitan area about Chicago, including a number of smaller cities in Illinois and Indiana. A municipal pier was completed in 1916 with a total length of 3000 feet, width of 292 feet, and 8500 feet dockage. At the shore end of the pier is the head house containing the administrative offices. Railroad tracks and warehouses for convenience of shipping, and trolley tracks extended the length of the pier to a large pavilion on the outer end. This building, which is for free public use, contains a dance hall, refectory, children's amusement rooms, lavatories and rest rooms. A great festival hall covers nearly the whole width of the pier. From the pavilion concrete terraces lead down to an open plaza extending to the end of the pier. The year following the completion of the dock it was found to be necessary to protect it from heavy weather on the lake. The city accordingly built a rock-filled pile breakwater 2350 feet long to the south of the pier, and extended the government breakwater that partially sheltered it on the north and east. These jetties not only served to protect the pier, but were so built that they could be used as the dock walls of other piers, and could be extended as required when additional commerce made such action necessary.

The city parks also were extended, increasing from 40 in 1914 to 195 in 1920 and 200 in 1924.

Over 200 acres were added to Lincoln Park on the north, made by filling in the Lake Michigan shore. The project cost \$1,875,000, but the land so made was estimated to be worth fifteen million dollars. It embraced a yacht harbor, lagoon, bathing beaches, picnic grounds, playgrounds and a golf course. In Grant park at the southern end, the Field Natural History Museum was built as the first step in the development of this space as an educational centre. It was built of marble on made land, covered an area 700 by 350 feet, and cost \$6,000,000. The Chicago Zoological Park was being organized in 1923 on a 300 acre tract given by Mrs. Edith Rockefeller McCormick, but the voters in 1923 rejected a referendum on a special tax therefor.

In 1920 the city voted to increase the number of city wards from 35 to 50, but to reduce ward representation on the city council from two to one, thus cutting the council membership from 70 to 50.

The foundering of the excursion steamer *Eastland* in 1915 in the Chicago River cost 812 lives. The vessel had been declared unsafe some time before the accident. She lacked stability, and, being overloaded and unevenly ballasted, she snapped the hawsers that held her to the dock and turned over. Most of those killed were imprisoned within the hull.

Rioting that lasted seven days broke out in 1919 between whites and negroes on one of the bathing beaches where the negro section of the city joined the white. Thirty-eight persons were killed, of whom 15 were white and 23 negroes; 537 were injured, of whom 178 were white and 359 negroes. Many houses were burned and a thousand negroes made homeless. See CITY PLANNING; RAPID TRANSIT.

CHICAGO CIVIC OPERA COMPANY. See MUSIC, *Opera*.

CHICAGO FIELD MUSEUM. See EXPLORATION.

CHICAGO OPERA ASSOCIATION. See MUSIC, *Opera*.

CHICAGO SANITARY DISTRICT. See SEWAGE AND SEWAGE TREATMENT.

CHICAGO SYMPHONY ORCHESTRA. See MUSIC, *Orchestras*.

CHICAGO, UNIVERSITY OF. A coeducational institution at Chicago, Ill., founded in 1891 largely through gifts of John D. Rockefeller, although additional millions of contributions to its resources had been made after the last of his gifts were received. The enrollment of students began with 744 in the year 1892-93 and increased to 7781 in the year 1914-15. The enrollment for 1922-23 was 12,748. The foregoing enrollment is exclusive of the students in the correspondence study department (6658 in 1921-22), and exclusive also of the pupils enrolled in the laboratory schools of the School of Education. The number of members in the several faculties increased from 274 in 1914-15 to 401 in 1922-23, this number including members of the teaching staff of rank above assistant. The bound volumes in the university libraries increased in number from 458,616 in 1914-15 to 670,749 in 1922-23; in addition, it was estimated that there were available 250,000 pamphlets. The productive funds increased, between the years 1914-15 and 1922-23, from \$18,608,275 to \$32,208,885; and the annual income from \$1,693,814 to \$3,317,792. Mr. Rockefeller's total gifts to the university amounted to

\$34,873,360.90, including that for \$10,000,000 which he designated as his "final gift." Other contributions in buildings and funds for endowment brought the total assets of the university in 1924 to more than \$60,000,000. The trustees had designated \$1,500,000 for the erection of a chapel in accordance with the donor's wishes, but this work was delayed by the War and excessive building costs. The Divinity School received an anonymous gift of \$200,000 in 1916 for buildings, an amount subsequently augmented by \$150,000, the several gifts to be used for a theology building and a chapel. Various medical institutions in Chicago, including two hospitals and organizations intended for medical research, were affiliated with the university after funds to the extent of \$5,300,000 had been secured for enlarging the medical schools of the university. Of this \$5,300,000, \$1,000,000 was contributed to found the Albert Merritt Billings Hospital, for which plans were prepared, as also were plans for the university chapel. In 1918, Mr. LaVerne Noyes deeded property to the university estimated to be worth a million and a half, to constitute the LaVerne Noyes Foundation. The income from this foundation was to be used to pay tuition fees for deserving students who served in the army or navy of the United States in the War, or their descendants. Ernest DeWitt Burton succeeded Harry Pratt Judson as president in 1923.

CHILD, CHARLES MANNING (1869-). An American zoölogist born at Ypsilanti, Mich. He was educated at Wesleyan University (Ph.B. 1890, M. S. 1892), and at the University of Leipzig (Ph.D. 1894). He was assistant in biology at Wesleyan University (1890-92); and assistant in zoölogy (1895-96), associate (1896-98), instructor (1898-1905), assistant professor (1905-09), associate professor (1909-16), professor (1916-) at the University of Chicago. Besides numerous articles in zoölogical journals he published *Senescence and Rejuvenescence* (1915); *Individuality in Organisms* (1915); *Origin and Development of the Nervous System* (1921).

CHILD, RICHARD WASHBURN (1881-). An American author and diplomat, born at Worcester, Mass., and educated at Harvard University. He was engaged in the practice of law during the period 1906-17. In 1917-18, he was employed in the United States Treasury on problems of war finance. In 1919, he became editor of *Collier's Weekly*. In 1921, he became American Ambassador Extraordinary and Plenipotentiary to Italy. He wrote the following books: *Jim Hands* (1910); *The Man in the Shadow* (1911); *The Blue Wall* (1912); *Potential Russia* (1916); *Vanishing Man* (1919); *Velvet Black* (1920); *The Hands of Nara* (1921).

CHILD LABOR. The most prominent features of the child labor situation in the United States from 1914 to 1924 were the temporary but marked increase in the number of child workers, which reached its peak in 1918, and, the persistent but unsuccessful efforts to bring the matter under Federal control. During the War, the attraction of high wages and the pinch of the high cost of living caused many children to seek employment; at the same time the scarcity of labor and the urgent need of workers had a tendency to weaken the enforcement of restrictive laws. In Connecticut, New Hampshire, and Vermont, for example, provision was

made for the suspension of any labor law, should the need arise; New York and California provided for the shortening of the compulsory school years; in Dallas, Tex., the compulsory clause of the education law was suspended for a time. As a result of the generally weakened restriction and enforcement, irregularity in school attendance was marked, an unusual number of work permits were issued, a tendency to leave school at an earlier age than usual was noticed, and in industry a conspicuous trend backward to the 9-, 10- and 11-hour day was manifested. Although not without its advances in child labor legislation, the period was marked mainly by efforts to prevent suspension of existing laws and to bring the problem under Federal jurisdiction. The economic depression which followed the War gave impetus to a movement back to the schools in the late summer of 1920, and this, together with a systematic propaganda as to the advantages of education, went a long way toward restoring pre-war conditions. In 1922, with the return of better times, and, doubtless in some measure because of the quashing of the Federal Child Labor Tax Law, the number of children taking out their first work permits began to mount again, and strikingly large increases were reported in the first six months of 1923.

Statistics. According to the census figures, there was a considerable decrease between 1910 and 1920, the first in 40 years, not only in the total number of children at work, but also in the numbers employed in each of the principal general occupational groups. As compared with an increase of 15.5 per cent in the child population 10 to 15 years of age, inclusive, the number of children gainfully employed decreased almost half, or 46.7 per cent from 1,990,225 in 1910 to 1,060,858 in 1920. In the proportion, also, of all children of these ages who are gainfully employed, a corresponding decrease was shown, from 18.4 per cent in 1910 to 8.5 per cent in 1920. The decline in both actual numbers and proportion employed is most striking in connection with agricultural pursuits, in which the numbers decreased 54.8 per cent (1,432,428 to 647,309), or from 72 per cent to 61 per cent of the total number of children gainfully employed. Marked decreases are shown also for the mining occupations (60.2 per cent, 18,090 to 7191), domestic service (51.9 per cent—112,157 to 54,006), and manufacturing and mechanical industries (29 per cent, 260,944 to 185,337). In clerical occupations the number employed increased from 71,001 to 80,140 or 12.9 per cent.

According to the interpretation of the Census Bureau, the decrease in the number and proportion of children employed between the two census periods is at least in part due to differences in the time or the method of enumeration. The principal factor in this reduction of child labor reported in 1920 is believed to be the change in census date from spring, April 15 in 1910, to midwinter, January 1 in 1920, which undoubtedly resulted in a smaller number of children being returned by the census enumerators as engaged in farm work and perhaps other seasonal occupations than would have been returned if the census had been taken in April as in 1910. The statistics of employment in the nonagricultural occupations are not, however, influenced by this factor. The decrease of 26 per cent in the number of child workers in these

occupational groups as contrasted with a 20 per cent increase in the total number of persons so employed may therefore safely be attributed to conditions affecting directly and especially the labor of children, chief among which are the enactment or strengthening of legal regulations.

It should be remembered that the census did not report the number of child laborers under 10 years of age, of whom many were known to be at work in agricultural pursuits, street trades, tenement homework, domestic service, and canneries, and that no account is taken of child laborers who do not miss more than half of their school attendance or of those employed only during the summer vacation. Considering these facts and also that the Federal Child Labor Revenue Act, which was in effect in 1920, was afterward annulled, the figure for 1920 was considered as representing an underestimate of the extent of child labor in 1924. It is worth noting that more than one-third of the 1,060,858 child workers in 1920 were under 14, the legal age for factory employment in 45 States. The failure of the State child labor laws to prevent this widespread employment of children was attributed not altogether to low standards but in great part to the numerous exemptions permitted by many of the State laws and to inadequate enforcement of their provisions.

Federal Legislation. A strong argument in favor of Federal restriction of child labor was the need for uniformity of legislation. The disadvantage in industrial competition suffered by those States having restrictive laws was no encouragement to legislation in other States. From 1914 to 1924, efforts to establish Federal control were continuous, if unsuccessful. A bill to this effect introduced in 1914, after passing the House early in 1915, was prevented by the filibuster of the Senator from North Carolina from passing the Senate before adjournment. Early in 1916 the Keating-Owen bill succeeded in passing both houses and became effective Sept. 1, 1917. This law, enacted under the interstate commerce clause, prohibited the shipment in interstate commerce, within 30 days after production, of any goods produced by children under ages specified for certain industries or by children working longer hours than were specified. Its constitutionality was attacked almost immediately in North Carolina, and on appeal to the Supreme Court of the United States it was declared invalid in June, 1918, on the ground that it interfered with the powers reserved to States under the 10th amendment and transcended the power of Congress over interstate commerce. Almost at once another act was passed by Congress, receiving the presidential signature in February, 1919. In an attempt to meet the situation, the law was shifted from the interstate commerce clause to the broad field of taxation, and a 10 per cent tax was imposed on the net profits of any mine or industry in which child labor was employed. It was short-lived in its effect. Before the end of 1919 it had been declared unconstitutional in the courts of North Carolina; in 1922 it was condemned by the Supreme Court of the United States. According to the unanimous opinion of the Supreme Court, the law was invalid, since it attempted to regulate through the taxing power of Congress a matter entirely within the jurisdiction of the various States; and the decision attacked the idea of taxing as a penalty instead of as a means of revenue. In the latter

part of 1923, following memorials to Congress from a number of States, a constitutional amendment was introduced, to permit Federal child labor legislation. The resolution provided for an amendment granting Congress power to limit, regulate and prohibit the labor of persons under 18 years of age; the power of the several States would thus remain unimpaired except that the operation of State laws was to be suspended to the extent necessary to give effect to legislation enacted by Congress. It passed the House in April, 1924, and the Senate on June 2, 1924. It was then sent to the several States for ratification. Notwithstanding the delay in securing effective Federal control, the period was marked by progress in the centralization and standardization of efforts toward child labor regulation. The National Child Labor Committee, largely through whose efforts the United States Children's Bureau was established in 1912, did much by its investigations and publicity campaigns to create and encourage public sentiment in favor of restriction; and by its aid to various State commissions in drafting bills, and in constructive measures, made for some uniformity.

State Legislation. Meanwhile, through the legislation of the States, the movement made gradual, though uneven, progress. Child labor legislation in 1914 stood thus: Every State but New Mexico had passed laws relating to child labor or compulsory school attendance; 34 States and the District of Columbia had 14 year age limits for children in factories; 32 States and the District of Columbia prohibited night work for children under 16; 16 States and the District of Columbia limited the working day of children under 16 to 8 hours; night messenger service was regulated by special laws in 17 States; 7 closed it to persons under 18, while California prohibited all night employment for persons under 18; 26 States had strengthened the requirements concerning work permits so that there was reasonable assurance that a child under legal age would not receive one; inspection of child labor had been established and made more efficient in every State but six; certain forms of child labor previously unregulated were recognized as harmful and included in child labor laws, New York laws including tenement home work by children under 14; the age of children in street trades was regulated in 12 States and 8 cities, besides the District of Columbia.

By 1924, 18 of the 48 States had equalled or surpassed the moderate requirements of the Federal Child Labor Tax Law. The National Child Labor Committee thus outlined the general situation in that year: limitation of child labor by requiring an educational qualification was in force in 38 States, although only 30 required the completion of a specified grade, and only 12 required the completion of the 8th grade. In 46 States the minimum working age for boys and girls in factories, also in stores and canneries in many cases, was 14 years or higher; 1 State fixed the limit at 12 for boys and at 14 for girls; 1 State had no age minimum. Night work for children was prohibited under the age of 16 in 38 States; 5 States had a similar law, but with exemptions for certain industries; 1 State prohibited night work for children under 14½; 4 States had no prohibition of night work for children under 16. The maximum working day for children under 16 was limited to 8 hours in 30 States; in 17 States such

minors were permitted to work 9, 10, or 11 hours daily; 1 State did not regulate the working day in any way. Working in mines and quarries was forbidden for children under 16 in 26 States; in 7 States such minors were prohibited from working in mines but not in quarries. In only 10 States were there State-wide laws for street work, although some restriction on street trades was in force in 8 other States. A certain physical requirement for the issuance of regular employment certificates was fixed by law in 30 States, in 22 of which an examination by a physician was compulsory. A new method to discourage evasion of the law was found in providing for double compensation allowances, under the Workmen's Compensation Act, to illegally employed minors when injured. Practically all direct restriction of child labor, however, applied only to factories, stores, and mines. Compulsory school attendance laws were the only means of keeping children out of other wage-earning activities. In 1922, every State had some kind of compulsory attendance law; 2 States required full-time schooling up to 16 for all children; 26 required attendance up to 16 and in some cases to 17 or 18, although usually exempting those over 14 to go to work; and 26 States required employed children, in some States up to 18 years of age, to attend part-time continuation schools. (See EDUCATION IN THE UNITED STATES.)

The employment of children in agricultural occupations was not given much serious consideration until 1918; most State child labor laws, in fact, specifically exempted such work, and usually domestic service also, from their provisions. Investigations carried on after that year, by the National Child Labor Committee, in cotton picking, sugar beet growing, and other forms of commercialized agriculture, revealed that some regulation of age and hours was needed, not only to check loss of schooling but to safeguard children from the heavier kinds of farm work. Nebraska, recognizing this necessity, specifically provided in its child labor law for children working in the beet fields. Another difficulty in the rural situation which was being given serious consideration was the case of children of migratory farm laborers. Such children were beyond the reach of compulsory education laws, either in their home locality or the district where they went to work. California made an attempt to solve the problem in 1921 with a law making it the duty of the State superintendent of education to organize and maintain special classes for the education of children of migratory laborers in rural districts; and in 1924 a survey of the migratory labor situation was in progress in that State. Industrial homework was another phase against which little effective legislation had been directed. In New York in 1923, in 2169 families, 535 children between 10 and 16 were regular workers, 79 per cent of them under 14 and 35 per cent under 10. In the opinion of some, much was to be accomplished by making the employer responsible for such illegal employment of children; others held that the only remedy was complete prohibition of industrial homework.

Other Countries. In Europe the effects of the War on child labor were far greater than in the United States. Great Britain, to meet the situation, passed the Fisher Education Act in

1918, regulating for the first time the employment of children in all gainful occupations, including agriculture and domestic service; prohibiting employment of children under 12; requiring compulsory full-time school attendance up to 14; and compulsory continuation school attendance up to 16. Similar measures were found necessary in the other European countries, where practically all restraints on child labor had been cast aside during the War. Belgium, in 1919, prohibited employment under the age of 13, and under 14 without certificate; fixed a 12-hour day with rest periods; and instituted an advanced programme of medical examinations for industrial workers at least once a year until 18. Russia adopted a 16-year limit for entrance to full-time employment and was developing a complementary educational plan. Poland set a minimum school attendance of seven years. Switzerland placed the minimum age of employment at 14 years and fixed the maximum of daily educational and occupational activity for those under 16 at 10 hours. Various draft conventions adopted at the International Labor Conferences under the League of Nations in 1919, 1920, and 1921 affected children employed in industry, night work for children, children on vessels, and children in agriculture. The convention fixing a minimum age of 14 had been ratified, in 1924 by Czecho-Slovakia, Esthonia, Sweden, and Japan. See INTERNATIONAL LABOR OFFICE; LABOR LEGISLATION; LAW, PROGRESS OF, *Police Power*; HOURS OF LABOR.

CHILDREN'S BUREAU. See LABOR ORGANIZATION, INTERNATIONAL.

CHILD WELFARE. In the decade closing with 1924, public interest in the problems of child welfare in the United States was not only increasingly active; it took on an increasingly scientific turn. Only one State had dealt with the health of children through a special bureau in 1912; in 1923 there were child health bureaus in 46 States. The practice of physical and dental examination in the public schools was rapidly spreading. Special bureaus dealing with dependent, neglected, and delinquent children (see JUVENILE COURTS), had been organized in more than half the States by 1923; and about the same number of States had at that time created commissions to make comprehensive inquiries into all aspects of child welfare with a view to recodifying existing laws and determining what improvements were needed to bring the public care of children up to standard. There was a steady growth in such efforts to provide wholesome recreation as the playground movement. The need for special education for the deaf and blind and for the physically and mentally handicapped was coming into general recognition. For dependent children, efforts were widened to obviate neglect and avoid the institutional atmosphere by the creation of systems of mothers' pensions (q.v.), by placing children in private homes under supervision, and in some instances by building institutions on the cottage plan. Characteristic of the general tendency to strike through to the root of social evils with preventive measures was the increased attention given to children of preschool years. Baby clinics and day nurseries to care for the children of working mothers increased in number; finally the preventive theory brought about the establishment of prenatal clinics to decrease infant mortality. (See MATERNITY PROTECTION.) An outstanding development of

the period was the growing realization that it was a duty of the State to protect the interests of children born out of wedlock. The movement advocated confidential records of birth, private proceedings to establish paternity, compulsory financial provision by the father, according to his economic condition; licensing and supervision of child-placing and child-care institutions, assistance to unmarried mothers, making desertion of an illegitimate child an offense, and establishing legal right to the father's name and the right of inheritance after an adjudication or acknowledgment of paternity. By 1924 the majority of the States had given to the child of illegitimate birth practically the status of a child of legitimate birth, with respect to the mother. The full legal relation of father to child had been established only in North Dakota. A uniform State law on illegitimacy, designed, for one thing, to facilitate extradition for offenses of this sort, had been accepted by several States.

In this period was done most of the work of the Children's Bureau of the Department of Labor, which was founded in 1912 and was the first national organization of its kind in any country. It began with an inquiry into the subject of infant mortality, and published reports on its findings and popular bulletins on proper infant and maternal care. Subsequently it carried on research and published much material on such subjects as child labor, juvenile delinquency, and juvenile courts, illegitimacy as a problem in child welfare, and the so-called mothers' pension laws. It also investigated the methods of child care in New Zealand, which had the lowest infant mortality rate of any country. The Bureau was given the administration of the first child labor act, which was in effect nine months before it was declared unconstitutional, and of the maternity and infancy act. (See MATERNITY PROTECTION.) From its foundation, it did much work in coöperation with the national women's organizations. In 1916, through the General Federation of Women's Clubs, it inaugurated the National Baby Week campaigns, which expanded in 1918 under the stimulus of the War into the Children's Year. All but two of the States eventually participated in the programme, which reached more than 16,500 cities, towns and villages. A campaign for birth registration was also carried on by the Bureau and the Federation, and by June, 1923, the birth-registration area included 30 States and the District of Columbia and affected 72.2 per cent of the population. See CHILD LABOR and EDUCATION IN THE UNITED STATES.

CHILE. A South American republic extending along the western or Pacific coast from Peru to the southern extremity of the continent. Its area is 292,414 square miles, and its population, by the census of Jan. 1, 1920, 3,754,723. This was a gain of 505,444 over the last official census, that of 1907, or an annual increase of 1.2 per cent. The populations of the principal towns (1920 census) were Santiago, the capital, 507,296; Valparaiso, 182,422; Concepcion, 64,074; Iquique, 37,421; Talcahuano, 36,079; Chillan, 30,881; Antofagasta, 51,531. The movement of population continued toward the cities in 1920; 46.6 per cent was urban as compared with 38.6 per cent in 1895 and 43.3 per cent in 1907.

Agriculture. In 1922 the divisions of agri-

cultural land comprised land capable of cultivation or suitable for grazing, 51.1 per cent, outside of the Territory of Magallanes; natural forests, 23.9 per cent; waste land, 13 per cent; land capable of irrigation, 5 per cent; natural pastures in the Territory of Magallanes, 7 per cent. Cereal culture and the vine continued to engage the greatest attention. The following table indicates the tendency of the period. The

producing association were features of this trade. More than 3,000,000 tons accumulated with no buyers. The ensuing depression affected the whole country because of Chile's dependence on its nitrate trade. Chilean pesos dropped from 3 to the dollar to 11; more than four-fifths of the nitrate plants closed, and hard times were universal, so that the government was compelled to resort to unemployment doles. The market

Principal Crops	Area in Acres 1922-23	Production in Metric Tons			Exports in Metric Tons 1922
		1913	1921	1922	
Wheat	1,285,233	641,604	631,131	643,279	1,901
Alfalfa (1921)	134,303	332,492	332,845	.....	.....
Beans	109,478	42,200	46,110	46,977	10,172
Potatoes	80,252	238,224	311,174	315,362	854
Oats	75,133	64,489	45,800	45,995	13,967
Corn	70,315	41,835	42,799	45,134	438

production of wine was 1,647,503 hectoliters in 1921 as compared with 1,345,979 in 1911. The possibility of reaching the American market during the winter for fruits and vegetables led to a growing interest in horticulture and gardening after the War. The trend toward intensive agriculture manifested itself in the increase in dairy farming, though production by 1923 did not yet suffice for local wants. In 1919 livestock included 391,718 horses, 36,489 asses, 51,411 mules, 2,163,141 cattle, 4,500,190 sheep, 459,606 goats, and 292,431 pigs. These showed little change from the figures of 1912. The wool clip in 1919 amounted to 16,937 metric tons, and in 1921-22 it was 10,000 metric tons. The two subsequent years showed a recovery.

Mining. In spite of the importance of agriculture, mining is the greatest source of the country's economic wealth. The copper industry increased in recent years, Chile advancing to the place of the world's second largest producer. Iron ore deposits, placed at 1,000,000,000 tons, were found in the departments of Atacama and

did not recover until the producers yielded to necessity in 1922-23, and cut prices materially. The year ending June 30, 1923, saw the sale of 2,000,000 tons of nitrate, and the year 1923-24, according to early forecasts, showed even larger sales. In the calendar year 1922, total mineral products exported were valued at \$103,052,760 dollars, a decline of \$21,000,000 from the 1911 figures.

Manufacturing. In 1920 Chile had 2975 manufacturing establishments using raw materials to the value of 589,823,090 paper pesos; 72,713 workmen were employed. Goods valued at 993,220,108 paper pesos were produced. Leading manufactured products were food supplies, gas and electric power, textiles, leather, furs, clothing, chemicals, paper, metal goods, alcohol, lumber, and tobacco. In 1920-21 German capital was active once more, and German shipping became important, woolen mills, flour mills, and railway shops and other industrial establishments increasing in the southern districts around Concepcion, Penco and Valdivia.

Country	IMPORTS		EXPORTS	
	1913	1922	1913	1922
United States	\$20,089,159	\$23,194,885	\$30,413,385	\$45,027,410
Belgium	5,671,426	2,776,706	5,674,669	2,372,770
Germany	29,578,138	12,079,429	30,772,742	7,994,210
Great Britain	36,109,210	20,825,212	55,548,341	14,264,860
France	6,623,260	4,933,180	8,847,885	4,296,770
Others	22,202,808	23,361,913	11,144,575	47,081,480
Total	\$120,274,001	\$86,571,275	\$142,801,577	\$121,037,500

Coquimbo. Besides, there were mines for gold, silver, cobalt, manganese, coal, salt, borax, sulphur, and other minerals. Nitrate of soda with its by-product, iodine, remained the most important single mineral product and the chief article of commerce; its production steadily absorbed large blocks of capital. The following table indicates the production and export of nitrate for certain years.

Year	Production in Metric Tons	Export in Metric Tons
1910	2,465,415	2,335,941
1915	1,755,291	2,023,294
1918	2,859,303	2,919,177
1919	1,703,240	803,961
1921	1,311,036	1,193,062
1923	1,903,527	2,257,158

A break in the nitrate market followed in 1921 and 1922 as a result of the fall of the farmers' purchasing power the world over. The manipulations of a European buyers' pool and a

Commerce. Up to 1920, Chilean commerce showed steady advancement except in 1915 and 1910, but the depression that set in with 1920 brought the trade record for 1922 below the pre-war level. Imports for 1913, 1920, and 1922 were worth \$120,274,001, \$166,103,810, and \$86,571,275; exports for the same years were \$142,801,577, \$284,293,108, and \$121,037,500. The distribution of leading exports in 1922 as compared with 1913 was nitrate, 51 per cent and 77 per cent; and copper, 29 per cent and 2 per cent. Frozen meat, wool, iodine, and truck produce represented from $1\frac{1}{2}$ to 3 per cent of the outgoing shipments in 1922. Textiles accounted for 18.6 per cent of 1922 imports as against 10.7 per cent in 1913; machinery 11.3 per cent as against 7.4 per cent; petroleum, 6.6 per cent as against 5.4 per cent in 1913. Imports which showed a heavy drop from 1913 to 1922 were coal, lumber, automobiles, and cement. The accompanying table indicates the distribution of the trade by countries for 1913 and 1922.

The United States steadily forged to the front in Chilean trade during the War and was able to maintain its leading position afterward. In 1918 Chilean exports to the United States equalled the combined values of all other countries, while imports from the United States into Chile accounted for 46.6 per cent of the total. In 1922 American imports into Chile were 26 per cent of the total, as compared with 16 per cent in 1913. Exports to the United States were 36.6 per cent in 1922 and 21.3 per cent in 1913. Thus Great Britain was completely supplanted. The maintenance of cordial commercial relations between Chile and the United States was due to the expansion of shipping facilities, the local establishment of American banks and credit information companies, investments in Chilean mines and industries, and the completion of direct cable service. Shipping in 1922 was far below the pre-war level but improved materially in 1923. Foreign vessels and tonnage entering Chilean ports in 1911 were 14,698 vessels, of 26,164,068 tons, and in 1922, 14,679 vessels, of 14,525,761 tons. By the law of 1922, coastwise trade was confined to ships of Chilean registry. In 1912, six American ships of 9000 tons entered Chilean ports; by 1921 the figure was 455 ships of 1,250,000 tons.

Communications. In 1922 there were 5288 miles of railway, 2837 of them state owned, as compared with 2740 in 1911, with 1418 state owned. In 1921 work was begun on electrification of the line between Santiago and Valparaíso and that between Llay-Llay and Los Andes, 233 miles in all; this was to be completed in 1924. Though agitation was carried on for construction of the Chilean section of the Antofagasta (Chile)-Salta (Argentina) railroad, no headway was made; this was due to a feeling prevalent in Chile that Argentina would receive most of the benefit from the line. The projected railway is 350 miles, 200 miles of which lie in Chile. A railway loan of £5,000,000 was floated in New York in 1921, and of the money spent, at least 90 per cent went to American manufacturers.

Finance. The budget for 1922 provided for the collection of 82,487,000 gold pesos and 319,209,781 paper pesos in revenue. The 1912 figures were 101,050,000 gold pesos and 189,200,000 paper pesos. Expenditures in the 1924 budget totaled 72,305,161 gold pesos and 366,193,673 paper pesos; in 1912, expenditures according to the budget were 81,070,966 gold and 280,894,118 paper pesos. In June, 1924, President Alessandri declared that budget deficits carried since 1920 totaled 160,000,000 pesos. The public debt on Dec. 31, 1922, included an internal debt of 154,714,000 gold pesos and 250,841,691 paper pesos; external debt made up of £28,672,352 sterling and guarantees amounting to £5,797,154, \$33,141,694 and guarantees of \$26,338,306, and guarantees amounting to 35,378,000 paper pesos. The paper peso in 1914 was worth, on an average, 5.50 to the dollar, and in 1918, 3.47; but in 1921 the industrial depression lowered it to 8.29; in 1922 it was 8.41; and the average for 1923 was 8.22, notwithstanding improved economic conditions.

Education. Primary education was made compulsory in 1920, but the figures for 1923 show no great change from 1911. In the later year primary schools numbered 3099 (2896 in 1911); enrolled pupils 369,423 in July, 1923 (375,274 in 1911); and teachers, 9162 in 1920

(4829 in 1911). In 1921, 52,880 pupils were in secondary schools (20,329 in 1911). Two new universities were opened in 1920, the Industrial University at Valparaíso and the University of Concepción. Agricultural and vocational education received increasing attention.

History. The known sympathies of a considerable element of the Chilean population for Germany in the War, through family, intellectual, and commercial ties, did not interfere with the neutrality which it maintained throughout. The falling off of trade immediately following the outbreak of the War caused serious unrest, but affairs improved when Chile began to play a prominent part in furnishing the Allies with war materials. In 1918 this intercourse reached its peak, with wide-spread prosperity. In 1919, exports fell to half their former volume but were completely restored in 1920. Not until the world-wide depression of the next year did trade once more languish, to the accompaniment of labor troubles and disorders.

The end of the administration of Juan Luis Sanfuentes (1915-20), Conservative coalition leader, marked an election campaign which revealed how widely liberal tendencies had spread. The campaign was fought between Arturo Alessandri, candidate of the Liberal Alliance, a bloc of middle-class and working men's parties, and Luis Barros-Borgoño, the representative of the governing bureaucracy. The returns gave Alessandri 179 electoral votes to Barros-Borgoño's 175, but as a result of several contests, the election was thrown into the Congress. Because of the excited state of public opinion it was decided to constitute a Court of Honor, which after months of deliberation found for Alessandri on Oct. 4, 1920, an electoral vote of 177 to 176. Congress accepted the decision and declared Alessandri president. He was committed to a reform programme that included administrative decentralization, qualified woman suffrage, separation of church and state, an income tax, a labor code, and state control of the nitrate industry. President Alessandri, never in sympathy with the groups controlling the Congress, came into open conflict with the Conservative Senate late in 1923. His legislative programme had aroused dissent to such a degree that funds were denied the government, with the result that the cabinet had to resign. A new cabinet, constituted on Jan. 3, 1924, fared no better than its predecessor, and to still the political bickering which threatened political turmoil, President Alessandri dissolved the Congress on Jan. 7. The character of the constitution succeeded in bridging over a bad situation, for by the Commission of Safety, empowered by the fundamental law, to sit during the adjournments of Congress, a compromise was effected which brought the two parties together again. President Alessandri, on his side, accepted a limitation of his power to suspend Congress, while the Senate consented to incorporate the president's demands for reform in the constitution as amendments. Chilean politicians and publicists hailed the settlement of the crisis as containing the elements of a pacific revolution. On February 9 the Senate passed the President's programme. It contained laws for an income tax, for the right to expend sums based on the previous year's budget in the event of the Congress's failure to pass a budget for the year, and for the restriction of votes of confidence to the lower house. Congressional elec-

tions in March, 1924, upheld the president's liberal policies, so that the Congress, assembled on June 1, held government majorities in both houses for the first time in the President's administration.

Chile's rôle in South American affairs during 1914-24 was stormy. The dispute over the Tacna-Arica provinces (q.v.) with Peru, which in 1913 was in abeyance, flared up once more in 1919. The secret attempt of Chile to gain the sympathies of Bolivia by offering her an outlet to the sea, which was divulged in 1919, once more set at work the hatreds that had been smoldering since the making of the treaty of Ancon in 1884. The impasse in which negotiations of 1920 and 1921 ended resulted in an attempt, first, to have the Assembly of the League of Nations adjudicate the matter, and then the President of the United States. The point involved was the holding of a plebiscite in the two obscure provinces of Tacna and Arica, which have no economic importance with their area of only 26,036 square miles and population of 39,000. Finally, on July 15, 1922, as a result of the intercession of the United States, both governments consented to accept the American president as arbitrator. On Nov. 30, 1922, after a stormy debate in which the Chilean lower house by a two-thirds majority was compelled to override the veto of the upper house, the protocol of July 15 was ratified. Chilean representatives were appointed in November, 1923. Thus after a lapse of 38 years it appeared that friendly relations between Peru and Chile were once again to be reestablished. (See TACNA-ARICA DISPUTE.) The failure of the 1923 Pan-American Conference (q.v.) to cope with the problem of disarmament caused much disquietude in the country, for Chile was spending on an average 22 per cent of her budget on defense, and even such large sums fell below the costs of the Argentine and Brazilian military and naval establishments. As for international affairs, it should be recorded that Chile assumed an honorable part. In 1919, at the request of the Council, she joined the League of Nations and had the pleasure of seeing Augustin Edwards, Chilean minister to London, elected president of the third League Assembly in 1922. See also NAVIES OF THE WORLD.

CHINA. China proper consists of the 18 provinces, about 2,000,000 square miles in area, Chihli, Shansi, Shantung, Kansu, Shensi, Honan, Anhwei, Kiangsu, Chekiang, Kiangsi, Hupeh, Szechwan, Kweichow, Hunan, Fukien, Kwantung, Kwangsi, and Yunnan; and the dependencies of Manchuria, Mongolia, Sinkiang (Chinese Turkestan), and Tibet (q.v.)—a total area of 4,278,352 square miles. The exact population was unknown; estimates varied from 325,000,000 to 430,000,000. China, therefore, had a density of population of from 80 to 100 per square mile and about 175 for China proper; Shantung had 528 to the square mile, and Kansu 40. Six-sevenths of China's population, however, lived on one-third of its area and was concentrated generally along the coasts and in the huge delta plains of the three great rivers, the Yellow in the north, the Yangtze in the centre and the West River in the south.

Agriculture. No statistics of production in China were available. The only reliable clue to production was the surplus exported and regularly recorded by the Maritime Customs,

under foreign control. The following estimates of China's production of chief crops was based on observation by reliable authorities: silk, 100,000,000 pounds; rice, 600,000,000 bushels; wheat, 200,000,000 bushels; soya beans, 150,000,000 bushels, 70 per cent Manchurian; Han cotton, 2,200,000 bales; Kaohang corn, 200,000,000 bushels; maize, 100,000,000 bushels; millet, 100,000,000 bushels; peanuts, 200,000 tons. Soya beans and raw cotton showed remarkable increases following 1913. Other crops remained the same.

Exports. Silk. In 1922 China exported 44,997,064 pounds of silk, a decline from 46,917,864 pounds in 1913, due to inexpert reeling of raw white silk not adapted to United States machines; 12,440,000 pounds of waste silk against 15,581,333 pounds in 1913, due to diseased worms; 11,214,666 pounds of flature silk, an increase over 9,112,266 pounds in 1913; 5,023,600 bushels of refuse cocoons compared with 3,473,200 in 1913; 4,276,933 pounds of cocoons against 3,395,866 pounds in 1913; 3,165,466 pounds of wild silk compared with 3,954,933 pounds in 1913; 2,709,733 pounds of yellow silk, a slight increase over 2,510,933 pounds in 1913; 2,356,800 pounds of pongees against 2,233,200 pounds in 1913; 2,040,533 pounds of raw white silk, a serious decline from 4,289,333 pounds in 1913; and 1,769,333 pounds of silk piece goods, a decrease from 2,366,800 pounds in 1913. More than half the white silk in 1922 went to Hongkong, where it was transhipped to Europe and America; one-sixth to France, one-sixth to the United States and one-twentieth to Great Britain. In 1914 one-half went to Hongkong, one-fourth to United States, one-sixth to France and one-thirtieth to Great Britain. Over half the raw yellow silk went to India in 1922 against two-thirds in 1913, France taking one-fourth in 1922 and one-tenth in 1913. Japan took over half the raw wild silk in 1922 and one-fourth in 1913, and the United States one-fourth in 1922, the same as 1913.

Beans, Oils, and Seeds. In 1922 China exported 33,071,471 bushels of yellow and other soya beans, 33 per cent more than in 1921 and 50 per cent more than the 22,946,566 bushels of 1913. 178,199,466 pounds of peanuts were sent abroad in 1922, which was 14 per cent less than in 1921 but 17 per cent more than the 153,798,000 pounds of 1913. Other 1922 exports of oil seeds included sesamum, 167,702,133 pounds (1913, 271,286,000 pounds); rape seed, 81,703,133 pounds (1913, 82,236,000 pounds); linseed, 74,657,600 pounds (1913, none recorded); cottonseed, 43,291,066 pounds (1913, 24,332,000 pounds). In addition to these, China exported 197,350,486 pounds of bean oil, three times the 1913 exports; 99,408,666 pounds of wood oil from the fruit of the Aleurites tree; and 51,135,100 pounds of peanut oil.

Foodstuffs. In 1922 China exported only 2,557,809 bushels of wheat, less than one-quarter the 1921 shipments against 4,106,800 bushels in 1913; 5,851,723 bushels of bran, two and one-half times 1913 exports of 2,283,000 bushels; 403,575 barrels of wheat flour, one-third of 1921 exports (none recorded in 1913); 57,641,866 pounds of egg albumen and yolk, about the same as 1921 and nearly three times 1913 exports of 20,790,400 pounds; 98,498,334 dozen fresh and preserved eggs, about same as 1921 and three times the 1913 exports of 30,266,833

dozen; 36,812,933 pounds of frozen eggs, three times the 1921 exports (none recorded in 1913); 26,640,800 pounds of fresh and frozen meats, one-quarter less than 1921 and slightly more than 1913 exports of 24,431,466 pounds; 1,798,133 pounds of preserved and prepared meats, one-quarter less than 1921 and considerably less than 1913 exports of 14,603,066 pounds; 1,999,200 pounds of poultry and game, one-fifth greater than 1921 and two-thirds the 1913 exports of 3,265,066 pounds; 23,350,533 pounds of fresh fruits and nuts, one-fifth less than 1921 compared with the 73,173,733 pounds for 1913; 13,368,533 pounds of dried fruits and nuts, one-quarter less than 1921 and one-third the 1913 exports of 30,034,400 pounds; 31,609 tons of sugar, one-third less than 1921 and four times the 1913 exports of 8400 tons; 37,731,733 pounds of green tea, 5 per cent greater than 1921 but only 2 per cent greater than 1913 exports of 36,979,066 pounds; 35,605,200 pounds of black tea, double the 1921 shipments and half the 1913 exports of 73,027,733 pounds; 2,666,933 pounds of black brick tea, 50 per cent greater than 1921 but greatly less than the 1913 exports of 57,442,533 pounds, on account of the loss of the Russian market; 228,533 pounds of green brick tea, only one-seventh the 1921 figures and a tremendous decline from the 1913 export of 23,360,133 pounds, for the same reason; 348,256 pounds of tea dust and tea tablets, 14 times the 1921 figures but less than a quarter of the 1913 exports of 1,471,733 pounds; 12,552 tons of fish and fishery products, slightly greater than 1921 and a little less than the 14,058 tons exported in 1913; 3,742,552 poultry, slightly less than 1921 (2,779,543 in 1913).

Fibres. In 1922 China shipped abroad 112,268,000 pounds of raw cotton, over one-third more than 1921 (1913, 98,505,300 pounds); 8,621,866 pounds of nankeens or cotton cloth, one-fifth less than 1921 (6,407,466 pounds in 1913); 5,168,000 pounds of cotton yarn, 50 per cent greater than 1921 (none recorded in 1913); 8,077,500 pounds of camel's wool, twice the 1921 figure and half the 1913 exports of 4,400,933 pounds; 2,070,400 pounds of goat's wool, one-fifth less than 1921 and one-third more than 1913 exports of 1,557,866 pounds; 67,679,500 pounds of sheep's wool, 10 per cent greater than 1921 and nearly twice 1913 exports of 37,368,266 pounds; 17,418,666 pounds of hemp (for 1913, 10,788,400 pounds); 24,970,666 pounds of ramie, 22,816,800 pounds in 1913; 5,714,666 pounds of jute, 50 per cent greater than 1921 and one-third 1913 exports of 14,053,866 pounds; 9,045,466 pounds of bristles, nearly twice the 1921 exports (1913, 7,028,667 pounds); 11,615,733 pounds of fowl feathers, 50 per cent greater than 1921 and one-fifth 1913 exports of 54,530,000 pounds; 4,878,000 pounds of grass cloth, one-quarter greater than 1921; and one-half 1913 exports of 2,073,333 pounds; 5,590,666 pounds of hair of all kinds, one-fifth greater than 1921 slightly less than 1913 exports of 6,421,067 pounds; 231,354 rolls of matting, two and one-half times the 1921 exports and slightly more than 1913 exports of 266,231 rolls; 24,907,007 mats, 50 per cent greater than 1921 and a little more than 1913 exports of 21,839,088; 10,607,600 pounds of strawbraid, one-half greater than 1921 and less than the 1913 exports of 13,471,600 pounds, and 10,209,241 rush hats, twice the 1921 figure compared with 6,305,180 in 1913.

Minerals. In 1922 China exported 2,377,443 tons of coal, one-third greater than 1921 and 50 per cent more than 1913 exports of 1,489,182 tons; 741,314 tons of iron ore, one-third greater than 1921 and double 1913 exports of 302,010 tons; 224,169 tons of pig iron, one-third greater than 1921, three times 1913 exports of 71,420 tons; 37,600 pounds of quicksilver, one-eighth the 1921 figures (for 1913, 4667 pounds); 15,170 tons of regulus and crude antimony, 10 per cent less than 1921 and a little over 1913 exports of 14,360 tons; 10,111 tons of tin in slabs, one-half greater than 1921 against 1913 exports of 9246 tons; 5621 tons of lead ore, one-fifth less than 1921, compared with 1913 exports of 4481 tons. In 1913 China exported 10,524 tons of zinc ore, but by 1922 the export was negligible.

Hides and Skins. China exported in 1922 32,099,200 pounds of buffalo and cow hides; one-seventh greater than 1921 and one-half 1913 exports of 66,405,066 pounds; 9,308,136 untanned goat skins, one-third greater than 1921 and greater than 1913 exports of 7,153,693; 1,340,535 pounds of horse, ass, and mule hides, one-third less than 1921 and a little less than 1913 exports of 1,517,866 pounds; 111,794 sheepskins, three times the 1921 figures and one-fifth the 1913 exports of 552,425; 937,533 tanned dressed goat skins, twice 1921 and one-third greater than 639,992 exported in 1913; 730,784 dressed lamb skins, one-fifth greater than 1921 and 50 per cent more than 1913 exports of 587,151; 557,650 dog skins made up as clothing, mats, or rugs, twice the 1921 figure and the same as 1913 exports of 591,118; 456,076 goat skins made up as clothing, mats, or rugs, three times the 1921 number and a little more than 1913 exports of 329,298; 143,551 kidskins made up as clothing, 50 per cent greater than 1921 and two-thirds greater than 1913 exports of 93,483; 68,533 lambskins made up as clothing, double 1921 and same as 1913; 42,633 sheepskins made up as clothing, mats, or rugs, eight times 1921 and same as 1913; 2,288,022 marmot skins, dressed and undressed, twice 1921 and ten times 1913 exports of 279,264; 814,539 weasel skins, one-fifth less than 1921 (1,033,582 in 1913); 77,947 fox skins, three-quarters larger than 1921 (107,069 in 1913); 77,603 raccoon skins, eight times 1921 exports and one-third 1913 exports of 226,787; 2,343,066 pounds of leather, one-third the 1921 output, compared with 2,468,533 pounds in 1913.

Miscellaneous. Other leading exports from China in 1922 were 342,947 cattle, sheep, goats and pigs, one-fifth less than 1921 but greater than 1913 exports of 318,681; 112,331,253 square feet of softwood, one-quarter greater than 1921 (1913 not specified); 548,143 cubic feet of hardwood, slightly more than 1921 (1913 not specified); 38,070,933 pounds of paper, slightly less than 1921 but more than the 33,263,333 pounds exported in 1913; 3,435,733 pounds of animal tallow, one-third the 1921 amount and one-fifth the 1913 exports of 16,370,800 pounds; 8,540,800 pounds of vegetable tallow, same as 1921 but less than one-third the 1913 exports of 29,466,400 pounds; 33,645,233 pounds of leaf and prepared tobacco, 10 per cent less than 1921, 66 per cent greater than 1913 exports of 20,268,533 pounds; 8,103,600 pounds of cigarettes, one-fifth less than 1921 but nine times 1913 exports of 992,933 pounds; 2,370,266 pounds of varnish, slightly less than

1921 but 50 per cent more than 1913 exports of 1,790,933 pounds; 34,964 ounces of musk, 10 per cent greater than 1921 and 30 per cent greater than 1913 exports of 28,800 ounces; \$2,459,698 in chinaware, 33 per cent less than 1921 (1913 not specified); \$3,016,167 in fire-crackers and fireworks, 10 per cent over 1921 30 per cent more than 1913 exports of \$2,332,766; 9,315,600 pounds of gall nuts, three times 1921 exports and one-quarter more than 1913 exports of 7,419,333 pounds; 12,600,800 pounds of ginger, one-third greater than 1921 and 50 per cent greater than 1913 exports of 8,469,733 pounds; 1,693,733 pounds of glass bangles, same as 1921, compared with 1,752,533 pounds in 1913.

Foreign Trade. Total exports for 1913 were \$299,051,963; 1922, \$536,814,917; 26 per cent to Hongkong (for transshipment), 24 per cent to Japan, 15 per cent to the United States, 6 per cent to France, 6 per cent to Russia, 6 per cent to Great Britain; 2 per cent to Singapore (for transshipment), 2 per cent to India; and the rest to the Dutch East Indies, Germany, Italy, Netherlands, and other less important countries.

Total imports for 1913 were valued at \$422,775,535; 1922, \$799,235,520; 25 per cent from Hongkong, 24 per cent from Japan, 17 per cent from the United States, 14 per cent from the United Kingdom, 4 per cent from India, 3 per cent from Germany, 1 per cent each from Russia, Dutch East Indies, Belgium, Macao, Netherlands and Singapore, and less amounts from other countries.

Chief Imports, 1913 and 1922. Raw cotton, 237,514,733 pounds in 1922—17,767,333 pounds 1913; notwithstanding rapid increase of China's cotton crop to approximately 2,200,000 bales in 1922 the spinning industry has increased even more rapidly; cotton yarn, 162,697,833 pounds, 1922—358,048,299 pounds 1913 due to rapid increase in Chinese spindles, 3,055,999 in 1922; gray shirtings, 3,270,425 pieces in 1922 and 5,209,441 pieces in 1913; white shirtings, 3,580,977 pieces in 1922 and 4,537,900 pieces 1913; plain fast black Italians, Ventians and Lastings, 1,410,830 pieces in 1922, none in 1913; colored ditto, 2,983,775 pieces in 1922 none in 1913; figured ditto, 639,455 pieces in 1922, none in 1913; 2,490,088 pieces jeans, in 1922 and 1,720,868 pieces in 1913; 2,121,431 pieces plain prints in 1922, none in 1913; 1,356,699 pieces sheeting in 1922 and 5,209,041 pieces in 1913. Machinery and fittings, \$40,512,380 in 1922 and \$5,136,000 in 1913; 61,923 tons iron bars in 1922 and 39,524 tons in 1913; 48,965 tons rails in 1922 and 19,524 tons in 1913; 20,980 tons galvanized sheets in 1922 and 15,043 tons in 1913; 25,720 tons nails and rivets in 1922 and 21,955 tons in 1913; 33,790 tons sheets and plates in 1922 and 23,852 tons in 1913; 14,726 tons pipes and tubes in 1922 and 4,257 tons in 1913; 40,460 tons of plate cuttings in 1922 and 23,984 tons in 1913; \$7,592,054 railway and street cars in 1922 and \$870,297 in 1913; \$3,611,763 locomotives and tenders in 1922 and \$560,330 in 1913; \$630,412 sewing machines in 1922 and \$644,638 in 1913; 22,725 tons of cobbles and wire shorts, 5944 tons of hoops, 8223 tons of nail rods, and 8228 tons of pig and Kentledge imports in 1913; these commodities show no imports for 1922, due to the operation of Chinese steel mills supplying these demands. American kerosene, 175,823,711 gallons

in 1922 and 112,459,925 gallons in 1913; Borneo kerosene, 4,242,242 gallons in 1922 and 23,603,943 gallons in 1913; Sumatra kerosene 18,763,408 gallons in 1922 and 41,915,648 gallons in 1913, all other kerosene 10,363,317 gallons in 1922 and 6,004,536 gallons in 1913; gasoline 4,818,271 gallons in 1922 and 465,577 gallons in 1913. Rice and paddy, 1,277,079 tons in 1922 and 360,993 tons in 1913; brown sugar, 238,700,800 pounds in 1922 and 303,679,067 pounds in 1913; white sugar, 225,778,666 pounds in 1922 and 257,742,267 pounds in 1913; refined sugar, 519,706,533 pounds in 1922 and 350,387,600 pounds in 1913; confectioners' sugar, 37,698,533 pounds in 1922 and 36,421,467 pounds in 1913; condensed milk, 73,116 dozen in 1922 and 483,720 dozen in 1913; flour, 2,449,636 barrels in 1922 and 1,766,500 barrels in 1913; fish and fishery products \$13,855,284 in 1922 and \$9,458,440 in 1913; dried fruits, \$1,154,697 in 1922 and \$555,635 in 1913; beans and peas 420,093 bushels in 1922 and 820,757 bushels in 1913; butter, 1,421,466 pounds in 1922 and 1,635,467 pounds in 1913; confectionery, \$342,298 in 1922 and \$241,714 in 1913. Aniline dyes, \$5,614,049 in 1922 and \$3,937,927 in 1913; paints and paint oil, \$1,721,542 in 1922 and \$628,935 in 1913; all other dyes, \$13,004,048 in 1922 and \$7,501,424 in 1913; chemical products, \$2,509,968 in 1922 and \$426,313 in 1913; match-making materials, \$2,342,245 in 1922 and \$1,158,541 in 1913; medicines \$5,508,346 in 1922 and \$2,935,591 in 1913; opium, 7280 pounds in 1922 and 2,418,345 pounds in 1913 (due to opium embargo on China); perfumery and cosmetics, \$2,104,385 in 1922 and \$325,392 in 1913; photographic material, \$668,917 in 1922 and \$229,437 in 1913; soap and soap materials, \$2,101,243; in 1922 and \$1,990,565 in 1913; soda, 61,550 tons in 1922 and 32,555 tons in 1913. Cigarettes, 9,837,127 thousand in 1922 and 6,209,037 thousand in 1913; tobacco, 33,871,060 pounds in 1922 and 19,057,466 pounds in 1913; cigars, 32,242 thousand in 1922 and 38,565 thousand in 1913. Leather, 17,890,800 pounds in 1922; and 14,572,666 pounds in 1913; imitation leather, \$194,725 in 1922 and \$143,873 in 1913; leather manufactures, \$97,890 in 1922 and \$277,094 in 1913; belting, \$967,803 in 1922 and \$195,301 in 1913.

Shipping. 114,619,544 tons of shipping entered and cleared from China's ports in 1921, as compared with 93,334,830 tons in 1913. Thirty-six per cent of this 1921 tonnage was British; 27 per cent Japanese and 27 per cent Chinese; 4 per cent American; 1 per cent Dutch; 1 per cent French, and the remainder of 4 per cent variously distributed. Forty-one per cent of this trade moved through Shanghai; 11 per cent through Dairen; 9 per cent through Tientsin; 8 per cent through Canton; 5 per cent through Kowloon; 4 per cent through Hankow, 3 per cent through Tsingtao, 2 per cent through Swatow, and the rest through the remaining 42 treaty ports, in lesser quantities.

Railroads. China had only 6740 miles of railroads to cover an area of 4,500,000 square miles. There was practically no new construction after 1913. The 23 different railroad lines form two north and south trunk lines, one from Changaha below the Yangtze to Peking and one extending from Shanghai to Tientsin and on up to Harbin. There is one east and west trunk line, which, when completed, will extend from Lanchow, in Kansu, to Haichow, on the sea-

coast of Shantung. There were various connecting and disconnected short lines.

National Debt. On Oct. 21, 1921, China's national debt was reliably estimated at \$1,814,002,511.88 silver (\$1 silver = about \$.50 gold). In addition there was at least \$86,000,000 (silver) contracted in concealed debt, treasury notes, and unpaid salaries of officials, or a total of \$1,900,002,511.88. The detail of this debt, which was about \$5.00 (silver) per capita is as follows: secured on Maritime Customs and Salt Revenue: general foreign loans, \$267,979,252.34; foreign railway loans, \$334,802,631; foreign indemnities, \$482,841,744; internal long term loans, \$275,226,738; internal short term loans, \$69,101,978.54; treasury notes, \$18,640,000; total secured, \$1,449,592,343.88; unsecured: foreign obligations, \$217,047,073; native obligations, \$41,412,078; concealed debt, \$65,000,000; advances on salt, \$40,951,017; additional concealed debt, \$40,000,000; treasury notes, \$14,000,000; salt bonds, \$10,000,000; Dragon Boat Festival notes, \$2,000,000; unpaid salaries, \$20,000,000; total unsecured, \$450,410,168.

Revenue. The principal sources of revenue for the central government in 1922 were collections from the Maritime Customs, \$96,104,000 silver (1913, \$66,970,003 silver) and from the salt tax, \$85,789,000 silver (1913, \$77,401,265 silver). Of the latter sum, approximately one-third was retained by local military leaders and never reached Peking. These revenues were entirely designed to take care of the secured indebtedness. Thus it became necessary for the central government to use for administrative purposes what revenue reached it from the wine and tobacco monopoly tax, the mining tax, stamp tax, postal and telegraph surplus, and income tax, all collected by the provinces. About \$2,700,000 silver a year reached the central government from all these sources in 1922. In 1913 the government collected from all sources \$557,031,167 silver. The annual expenses of the central government according to the 1922 budget were about \$110,400,000 silver, which through rigid economy could be reduced not lower than \$48,000,000 silver, leaving an annual deficit of at least \$45,000,000 silver, which had to be met by annual borrowing or failure to pay salaries of school teachers, police, and officials in the central government at Peking. Various expedients such as the issuance of Treasury notes met with such popular disapproval that other methods had to be resorted to in order to meet this chronic annual deficit. In 1913 the expenditures were estimated as \$632,236,876 silver, a deficit of \$75,205,709 silver. In 1914 this deficit was reduced by a balance of \$25,477,283 silver, and the budgets for 1916 and 1917 balanced. Extensive borrowing in 1918 brought on the almost hopeless conditions of the 1920's.

Local Budgets. The 18 provinces, only one of which, Chihli, could be identified with the central government, all had independent methods of collecting revenue, and their expenditures were made without any reference to Peking. Sources of revenue differed greatly in the various provinces. In some, opium growing was openly encouraged, and the farmers were heavily taxed by the military leaders on their sales of the product. In most provinces *likin*, or barrier taxes, were levied indiscriminately by local authorities; the movement of goods along recognized routes was so heavily taxed that trade was seriously interfered with.

Some military leaders confiscated revenues from government railways and sent receipts for their military expenses to Peking in lieu of the cash.

Disarmament Conference and China. In order to remedy the worst phases of this situation the Nine Power Customs Treaty was signed at Washington early in 1922. It provided for a Special Customs Conference at Peking three months after ratification by all Nine Powers. At this conference China was to be allowed to increase the import tariff from a 5 per cent to a 7 per cent ad valorem rate, to be levied in such manner and for such purposes as the conference should decide. The conference had not met up to 1924, because France had not ratified the treaty. Considerable divergence of opinion existed as to the use that should be made of the increased revenue, which at most could not exceed \$50,000,000 silver a year. If funded at reasonable interest, this increased revenue would not pay China's outstanding unsecured indebtedness of \$450,000,000 silver. Considerable scaling down might have to be done on all obligations on the basis of the actual use made of the original loan or advance, and in the case of much of the native and some of the foreign indebtedness this would be extremely difficult. Some of the loans, particularly those of native bankers, were at extremely high interest rates, ranging from 12 per cent to 24 per cent, and some were issued as low as 40 per cent of face value. It seemed obviously unfair that such loans should be funded at face value or that their amounts should be increased because of a low funding rate of interest. The Nine Power Open Door Treaty asserted in treaty form the principles and policies of the Powers concerning China which had been observed since 1900, when Secretary Hay sent his famous circular note to all the Powers and received their assurances that they aimed at no encroachment on China's sovereignty. The Shantung Treaty between China and Japan provided for the return to China of the leased territory of Kiaochow, taken by Japan from Germany. Several resolutions adopted at the conference dealt with the abolition of foreign post offices in China; for the investigation of the question of abolishing extraterritoriality; and for other means of controlling and eliminating international conflict in China. See NAVIES OF THE WORLD.

Government. The new constitution promulgated Oct. 10, 1923, provided that the President be elected by an electoral college composed of the two houses of the National Assembly. He was to promulgate laws enacted by the National Assembly and supervise their enforcement. With the exception of the premier, whose appointment must be ratified by the House of Representatives, and the Chief Justice, ratified by the Senate, all officials were to be appointed and removed directly by the President. He might declare war and conclude treaties of peace only with the concurrence of the Assembly. The President, with the consent of the Senate, could dissolve the House of Representatives, provided a newly elected House convened within five months. A Premier and nine Ministers were to head the usual executive departments. The adoption of the constitution was no indication of approaching political stability but merely an attempt of a dominant military clique to impose some semblance of permanence on its tenure of office. The National Assembly

was to be made up of a Senate of 264 members and a House of Representatives of 596 members. It was to exercise the legislative power. The Senate was to be elected for six years by the highest local assemblies of the various provinces. The House of Representatives was to be elected for three years by the electors in various elective districts divided on a basis of population. But it was plain that military force and bribery were to continue dominating Parliament in the future as in the past. The supreme court was to consist of a chief justice and a number of associates, five of whom, sitting together, would constitute a court. Under it were to be district courts, one in each district or *hsien*, and higher courts, one in each province. The Supreme court was to have both appellate and original jurisdiction.

Provincial government varied greatly throughout China. Some were out-and-out military despotisms. Others had a semblance of constitutional government with provincial assemblies, etc., but some strong leader in each province always collected the taxes and acknowledged little or no allegiance to the central government. Thus in the three eastern provinces of Manchuria, General Chang Tso Lin was dictator; in Mongolia there was an independent government under the domination of Soviet Russia; Tibet and Sinkiang (Chinese Turkestan) gave only a shadow of allegiance to Peking; Sun Yat Sen dominated Kwantung province in the south; Tang Chiyao dominated Yunnan province; Lu Yung-hsiang ruled Chekiang. By all of these military satraps, mandates and orders from Peking were openly disregarded. For the other provinces their effectiveness was regulated by the proximity and earnestness of the military forces of the Chihli province group dominating Peking. Actually, Peking, or the recognized government of China, exercised real control only over the city of Peking and its immediate environs. Wu Pei Fu, military dictator of Chihli province, supported the Peking government in 1924, and his support intimidated neighboring provincial military leaders into merely passive resistance and effective confiscation of revenue. Because Peking was dominated by one of the military cliques, any process of unification of China had necessarily to proceed along military rather than constitutional lines. As the independence of these provincial leaders continued to grow, their observance of rights guaranteed to foreigners in their provinces by treaties with foreign powers made by the Peking government inevitably became more lax. The foreign powers possessed no recourse against these provincial leaders, who exercised the real power, for violation of their treaty rights, but were compelled to protest to Peking, whose power over the provinces was nil. Foreign treaty rights were therefore subject to constantly greater violation without the possibility of any recourse by the Powers. The Powers, who, at the Washington Conference, offered China every opportunity to achieve absolute autonomy in respect to all of the functions exercised by foreign governments over their nationals in China, including taxation, criminal and civil authority, etc., were faced with the disagreeable task of either intervening in the domestic affairs of China or witnessing a complete disavowal of all of the treaty rights of foreigners in carrying on their peaceful and legalized pursuits.

History. At the beginning of 1914, Yuan Shih-K'ai was carefully proceeding in the execution of his plans for the reconstruction of the old autocratic government and of the centralization of power. Step by step he emasculated the innovations of western democracy and parliamentarianism. Outside of the circles of Young China these measures produced little reaction, for the mass of people were not greatly interested in the western innovations which ran counter to their instincts and customs, and, after all, they were tired of being looted in the name of liberty. It was only when the President decided to perform henceforth the Winter Solstice sacrifice at the Temple of Heaven that the people began to take notice, because by performing this ceremony, the symbol of the old emperors' function in the state, he practically proclaimed himself an autocratic ruler. This policy of Yuan Shih-k'ai was strikingly demonstrated by the presidential mandates, especially the Presidential Election Law of December, 1914, whereby the President's term of office was lengthened to 10 years. Deftly Yuan Shih-k'ai's astute statesmanship restored the authority of the central government, at the head of which he ruled as undisputed dictator.

If the restoration of the monarchy and the realization of Yuan Shih-k'ai's designs on the throne had been merely matters of internal politics, they would probably have succeeded. But questions of foreign policy intervened to frustrate Yuan's schemes. After the capture of Kiaochow the Japanese government presented on Jan. 18, 1915, a protocol embodying the notorious Twenty-one Demands, the fulfilment of which would have meant the grossest infringement of Chinese sovereignty that had occurred thus far. (See JAPAN and SHANTUNG.) After four months of negotiations, in which Yuan Shih-k'ai took the stand that acceptance of the demands would tend to impair China's sovereignty and the treaty rights of other Powers, the Chinese Foreign Office was compelled by a 48-hour ultimatum to accept most of the Japanese demands, in slightly modified form. As originally presented, the Twenty-one Demands were grouped in five sections. The first section required the Chinese government's full assent, in advance, to whatever settlement Japan and Germany might make regarding the disposition of German rights in Shantung, and the opening of additional commercial ports in Shantung and the construction of a branch from the Shantung railway to Chefoo or Lungkow. These stipulations were accepted with very little alteration and embodied in a treaty and several notes signed on May 25, 1915. In return, Japan agreed to return the leased territory of Kiaochow Bay to China, after the War, if certain conditions were fulfilled (see PEACE CONFERENCES and SHANTUNG). Section II, likewise accepted and embodied in a treaty with several supplementary exchanges of notes, strengthened Japan's grip on southern Manchuria and eastern inner Mongolia, by extending the Japanese lease of Port Arthur, Dalny, the South Manchurian Railway, and the Antung-Mukden Railway to 99 years, by granting Japanese subjects the right of leasing or owning land and engaging in any kind of business, by handing the Kirin-Changchun railway over to Japanese administration, and by assuring to Japan an option on the development of mines, financing of railways, and nomination of foreign advisers

in these provinces. Section III proposed to convert the Hanyehping Company, the great Chinese coal, iron, and steel concern located at Hankow on the Yangtze, in the British sphere of influence, into a joint Sino-Japanese enterprise with monopolistic control of future mine development in the neighborhood. To this extraordinary demand, China assented in an exchange of notes, but the clause relative to future mining operations was omitted. Section IV embodied a blanket pledge on the part of China "not to cede or lease to a third power any harbor, bay, or island along the coast of China"; this pledge China refused to incorporate in any treaty or note, as such a declaration would have implied a Japanese protectorate.

Finally, Section V, or "Group Five" as it was more commonly called, contained provisions that would have meant the firm establishment of a Japanese protectorate over China; China was to employ "influential Japanese as advisers in political, financial, and military affairs"; Japan was to have a share in the police administration "of the important places in China"; China was to purchase "say 50 per cent" of her war munitions from Japan, either directly or through a Sino-Japanese arsenal. Furthermore, Japanese were to be allowed to propagate religious doctrines, i.e. Buddhism, in China; Japanese hospitals, churches and schools were to be given the right of owning land; Japan was to build certain railways in the Yangtze valley, again infringing on the British sphere of influence; and Japan was to have an option on supplying capital for mines, railways, harbors, and dockyards in Fukien province. To Group Five the Peking government resolutely refused assent; the most that could be conceded was an exchange of notes stating that China had not given any foreign nation permission to construct military or naval works on the Fukien coast; there had been rumors of an agreement for such construction by the Bethlehem Steel Company.

Although the other items in Group Five were temporarily dropped, the Japanese government merely postponed them "for future discussion"; and they may be regarded as significantly expressive of the imperialist aims of the Japanese government in 1915. The net result of China's partial acquiescence in the Twenty-one Demands of 1915 was to fortify Japan's privileged position in her spheres of influence—South Manchuria, eastern Mongolia, Shantung, and Fukien—and to open the heart of the rich Yangtze valley to Japanese economic penetration. The attitude of the United States government toward the Japanese manœuvre was set forth in identical notes to China and Japan, May 9, stating that the United States could not recognize any agreements impairing treaty rights, the integrity of China, or the Open Door; and as Secretary Bryan had already issued a statement to the press on May 6, expressing his hope that the agreements might be mutually "satisfactory" and contribute to the "prosperity" and "cordial relationship" of "these great Oriental empires," it was obvious that the United States, while formally supporting Chinese integrity, was not disposed to offer any determined opposition to Japanese aggression.

These events served to make it clear that in any fundamental change in the Chinese govern-

ment, such as the restoration of the monarchy, Japanese intervention would have to be reckoned with. When, therefore, the State Council referred the question of the monarchy to a vote of the provinces, in October, 1915, the Japanese Minister in Peking, supported by his British and Russian colleagues, "offered friendly advice" on behalf of his government against the restoration of the monarchy. This intervention of the Powers, especially of Japan, sealed the fate of Yuan's aspirations to the throne. Although the provinces registered a unanimous vote in favor of his accession on Nov. 5, 1915, the proclamation of the monarchy on December 12 was followed almost immediately by an insurrection, which rapidly accumulated speed and became universal. The southern leaders set up a provisional government at Canton and hailed as president the former Vice-president, Li Yuan-hung. After many and prolonged manœuvres to save his face, Yuan Shih-k'ai died on June 5, 1916, of a broken heart, as it was said. Li Yuan-hung became President of the Chinese republic, and Tuan Chi-jui, Premier. If Yuan's death was universally regarded as a temporary solution of China's great internal problem, it proved almost at once to be quite the opposite.

After Yuan's death, conditions in China became rapidly more chaotic. The new Peking government made a show at parliamentary government by convening the Parliament of 1913 for Aug. 1, 1916. Its measures, however, did not tend to produce any coöperation from the southern or Canton government. The essential difference between the two camps was that Peking was dominated by the military party, a combination of military governors and shrewd politicians, in which the former used the latter for their purposes, whereas Canton represented the Kuo Min-tang party and Young China with their exuberant enthusiasm for western democracy. During the remainder of 1919 the political situation grew more disorganized. At the same time the financial situation went from bad to worse. In the spring of 1917 China's entrance into the War on the Allies' side offered a temporary way out of the difficulties besetting the country. After numerous political intrigues and wrangles, after coaxing and veiled threats from the Allies, and especially after persuasion by the United States, the Peking government finally severed relations with Germany on Mar. 14, 1917. It was clearly a matter of German intrigues having been outmatched by Allied intrigues. The declaration of war, however, was not to take place without a three months' struggle among the various opposing internal factions. The first phase involved a conflict between the protagonists of drastic action, Premier Tuan Chi-jui and the military party on the one side, and President Li, the Kuo Min-tang, and the Canton chieftains, who favored a declaration of war by parliamentary procedure, on the other. An entangled situation developed, President Li was compelled to dissolve Parliament unconstitutionally. He dismissed Premier Tuan on May 23, 1917, whereon the latter in conjunction with the military governors set up a provisional government at Tientsin. The internal strife was further accentuated by the American note of June 6, deploring the growth of internal dissensions and intimating that internal unity was more important than a declaration of war. This ethi-

cally justifiable move on the part of the United States was resented by Japan, as Tuan Chi-jui was generally regarded as a Japanese tool and had carried on a policy in accordance with Japan's wishes. A solution of the difficulties seemed to be provided by the "mediation" of General Chang Hsün of Shantung, who on June 12 arrived before Peking with an army. Chang Hsün's real intention, however, was the restoration of the Manchus and not the solution of the war issue. After 18 days of seemingly satisfactory mediation in Peking, which was only a face-saving manœuvre, Chang Hsün struck his coup d'état on July 1, 1917, and restored the Manchu Emperor to the throne. But the rule of the young Son of Heaven lasted only 12 days. Tuan Chi-jui emerged from Tientsin and at the head of an army composed of the troops of the military governors and of the republican South ejected Chang Hsün and his Manchu Emperor and reestablished the Republic. The action of Tuan and the Tsuchuns (military governors), who were all known to be monarchists, was due to the fact that the blunt and energetic Chang Hsün had stolen a march on them, much to their chagrin.

The farcical coup d'état and restoration of the Republic resulted in the resumption by Tuan of the premiership and the replacement of Li Yuan-hung as president by Vice President Feng Kuo-chang on July 18. The most important result was, however, the final declaration of war on Germany on Aug. 14, 1917. This involved the sequestration of German property and above all the systematic uprooting of Germany's financial and commercial interests in China. As a reward for joining the Allies, China received, by an agreement between the Consortium banks, a loan of 10,000,000 yen, secured against the salt gabelle revenues, as well as a suspension of the Boxer indemnities. The new government wielded relatively strong authority, especially in view of its submission, not to say subservience, to Japanese wishes. Its position, however, was seriously weakened by the opposition of the South. The southern faction had regarded a declaration of war without approval by Parliament as unconstitutional and had also protested against the exclusively militarist character of the Peking government. In June, 1917, after the dissolution of Parliament, the situation came to a head. The southern provinces revolted, and a new government, headed by Dr. Sun Yat-sen, was set up in Canton. Dissension developed thereupon among the Peking leaders about the methods to be adopted against the rebellious South. President Feng favored conciliatory methods, while Premier Tuan wished to use strong military measures. A hopeless tangle ensued, with war between the North and South, some provinces remaining neutral; a conflict between the heads of the Peking government; and independent action on the part of the northern Tsuchuns. Premier Tuan finally had his way, and as a result the war against the southern secessionists was carried on with fluctuating success during the remainder of 1917 and the first half of 1918. To preserve a semblance of constitutionality, Tuan convened an assembly for a revision of the electoral law. On the promulgation of this law on Feb. 17, 1918, a new parliament was elected, which on September 4 chose a new president. Feng Kuo-chang, who had proved unsatisfactory to the Anfu Club was replaced by

Hsü Shih-chang. The new president made a sincere effort to end the civil war between the North and the South, and accordingly on Nov. 16, 1918, he ordered the northern commanders to suspend hostilities and withdraw from southern territories. This armistice was eventually followed by a peace conference in the spring of 1919 at Shanghai, which dragged out interminably and ended in failure. Actuated by selfish motives, neither faction showed an earnest desire to come to an agreement.

Under Tuan Chi-jui and the Anfu party, China became powerless in the hands of the Japanese, since the Allies were too preoccupied with the war in Europe to interfere. In March, 1918, the Peking government concluded military and naval agreements with Japan whereby the Japanese, under the pretext of action against a Bolshevik danger, obtained a complete hold on northern China, including control of the Chinese Eastern Railway and northern Manchuria. At the Peace Conference, Japan's actions with regard to China during the War received the official endorsement of the Allied Powers when Lloyd George and Clémenceau, in accordance with secret pledges given to Japan in 1917, and President Wilson, in order to save the League of Nations, accorded Japan all the former German "rights, title, and privileges in the province of Shantung." (See PEACE CONFERENCES.) The Chinese delegates, supported by Chinese public opinion, pleaded their case with ardor and ability and refused to sign the Versailles Treaty, which contained the article relating to Shantung. The decision of the conference aroused vehement indignation in China, which Young China successfully employed to launch an anti-Japanese movement. The general disappointment and resentment of the Chinese people, who derived some comfort from the fact that the United States refused to ratify the Treaty, were directed primarily against the ruling Anfu party, whose pro-Japanese policy was blamed for the national misfortune. Although in the great excitement the guilt of that political clique was greatly exaggerated for reasons of internal policy, there was nevertheless much cause for such feeling, since the position of the Chinese delegation at the conference had been seriously injured when it became known that the Tuan government had concluded in the fall of 1918 a secret agreement whereby Chinese rights with regard to Shantung had been practically surrendered. In the summer of 1920 the anti-Japanese movement, under the influence of the agitation of the students, drove Tuan Chi-jui and the Anfu Club from the government. The Anfu leaders took refuge in the Japanese Legation, and some of them fled subsequently to Japan to escape popular wrath.

Japan worked hard to consolidate her position in China, but after the Peace Conference the Powers were once more able to devote their attention to Far Eastern affairs, and subsequent events brought about a partial modification of the Japanese policy in China. The new Peking governments were less subservient to Japan than the Anfu leaders and strove to recover some of the ground lost during the War. Repeated attempts on the part of Japan in 1920 and 1921 to come to an agreement with China regarding Shantung by offering to restore the territory provided certain concessions were granted her, failed because of Peking's steadfast refusal to consider anything short of al-

most unconditional evacuation. At the Washington Conference (q.v.) at the end of 1921, the Chinese delegation insisted on bringing the Shantung question before the Conference. The Japanese, on the other hand, wanted to negotiate with the Chinese directly, for this would have confirmed the tacit Japanese contention, contained also in the Lansing-Ishii Agreement, that China was in fact an informal Japanese protectorate. The Conference decided on a compromise by conceding the Japanese demand but providing for Anglo-American mediation in case of deadlock. When the deadlock actually took place the English and American mediators, influenced by public opinion at home, brought pressure to bear on the Japanese to give way. The Shantung Treaty which was signed by Japan and China early in 1922 provided for the restoration to China of the former German Leased Territory of Kiaochow and all public properties therein, together with the Tsingtao-Tsinanfu Railway and its branches, the value of the railway properties being reimbursed to Japan by China. The conference reached, in addition, numerous other agreements of primary importance to China. (See SHANTUNG and WASHINGTON CONFERENCE) The lapsing of the Anglo-Japanese Alliance (q.v.), as a result of the conclusion of the Four Power Treaty, should affect China greatly in the future, inasmuch as Great Britain in consequence thereof will be inclined in the future to coöperate with the United States rather than with Japan in regard to Chinese affairs. The surrender by the Japanese of Kiaochow Bay induced the British to promise to relinquish the Leased Territory of Wei-hai-wei. Provisions were also made for a revision of the customs schedule and for the abolition of the foreign post offices in China. The conclusion of the Nine Power Treaty reaffirming the Open Door and the integrity of China brought with it also the abrogation of the Lansing-Ishii Agreement.

In general the Washington Conference resulted in a material improvement of the Chinese situation with reference to the Powers. Whether it was due to pressure from the Powers or to a voluntary new orientation of Japanese policy, Japan seemed to modify thereafter her policy of encroachment on Chinese territory and sovereignty. By far the most important result of the Washington Conference with regard to China was, however, the adoption of the Open Door policy, which in substance amounts to a concerted exploitation of China by the Powers as over against competitive exploitation based on spheres of influence in the past. This development is to be ascribed directly to the efforts of the United States. The Chinese Loan Consortium and its workings were part and parcel of this policy. An agreement had been arrived at in October, 1920, whereby combined financial supervision over China had been provided through the establishment of a Four Power Consortium to represent banking interests in the United States, Great Britain, France, and Japan. The chief points in the arrangement were the establishment of an international board for the abolition of special spheres of influence, insistence on the disbanding of troops, and the combining of all railway concessions into a large Chinese railway system financed and supervised by the Consortium.

After the fall of Tuan Chi-jui and the Anfu Club from power the government passed into

the hands of the Chihli faction, which was led by the two powerful Tuchuns, Tsao Kun and Chang Tso-lin. This event meant the substitution of one military faction for another. High hopes for an improvement in internal conditions did not materialize. General Wu Pei-fu, who had been an important factor in the defeat of the Anfu Club, and who had come to the fore with the proposal for a National Convention, was deftly pushed aside. The ruling politicians of the Chihli faction began anew and on a greater scale the old struggle for spoils. The concentration of power in the hands of a few powerful super-Tuchuns who could more effectively deal with the Peking politicians than a larger number of lesser chieftains reduced the authority of the central government to a mere shadow. The President and the members of the cabinet became figureheads who governed without Parliament, obeyed the command of the Tuchuns, and were removed by the latter at will. Thus in 1921 Tsao Kun and Chang Tso-lin caused the fall of two cabinets because they were displeased with the policy of Peking. In the South the situation was no different. The Canton government had become disrupted, and intermittent fighting took place between Sun Yat-sen, his former lieutenant Chen Chiung-ming, and other factional leaders. New hope for the early cessation of the internal strife was derived from the struggle of the super-Tuchuns for supremacy in 1922. Wu Pei-fu, lord of the Yangtze, opposed Liang Shih-yi who was a creature of Chang Tso-lin, lord of Manchuria. An armed struggle took place between Wu and Chang in the course of which the latter was defeated and driven back to Manchuria. By virtue of his victory over the powerful Chang, General Wu found himself in the position of dictator. He forced President Hsü Shih-chang and the Cabinet to resign and recalled former President Li Yuan-hung and the twice-dissolved Parliament of 1917. In view of Li's reputation as a defender of parliamentary rule and of General Wu's supposed liberal tendencies, these developments gave rise to hopes for the establishment of orderly and constitutional government.

These hopes were sadly disappointed, for neither President Li, nor Parliament, nor the Cabinet, which was composed of leaders of Young China, were able to cope with the situation, and General Wu's good intentions had been grossly exaggerated. The Tuchun rule remained essentially the same as before, with each of the three powerful leaders, Wu Pei-fu, Tsao Kun, and Chang Tso-lin, striving for supremacy. Likewise the relations between the North and the South did not undergo a change. During 1922 and 1923 General Wu repeatedly prepared to invade the South for a final combat with the Canton government but in each case was prevented from doing so by the rivalry of the other Tuchuns. Sun Yat-sen also was too occupied with fighting his rivals in the South to carry out his threat to move against Peking. Slowly, however, two large hostile camps evolved, the northern group under Wu Pei-fu and Tsao Kun, with Chen Chiung-ming in the South as collaborator, and the southern group, led by Dr. Sun Yat-sen, who counted on the aid of Marshals Chang Tso-lin and Tuan Chi-jui in the North. Open hostilities did not develop for some time because the leaders on either side were too busy fighting their rivals

and pursuing their own petty schemes. New political squabbles and intrigues took place at Peking during the first half of 1923, in the course of which President Li Yuan-hung clashed with the militarists and was forced to seek refuge in Tientsin. When compelled by the governor of Chihli, a follower of Tsao Kun, to renounce all claims to the Presidency, he fled to Shanghai, where he attempted unsuccessfully, in conjunction with 200 members of Parliament, to form a provisional government. Li subsequently found an asylum in Japan, and this eliminated him for the time being from the Chinese political arena. The election of a new president was delayed for some time, because the absence of some 200 members in Shanghai left Parliament short of the three-fourths majority required for a presidential election.

After several months of deadlock, Marshal Tsao Kun, who was very eager to become president, bribed a sufficient number of the recalcitrant members to return and was duly elected in October, 1923, by 420 votes, for each of which he paid \$5000. He thus emerged as the most powerful factor in the North. His reputation as a veteran military leader, his great military and financial resources, and his alliance with Marshal Wu Pei-fu aroused hope that in the end he would be the man to unite the many factions and bring order out of chaos. On the whole Tsao Kun used his new authority well, inasmuch as he installed a cabinet which enjoyed public confidence and immediately on his inauguration had Parliament adopt a new constitution which superseded the old provisional constitution and which provided for far-reaching provincial decentralization. Moreover he faithfully supported Wu Pei-fu in his campaign against the South, which assumed a new and more promising aspect during the first half of 1924. In the spring of that year General Wu finally succeeded in conquering a large portion of Southwestern China and thereby obtained a strategic position for the final attack on the Canton government. While the military situation thus changed in favor of the Peking government, there still remained in the extreme North the powerful Chang Tso-lin, who with Japanese support successfully challenged the authority of Peking from his stronghold in Manchuria. General Wu's victories in the South materially increased his power and gave him additional influence on the internal affairs of the Peking government. As long as Wu Pei-fu and Tsao Kun remain allied and sink their personal rivalries and ambitions into effective coöperation toward the unification of China, there seems reason to hope that this end will finally be attained. Meanwhile the confused situation in the South continued without change. Sun Yat-sen carried on desultory warfare against his southern rivals. Having exhausted all means of obtaining the necessary financial support, Dr. Sun started several times during 1923 and the early part of 1924 to seize the customs revenues in Canton which had been pledged against foreign loans. These moves involved him in difficulties with the Powers and brought foreign warships to the scene.

Perhaps the most serious difficulties besetting China during the last few years of the decade were financial disorders and the bandit problem, which were direct results of internal strife and Tuchun rule. The Peking government found it increasingly difficult to collect revenues for ear-

rying on the administration and for paying outstanding foreign obligations. The military governors in the interior withheld the taxes and used them for their own selfish purposes while certain lucrative revenues, such as the customs duties and the income from the salt gabelle, were pledged as securities for foreign loans. At the same time the financial supervision of the Consortium struck a snag because the Chinese government refused to give the guarantees which were regarded by the international bankers as absolutely necessary for the stabilization of Chinese finances. The bandit problem was no less vexing. Endless civil war and Tuchun rule had resulted in a tremendous increase of the mercenary soldiery fighting for one or the other of the many factions. On the failure of the chieftains to pay their undisciplined hosts, or on their disbanding, these soldiers resorted with arms in hand to open banditry. For lack of authority the central government was either unable or unwilling to cope with this situation. Consequently murder, rape, and robbery were almost daily occurrences. Many cases of kidnapping of foreigners, particularly of missionaries, took place during 1923 and the early part of 1924. The most flagrant incident was the derailling of the Shanghai-Peking Express on May 6, 1923, which resulted in the abduction of some 300 passengers, including 20 foreigners. This affair elicited sharp protests from the Powers. After dilatory tactics on the part of the Peking government, the foreign prisoners were released some months afterward and remedial measures were taken in the fall of the year, but no actual alleviation of the bandit evil was effected. In fact, certain occurrences seemed to invite the conclusion that the bandits operated with the connivance of some of the military governors and that the Peking government was afraid or unwilling to take strong measures against them.

Of late years some improvement took place in China's relations with foreign countries. As a result of the Washington Conference and from other causes, Japan's attitude toward China underwent a slight modification. In accordance with the Treaty concluded at Washington, Tsingtao was returned to China on Dec. 10, 1922, against the payment of 14,000,000 gold yen, and the Tsingtao Railroad was restored on Jan. 1, 1923, on China's promise to compensate Japan in due time by the payment of 53,000,000 gold marks. A Chinese note of Mar. 10, 1923, requesting the abrogation of the Sino-Japanese Treaties and Agreements concluded in the spring of 1915, was met by Japan with a blunt refusal. (See JAPAN.) Japan maintained her hold on Inner Mongolia and Manchuria, and in the latter province she encouraged Chang Tso-lin in his open defiance of the Peking government. (See MONGOLIA and MANCHURIA.) The restoration of Wei-hai-wei by Great Britain and of Kwang-chow-wan by France, in accordance with the agreement concluded at the Washington Conference (q.v.), had not been effected by the summer of 1924. The delay in regard to Wei-hai-wei was due to the failure of Great Britain and China to agree on the terms of surrender, while the refusal of the French to return Kwang-chow-wan at this time must, no doubt, be ascribed to the difficulties between France and China over the Boxer Indemnity installments. The Chinese insisted on paying these installments in the depreciated French pa-

per currency instead of in gold francs as the French demanded. The protracted wrangles over this question were also responsible for the failure of the French to ratify the Washington Treaty which provided for a 2½ per cent increase in the Chinese Tariff (see WASHINGTON CONFERENCE) and thus brought about indefinite delay in the application of this very important financial agreement. Of outstanding importance were the agreements concluded between China and Soviet Russia during the spring and summer of 1924. These should greatly affect China's relations with the Powers. Since the consolidation of Soviet rule in Siberia, Russia adopted a definite Chinese policy and began to make overtures to China. This policy resulted after many preliminary negotiations in the conclusion of a treaty between China and Soviet Russia on May 31, 1924, whereby Russia obtained full and unconditional recognition from China and control over the Chinese Eastern Railway, while she pledged in return to withdraw her troops from Outer Mongolia. (See MONGOLIA.) In substance this meant the entrance of Soviet Russia into the Chinese arena in opposition to the western Powers. In the light of the rearrangement of Far Eastern policies at and since the Washington Conference and the reported Russo-Japanese rapprochement, this development should be of far-reaching significance for China and might well foreshadow a Russo-Japanese understanding with regard to China. Protests against the agreement were entered by the United States, France and Japan, on the ground that their financial interests in the Chinese Eastern Railway were not adequately protected.

CHINA, ANCIENT CIVILIZATION OF. See ETHNOGRAPHY.

CHINARD, GILBERT (1881-). A French philologist. He was born in Châtelleraut, and studied at Poitiers and the Sorbonne. He was professor of French language at the College of the City of New York in 1908, then for four years at Brown University, and from 1912-19 at the University of California, teaching during the summer sessions at Columbia University. Since 1919, he has been professor at Johns Hopkins. He has published among other works: *L'exotisme américain dans la littérature française au XVIème siècle* (1911); *L'Amérique et le rêve exotique* (1913); *L'exotisme américain dans l'œuvre de Chateaubriand* (1918); *Chateaubriand, Les Natchez* (1919); and *La doctrine de l'Américanisme* (1919).

CHIROL, SIR VALENTINE (1852-). An English journalist and writer on the Orient (see VOL. V). His later works include: *Cecil Spring-Rice: In Memoriam* (1919); *The Egyptian Problem* (1920); and *India Old and New* (1921).

CHIROPRACTIC. A system of preventing and healing disease by manipulation which followed the success of osteopathy but which its practitioners assert to be of independent origin and derived by its originator, D. M. Palmer, from discoveries made accidentally during so-called magnetic healing. At first a practitioner of the latter and conductor of a school of magnetic healing, D. M. Palmer, then of Davenport, Iowa, changed his methods to what he designated as chiropractic. He soon established his cult in Oklahoma, where he opened a college. This period, from the accidental discovery until the establishment of the school, covered the decade

1895-1905. Palmer later removed to California and continued his practice there until his death at San Diego in 1913. Disputes arose as to the legitimate successor of Palmer and also as to the essential features of chiropractic. In the absence of harmony among the leaders it is exceedingly difficult to present a satisfactory sketch of the movement. E. D. Palmer, son of the founder, opened a school of Chiropractic at Davenport which turned out thousands of graduates practicing the so-called Palmer method. On the other hand, Wilfred Carver, originally a practicing attorney who acted in a professional capacity for D. M. Palmer, became interested in the method, and in 1909 he published the first work on the subject. He was at the head of the Carver School of Chiropractic in New York in 1924. He also drew the bills for legitimizing the practice of chiropractic in Oklahoma in 1907 and in the District of Columbia in the following year. In the meantime the practice had been legalized in several States, while bills were pending in others. By 1924 the cult claimed many thousand practitioners and millions of adherents. It seemed to have outstripped for the time the older cult of osteopathy, which had progressively elevated its standards and eliminated the opportunities for practice by the unqualified.

It was admitted by the legitimate chiropractors that many bogus graduates and unqualified practitioners were usurping the name and functions of chiropractic, and they asserted that universal legalization of the practice would be necessary to eliminate this fraudulent element. Owing to the highly technical character of the manipulations of chiropractic, as well as the different conceptions of the art by its own practitioners, and the resemblances between chiropractic and osteopathy, no attempt will be made to describe them here. The late Dr. A. Abrams of San Francisco attempted in 1910 to incorporate the teachings of both osteopaths and chiropractors in a highly technical work called *Spondylotherapy*, which in a few years passed through five editions. This book is not regarded as authentic by the cults mentioned, both of which issue their own textbooks and propaganda; but it is of much interest as a document seeking to establish manipulation of the vertebrae on a scientific basis.

CHITTENDEN, RUSSELL HENRY (1856-). An American physiological chemist (see VOL. V). During the War, Chittenden was a member of the Advisory Committee on Food Utilization and also a member of the Executive Committee of the National Research Council. He edited the United States Report of the Inter-Allied Scientific Commission.

CHLORINE. See CHEMISTRY.

CHODAT, ROBERT (1866-). A Swiss botanist (see VOL. V). In 1914, he was made a member of the Lennean Society and in 1908 became director of l'Herbier Boissier. He published another volume of *Principles of Botany* in 1920, and *Vegetation of Paraguay* (1916, 1921).

CHÖSEN. See KOREA.

CHRISTEN, JOSEPHINE (1869-). An Austrian sculptor and feminist. She was born in Bohemia of Czech and French parentage. She studied music and for 13 years was on the operatic stage under the direction of the famous manager Angelo Neumann. Then she studied art in Prague and later in Paris, and

in 1908 settled in Vienna. From 1915 to 1917, she was with the Austrian army as official sculptor, and in 1918 exhibited her war work. Since then she has become absorbed in political life, and is the founder and president of the Austrian women voters' association. Her principal works are "Cain," "Salome" and "The Consoling Muse." She has also done many private monuments and has exhibited in Paris, Vienna, Turin, etc. Her unusual versatility is proved by the fact that she has also published musical compositions, among them a mass.

CHRISTIAN X, CARL FREDERIK ALBERT ALEXANDER VILHELM (1870-). King of Denmark (see VOL. V). By his personal popularity and tact he was able during the War to keep Denmark to a strict neutrality. The great event of his reign was the plebiscite which brought back North Schleswig to Denmark. During his reign more than 2500 square miles of useless land were reclaimed to agriculture; a merchant marine was developed; world-wide commercial enterprise launched, such as the Great Northern Telegraph Company and the East Asiatic Company; and a number of important scientific discoveries were made.

CHRISTIAN CHURCH. During the decade 1914-24 the Christian Church changed the name of its administrative body from the American Christian Convention to the General Convention of the Christian Church. According to the Federal census there were, in 1916, 1213 ministers; 1265 churches, including 111 colored; 118,737 members, including 10,120 colored; and 1115 Sunday schools, with 91,853 members. These compared with the statistics reported to the denomination in 1923 as follows: 1002 ordained ministers, including 204 colored; 1179 unordained, including 177 colored; 1134 churches, including 169 colored; 103,091 members, including 10,258 colored; 851 Sunday schools with 82,614 members; and 301 Christian Endeavor societies with 7141 members. It was estimated by the secretary that membership was 10,000 more than that reported in 1923.

The foreign mission work was extended in the 10 years by the addition of two single workers and one family in Japan, and one single worker and two families in Porto Rico. There was a corresponding gain in the number of national workers in each field, and new types of work were added, including kindergartens, a night school, newspaper evangelism and a lending library of religious books, and a large amount of interdenominational coöperative work. A church, a parsonage, and a mission home were added to the equipment in Porto Rico; and three chapels, three combination chapel-kindergarten-parsonages, and one kindergarten building were added in Japan, and a good deal of rebuilding was done following the earthquake. New stations were added in both fields. The total membership of churches in Porto Rico increased from 200 in 1914 to 300 in 1924, and in Japan from 819 to 1694.

The departments of Sunday school, Christian Endeavor and education were merged into the department of Christian education, a department of evangelism and life recruits was added, and stewardship was being pushed by a secretary. The home mission department more than trebled its income and its force of workers, added work among Indians, new Americans and mountaineers, and developed a church exten-

sion work. The denomination conducted six colleges, one di.inity school, and a college for colored people at Franklinton. The college buildings at Elon College, N. C., which were totally destroyed by fire in 1923, were replaced by larger and wholly modern buildings. Books, tracts and several magazines were published by the denomination.

CHRISTIAN ENDEAVOR, UNITED SOCIETY OF. Founded in 1881. This is an interdenominational society of young people whose purpose is the training of converts for church membership and church work. Its activities are divided into four classes: junior, intermediate, and senior societies, and alumni councils. The number of societies throughout the world increased from 75,000 in 1914 to 79,157 in 1923. From 1917 to 1923, when the world increase was from 78,039 to 79,157, the number of societies in the United States decreased from 52,462 to 46,560; the number in Canada decreased by four, from 4094 to 4090, and the number in foreign countries increased from 21,483 to 28,507. The Comrades of the Quiet Hour, who devoted themselves to a definite period of meditation and prayer each day, increased in membership from 168,779 in 1918 to 225,277 in 1923; the Tenth Legion, whose members gave one tenth of their incomes to religious work, increased in membership from 51,302 to 66,901; and the Life Work Recruits, young people who were ready to give themselves to full-time church service, increased from 4668 to 7217. In 1919 an alumni department was established. The degree of Christian Endeavor Expert was given to 39,864 young people who passed a definite examination in Christian Endeavor method.

CHRISTIANS. See **CHRISTIAN CHURCH.**

CHRISTIAN SCIENCE. The number of Christian Science organizations increased from 1551 in 1915 to 2117 in 1924; the number of lectures given, from 1530 to 3084, the estimated attendance being 1,200,000 and 2,389,677 respectively. The trustees under the will of Mary Baker Eddy announced in 1914 that they would use the income of the trust to contribute toward the expense of distributing authorized literature throughout the world, to the expense of lectures given outside the United States, Canada, and Great Britain, and to assist so far as possible in building church edifices. During the year ending June 1, 1924, the number admitted to membership in the Mother Church was greater than at any time during the history of the movement. Reports from branch churches throughout the world also indicated a substantial growth in membership and regular attendance. The sale and distribution of authorized Christian Science literature, including the circulation of the *Christian Science Monitor*, showed a marked increase. In 1917 Mrs. Eddy's major work, *Science and Health with Key to the Scriptures*, was published in French, and the French *Héraut de Christian Science*, a monthly periodical, was established. Pamphlets on Christian Science were published in practically every language known to civilization.

During the War the denomination maintained relief work among the soldiers and sailors of the various countries, which, together with its healing work, was the subject of favorable comment by men high in government, military, and medical authority. Christian Science chaplains

for both the army and navy were appointed. Through one of these relief work was carried on in the Near East. The prompt and generous aid furnished by the Mother Church and its branches to the earthquake sufferers in Japan was officially recognized by the Japanese government. Prominent among the important changes of 1914-24 favorably affecting the legal status of Christian Science as a purely spiritual system of healing was the incorporation of an amendment in the Federal Maternity and Infancy Bill (see MATERNITY PROTECTION), giving to parents or guardians the right to determine the form of treatment to be administered to a child. As a result of legislative enactment Christian Science became an authorized mode of healing in the United States and practically all foreign countries. A sanatorium was opened in 1920 at Brookline, Mass., for the purpose of healing the sick and caring for some of those who had been associated with Mrs. Eddy in establishing the Christian Science Church and who were in need of provision for their peace and comfort during their mature years. In 1919 the trustees of the Christian Science Publishing Society brought suit against the Christian Science Board of Directors of the First Church of Christ, Scientist, in Boston, called the Mother Church, to determine whether the trustees or the Board of Directors had control over the policies of the publications. The Supreme Court of Massachusetts handed down a decision in favor of the Board of Directors in 1921. A memorial to Mrs. Eddy in Mt. Auburn Cemetery, Cambridge, Mass., was completed in 1917 at a cost of \$150,000, raised by voluntary contributions from beneficiaries of Christian Science.

CHRISTIE, GEORGE IRVING (1881-). An American educator, born at Winchester, Ont., Canada. He graduated from Iowa Agricultural College in 1903 and from that year to 1905 was assistant in agronomy in the Iowa State College. From 1905, he was connected with the agricultural department of Purdue University as superintendent of agricultural extension, director of the Agricultural Experiment Station, and director of the Summer School for Teachers. From 1917 to 1919 he was State Food Director for Indiana, and was assistant secretary of agriculture in 1918-19. He was also a member of several important boards relating to agriculture during the War, and in 1919 was a member of the National Commission for the Employment of Soldiers and Sailors.

CHRISTY, HOWARD CHANDLER (1873-). An American painter (see VOL. V). He returned to portrait painting in 1920 and painted portraits of Will. H. Hays, George Harvey, Post Wheeler and others. He also painted the picture of the late President Warren G. Harding for the U. S. S. *Leviathan*.

CHROMOSOMES. See ZOÖLOGY.

CHUBB, PERCIVAL (1860-). An American educator (see VOL. V). He was president of the Drama League of America from 1915 to 1917 and from 1918 to 1920.

CHURCHES OF CHRIST IN AMERICA, FEDERAL COUNCIL OF. See FEDERAL COUNCIL OF CHURCHES OF CHRIST IN AMERICA.

CHURCHILL, CHARLES SIMON (1856-). An American railway official, born in New Britain, Conn. He graduated from the Sheffield Scientific School in 1878 and from 1879

to 1881 was engaged in surveys and railroad construction in Connecticut and Pennsylvania. He served as superintendent of construction and as engineer of many important railroads in the Middle West and from 1918 was vice-president of the Norfolk and Western Railroad. He was chairman of commissions representing the Southern group of railways on Federal valuation, in 1913. He was an authority in the ventilation of railway tunnels and on the testing of materials. He was a frequent contributor of technical articles to engineering publications and was a member of several scientific societies.

CHURCHILL, WINSTON (1871-). An American author (see VOL. V). His most recent works include: *A Far Country* (1915); *The Dwelling Place of Light* (1917); *A Traveller in War-Time, with an Essay on the American Contribution to the Democratic Idea* (1918); *Dr. Jonathan*, three-act play, (1919); and *The Crisis* (1921).

CHURCHILL, RT. HON. WINSTON LEONARD SPENCER (1874-). An English statesman (see VOL. V). At the outbreak of the War he was First Lord of the Admiralty but was forced to resign in 1915, and was then appointed Chancellor of the Duchy of Lancaster. He entered the army in 1916 and went to France as major in the Grenadier Guards, but retired in the same year. In 1917-18, he was Minister of Munitions. He was blamed for the Dardanelles disaster of 1917, but nevertheless was appointed Secretary of State for War and for Air in 1918. He held this office until 1921, when he became Secretary of State for the Colonies. In 1914, he was Rector of Aberdeen University.

CHURCH OF ENGLAND. See ENGLAND, CHURCH OF.

CHURCH OF GOD. See ADVENTISTS.

CHURCH OF THE NEW JERUSALEM. See NEW JERUSALEM, CHURCH OF.

CILICIA. This region in southeastern Asia Minor was the centre, after the War, of Armenian nationalistic aspirations and later of French imperialistic schemes. It was occupied by the British-French forces in their triumphant march north in 1918; its control fell to the French in 1919 in accordance with the terms of the secret Sykes-Picot agreement of May, 1916. The later discredited Sèvres Treaty of 1920 put the stamp of approval on the occupation by assigning a portion of Cilicia to the French mandate territory of Syria. A secret treaty, signed at the same time by France, Great Britain, and Italy, protected France in her rights in the rest of the territory by means of a zone of influence. Armenians flocked there in the hope of gaining asylum as well as possible French support in operations against the Turkish Nationalists who late in 1920 were moving against their compatriots in the East. The French policy had veered about, however. Rather than manifest an interest in Armenians, the French bent all their energies to conciliating the Turks. Armenians, who complained bitterly of Turkish massacres in the Taurus, were informed by French officials that they must either accept Turkish rule or be prepared to quit the country. The Turks, strangely enough, were unyielding, and French attempts at the pacification of Cilicia were stubbornly resisted in 1920-21. The policy proved wasteful and ill-advised, and from March, 1921, the

French tried to withdraw as gracefully as they might. In that month, Briand met with a Turkish Nationalist at London to effect an understanding, but the French concessions were not deemed adequate by the Turkish National Assembly. Finally, on Oct. 20, 1921, France and the Angora government signed a treaty which provided for the evacuation of Cilicia. (See **TURKEY**.) A subsequent agreement provided for the protection of the Christian populations, the postponement of military conscriptions, and the creation of a Franco-Turkish commission with Cilician representation for the safeguarding of property. By Great Britain the step was regarded with hostility, for it meant a further repudiation of the Entente as well as the endangering of British interests in the Near East. The boundary between Syria and Turkey, as fixed by the treaty of Oct. 20, 1921, was written into the Treaty of Lausanne of July 24, 1923. Cilicia thus once more reverted to Turkey.

CINCINNATI. The second city of Ohio. The population increased from 384,745 in 1910 to 401,247 in 1920, and to 406,312, by estimate of the Bureau of the Census, in 1923. A new home rule charter was adopted in 1918 by popular vote and the ballot thereafter was shortened, as the city treasurer and city solicitor were to be appointed by the mayor instead of being elected by the public. A city planning commission was created and given extensive powers, and a zoning ordinance was enacted in 1924. A rapid transit system was under construction, a portion of which utilized the right of way of the abandoned Miami and Erie Canal, which was turned over by the State to the city for the purpose. Eleven miles of the system, which was to be 16½ miles long, were finished in 1923. The completed work was to include 2.45 miles of subway, 9 miles of open track-
age, 0.2 miles of tunnel, 3.4 miles of concrete trestle, and 1.4 miles of concrete elevated structure. A double deck terminal for interurban electric cars was finished the same year at a total cost of approximately \$11,000,000. The work of locking and damming the Ohio River with a view to establishing a 9-foot stage the year round was practically completed in 1924 and was expected to prove of especial benefit to Cincinnati in the shipment of coal from the Kentucky, Tennessee, and West Virginia fields. As a result of the War the city became a most important machine tool and metal working centre. See **CINCINNATI, UNIVERSITY OF**.

CINCINNATI, UNIVERSITY OF. A coeducational municipal institution at Cincinnati, Ohio, founded in 1871. The student body increased more than 150 per cent, from 1866 in 1914 to 4756 in 1924 and 323 in the summer of 1923; the faculty from 186 to 323 members; and the library from 96,000 bound volumes and 79,000 pamphlets, to 129,371 volumes. The productive funds rose from \$1,500,000 to \$4,291,244, and the income from \$299,000 to \$1,068,933. The College of Commerce was fused with the College of Engineering, which was known thereafter as the College of Engineering and Commerce; the Cincinnati Hospital Training School for Nurses became a department in the College of Medicine in 1916; the Cincinnati Law School became the College of Law of the university in 1918; the School of Household Arts, organized in 1914, was made the department of home economics in the College of Education; a new department

of hygiene and physical education was organized in 1916; and a department of leather research and a professorship of surgical anatomy were created in 1921. In 1922 the School of Applied Arts was opened under the direction of the dean of the College of Engineering and Commerce. A chemistry building and a women's building were completed in 1916 and a dormitory for men in 1923; the Alphonso Taft College of Law building was under construction at a cost of \$250,000 in 1924; the Tanners' Council of America was building a \$100,000 research laboratory in connection with the College of Engineering and Commerce. Francis Baldwin gave the university \$600,000 in 1916 and the Carnegie Corporation and the Rockefeller Foundation \$200,000 each in 1920; the Graduate School and classical department received a gift of \$275,000 in 1923. Frederick Charles Hicks succeeded Charles William Dabney, Ph.D., LL.D., as president in 1920.

CINCINNATI SYMPHONY ORCHESTRA. See **MUSIC, Orchestras**.

CITIES. See **MUNICIPAL GOVERNMENT**.

CITRUS CANKER. See **PLANTS, DISEASES OF**.

CITY MANAGER. See **MUNICIPAL GOVERNMENT**.

CITY PLANNING. Although the War brought city planning and replanning projects in Europe to a sudden stop and put a gradual stoppage to such work in the United States and Canada, yet in the long run it did much to stimulate such planning in all the warring countries. This arose, first of all, through the planning of industrial war towns, either new ones or additions to old settlements, which, under various new social stimuli, made use of the new art of city and town planning to increase the amenities of urban industrial life. The reconstruction of devastated areas in Europe also gave rise to much careful city planning for immediate or early execution. In the United States there was much planning despite the War, especially before America joined the Allies. In addition to all this, 1915 and 1916 saw the beginning in the United States of the great city zoning movement which gained impetus by 1920 and has since swept over the country. The fact that zoning requires no construction outlay and comparatively little operating expense and that it prepares the way for the more orderly, more economical and more efficient construction of several kinds of municipal works facilitated zoning at a time when many other municipal activities were almost at a standstill. Although not known by that name at the time, zoning in America was begun as early as 1904 by Boston, following State enabling legislation of 1898 and 1904 which empowered Boston to limit the height of building near the public library on Copley Square. In 1909, Los Angeles instituted zoning in a limited way. In 1915 zoning was adopted by Neenah, Wis. What gave it its real start in America was the exhaustive study of the subject made in New York City, followed by the adoption of a remarkably complete zoning ordinance in 1916, under a State enabling act passed two years earlier. A second city adopted zoning in 1916 and three States in 1917. Eight joined the ranks in 1918, 14 in 1919, 28 in 1921, 70 in 1922, and 81 in 1923. On Jan. 1, 1924, zoning had been adopted by 221 American cities in 27 States; 35 States and the District of

Columbia had authorized zoning, and in two States zoning had been adopted, by one city in each case, without State authorization.

The distribution of the 221 zoned municipalities and the character of the zoning are shown by the table on page 303 made up for use here from a list of zoned cities compiled by the Division of Building and Housing of the United States Department of Commerce. The original list cites the dates and character of the zoning enabling acts passed by 35 of the 48 States of the Union, some giving broad powers to all municipalities and others restricting the scope of the work and the cities permitted to undertake it. Zoning is effected by a city ordinance. When comprehensive it prescribes the percentage of the area of lots which may be covered with buildings or sets a minimum limit on the depths of front and rear and the widths of side lots; the heights to which buildings may be carried, either specifically or in relation to street widths, but generally with provisions for towers and for carrying other limited parts of a building above the main cornice line by means of one or more setbacks; and the classes of buildings that may be erected, as, for instance, residence, business or industrial. Generally there are two or more subdivisions in each main class. For instance, there may be single-family, two-family, and apartment-house residence districts, or even many more subdivisions in this class. The *Chicago* zoning ordinance, adopted by the unanimous vote of the city council on Apr. 5, 1923, provides for four classes of use and five classes of volume districts, with control by the city building commissioner. According to approved practice, there is a board of appeals. The ordinance was framed by a commission of 22 city officials, business men, engineers and architects. The use districts are private residence, apartment, commercial, and manufacturing. The volume districts are for the regulation of heights of buildings and percentage of lots built on and are thus combinations of the more usual height and area districts. The volume classification for private residences, two-story flats, and similar buildings is 33 feet to the roof line, and a considerable allowance for yard space; for three-story apartments, 66 feet; taller apartment houses, 132 feet; warehouse and office buildings, near the central district, 198 feet; downtown, 264 feet. These heights may be exceeded at certain distances back from the cornice and by spires and other projections.

Constitutionality of Zoning. The legal basis of zoning is the police power. Reliance should not be placed on the general grant of police powers by the State to the city but rather in specific State zoning legislation, preferably but not necessarily applicable to all the municipalities of the State. Since there was no such thing as zoning when many of the State constitutions were adopted, it has been considered necessary or advisable to secure constitutional amendments authorizing zoning in some States. A considerable body of court decisions in support of zoning has been built up; some of these have emanated from the United States Supreme Court. Broadly, the power to authorize zoning rests with each State legislature, subject only to inhibitions, generally implied if construed as existing. A standard or model State zoning enabling act was drawn in 1922 and revised as of Jan. 1, 1923, by a com-

mittee of experts appointed by Secretary of Commerce Hoover; this was obtainable from the United States Department of Commerce. Acts modeled wholly or partly on this standard had been passed by 11 States and were being considered by the Legislatures of four others early in 1924.

State court decisions up to 1924 were in some cases strongly adverse to zoning and in others equally strong in support of its legality under the State constitution. Thus in 1923 there were two adverse decisions in the *New Jersey* Supreme Court and one in the *Missouri* Supreme Court, while the *Louisiana* and *Wisconsin* courts upheld local zoning ordinances. The two adverse decisions in New Jersey were limited in application compared with those in the three other States and are subject to appeal. The Missouri decision, in the highest State court, was sweepingly against zoning as outside the police power and confiscatory, while the Louisiana and Wisconsin decisions, also in the highest State courts, were as unconditionally sweeping in the opposite direction. The New Jersey decisions were still under appeal in May, 1924. The Missouri decision, four to three, held that the St. Louis zoning ordinance "provides for the taking of property for a public use without compensation and without a judicial hearing," is outside the police power, and would result in "confiscation pure and simple." The *New Orleans* zoning ordinance, sustained by the Louisiana Supreme Court in reversal of a lower court, rests on this authorization of zoning in the Louisiana constitution of 1921: "All municipalities are authorized to zone their territory to create residential, commercial and industrial districts and to prohibit the establishment of places of business in residential districts." The court held that the New Orleans ordinance "is a valid exercise of the police power" and not in violation of the Federal constitution. The Louisiana court even went so far as to declare that æsthetic considerations, as affecting "the comfort and happiness of the residents" of a district and sustaining "in a general way the value of property in a neighborhood," may be protected by a zoning ordinance. It also said: "An eyesore in a neighborhood of residences might be as much of a public nuisance, and as ruinous to property values in the neighborhood generally, as a disagreeable noise, odor, or menace to safety or health."

In the *Milwaukee* decision, given by the State Supreme Court of Wisconsin on Dec. 11, 1923, the court said in part:

"If in the prosecution of governmental functions it becomes necessary to take private property, compensation must be made, but incidental damage to property resulting from governmental activities or laws passed in the promotion of the public welfare is not considered a taking of the property for which compensation must be made.

"This is no new idea, although it has but recently taken the form of legislation. Every one who has observed the haphazard development of cities, the deterioration in the desirability of certain residential sections by the encroachment of business and industrial establishments on and into such sections, resulting in the consequent destruction of property values and in the ultimate abandonment of such sections for residential purposes, has appreciated the desirability of regulating the growth and development of our urban communities.

"Fresh air and sunshine add to the happiness of the home and have a direct effect on the well being of the occupants. It cannot be denied that a city systematically developed offers greater attractiveness to the house seeker than a city developed in a haphazard way. The one compares to the other as a well ordered department store compares to a junk shop."

By a unanimous decision of the Kansas State Supreme Court in a *Wichita* case, the validity of excluding a commercial building from a residence district was established. Included in the decision were these sentences: "There is an æsthetic and cultural side of municipal development which may be fostered within reasonable limitations. Such legislation is merely a liberalized application of the general welfare purposes of the State and Federal constitutions." (See *National Municipal Review*, June 1923, for synopsis of case and decision.)

The Missouri decision is not locally construed as wholly invalidating the St. Louis zoning ordinance. The City Counsellor of St. Louis having ruled that the height regulations were still in force, an ordinance was approved by the mayor on Mar. 11, 1924, repealing the old height limits, which varied from 150 feet in the business districts to 45 feet in outlying sections, with 10 per cent additional in some cases, and providing that buildings in any part of the city may be carried to a height equal to two and a half times the width of the street, buildings of first class construction to go as high as 206 feet, and if fronting on these streets, to 250 feet. This opens residence districts to high houses and makes additional high buildings possible in the downtown district.

In both the United States and Canada, city planning is controlled by the several States and provinces, and activities of the general government in that field are confined to advice, research and the collection and dissemination of information. State activities in America have been confined to legislation, except that up to May, 1923, State departments or divisions of city planning had been created in Massachusetts, New York, Pennsylvania and California. In 1917, Canada, through its Department of Conservation and Development, engaged as town planning adviser Thomas Adams, who had been an inspector of the British Local Government Board since the passage of the Housing and Town Planning Act of 1909. In 1917 also the commission just named put out a model town planning act for the benefit of such of the provincial Legislatures as might wish to pass acts dealing with the subject.

In 1919, the British Town Planning Act of 1909 was amended. An important change was a clause making town planning compulsory instead of permissive, the compulsory feature going into effect Jan. 1, 1923, in all places which by the Census of 1921 had a population of 20,000 or more. By Jan. 21, 1926, these places must submit town planning schemes to the Ministry of Health, successor of the Local Government Board. France passed its first general city planning law in 1919. This is somewhat broader than the British act of the same year. Within three years of its promulgation, the French act provided that planning schemes must be in force in every city of 10,000 population or over, all communities in the Department of the Seine, all places of 5000 to 10,000 population that show a growth of more than 10 per cent between two successive quinquennial censuses, and settlements, regardless of size, having a picturesque, artistic or historic character. (See *The New International Year Book*, 1919, for further details.)

Regional planning received increasing attention since papers on the subject were presented

to the National Conference on City Planning at its meeting in 1919 (see *Proceedings of the Conference*). Up to 1924 the subject had not gone beyond the study and report stage. By far the most notable undertaking of this kind, under the name, "Plan of New York and Its Environs," was begun early in 1921 and first publicly announced in May, 1922, at a largely attended meeting of engineers, architects, city planners, publicists, and civic workers held in New York City at the call of the Russell Sage Foundation, the chief backer of the project. The plan included the entire metropolitan district of New York and New Jersey and all of Long Island and took in territory as far as Bridgeport, Conn.; West Point, N. Y.; Princeton, N. J., and a large part of the New Jersey seacoast. The regional survey embraces some 5528 square miles with a resident population of some 9,000,000, living in nearly 400 communities. The work was in charge of a committee having Frederic A. Delano as chairman, with Thomas Adams as general director of plans and surveys. The detail into which it was going is illustrated by a 50-page report issued by the committee early in 1924, on *The Chemical Industry in New York and Its Environs; Present Trends and Probable Future Developments*, the first of a series of economic monographs.

Los Angeles Regional Planning Conferences were held in 1922 and 1923. The Committee on Municipal and Metropolitan Affairs of the Boston Chamber of Commerce made a report in 1922 on *Metropolitan Planning and Development in Boston and Its Environs*. In 1923 was formed within the Metropolitan District Commission of Massachusetts a Division of Metropolitan Planning to investigate the transportation service and its coordination with roads, bridges, waterways, railroads, street railways, and other arteries of traffic. In January, 1924, a Minneapolis-St. Paul Metropolitan Planning Committee was organized to serve an area of 25-mile radius. This movement had been started by the Northwestern Section of the American Society of Civil Engineers. During 1923 the Regional Planning Association of America was formed, with Clarence S. Stein of New York City as secretary.

Construction work to carry out city replanning improvements included large expenditures at Chicago for various purposes and considerable outlays on major street plans or important street widenings and extensions at St. Louis, Detroit, Philadelphia, Boston, and elsewhere; civic centre groups at Cleveland, Denver, San Francisco, and smaller places, and the two municipal buildings and the tower between them at Springfield, Mass. A pamphlet review of *Progress in the Chicago City Plan during the Ten Years 1909-19* showed that in that period 12 major street improvements had been put under way at a total cost of \$230,000,000, of which \$61,500,000 had been raised by bonds voted by the people and \$162,000,000 fell on various railway companies. Besides these improvements, much was done and much more was projected to improve city transit facilities, and attention was given to the relief of street traffic congestion by automobiles, parking, etc. (See articles by Herbert S. Swan in *Engineering News-Record*, Feb. 22, and Mar. 1, 1923, on *Automobile Traffic, City Planning and Traffic Regulations and Speeding Up Traffic at Street*

Intersections, each accompanied by diagrams and tables.)

Bibliography. Among the many books on city planning and allied subjects published since 1913 are Koester, *Modern City Planning and Maintenance* (New York); Nolen, *City Planning* (New York); Lewis, *The Planning of the Modern City*, followed by new edition in 1922 (New York); Adams *Rural Planning and Development* (Ottawa, Canada); *Garden Cities and Back to the Land* (London); Moore, *Daniel Burnham, Planner of Cities* (Boston); Williams, *The Law of City Planning and Zoning* (New York), on world-wide legislation and American court decisions; Kimball, *Manual of Information on City Planning and Zoning* (Cambridge, Mass.); Hughes and Lanbourn, *Towns and Town Planning, Ancient and Modern* (London); Adshead, *Town Planning and Town Development* (London). Consult also annual reports of *National City Planning Conference* (New York) and *Town Planning Review*, a British quarterly.

CIVIC FEDERATION, NATIONAL. Seth

and the growth of welfare work during the past thirty years, and uniformity of legislation and court procedure. Seth Low, president, who died during the year, was succeeded by V. Everit Macy. In 1917 the annual meeting was held in New York City in January. The programme covered regulation of industrial corporations, compulsory health insurance, infringement of personal liberty, health of United States troops at the Mexican border, parallelism between settlement of international and industrial disputes, woman labor, and war problems. During the year, the Federation planned and undertook a great campaign for coöperation between employers and employees to help win the war. The convention of 1918 was also held in New York City. The main subject discussed was the programme of the British labor party. The Federation was active during the year in securing compensation for enlisted men, industrial training for the war emergency, proper housing for war workers, etc. During 1919 the Federation was especially active in spreading propaganda against Bolshevism through its official organ, *The National*

STATUS OF ZONING IN THE UNITED STATES, JAN. 1, 1924, FROM INFORMATION COLLECTED AND COMPILED BY THE DIVISION OF BUILDING AND HOUSING, UNITED STATES DEPARTMENT OF COMMERCE

State	Comprehensive	Use	Use and Height	Use and area	Height	Height and area	Not given	Total
Ala.								
Cal.	5	16	2				1	24
Colo.		1						1
Conn.								
Del.								
D. C.	1							1
Florida		1						1
Ga.	1							1
Ill.	23			2				25
Ind.	5							5
Iowa								
Kan.	2			1				3
La.								
Md.	1							1
Mass.	8	5			1	1		15
Mich.	4							4
Minn.	1							1
Mo.	4							4
Neb.	1							1
N. J.	43	14						62
N. Y.	18	12					5	35 *
N. O.	1							1
N. D.								
Ohio	13	2						15
Okla.		1						1
Ore.								
Pa.	1							1
R. I.	2	1						3
S. C.								
Tenn.	1							1
Tex.								
Utah		1	2	3		1		1
Va.		1					1	2
Wash.	1	1						2
Wis.	6	5						11
Wyo.								
Total	142	62	2	3	1	1	12 *	223 *

* Includes those places in Eastchester Town covered by one ordinance.

142 comprehensive; i. e. use, height and area.

209 cover use, alone or in combination.

146 cover area, alone or in combination.

146 cover height, alone or in combination.

Low was president of the organization in 1915. The Industrial Economics Department made a survey of the social and industrial changes which had taken place in the United States during the preceding generation. The annual meeting for 1916 was held at Washington in January. One session was devoted to the discussion of preparedness for national defense. Among other subjects considered were workmen's compensation, pensions for public and industrial employees, immigration, changes in labor conditions

Civic Federation Review. A commission was sent to England, France, and Italy for the purpose of studying industrial conditions in those countries. The report of this commission was made in September. In 1919, President Macy was forced to retire because of ill health, and Alton B. Parker was elected president. The campaign against Bolshevism continued in 1920. The Federation's foreign commission reported on social insurance. A second report on profit sharing was issued. International peace and

the League of Nations were considered. In this year the annual meeting of the Federation was held in New York City. Among the subjects discussed were increased production through industrial training; arbitration, conciliation, and collective bargaining, and revolutionary forces in the United States. In 1921 the national industrial commission of the Federation made a special study of questions affecting the three great divisions of society: capital, labor, and the general public. The annual meeting was held in New York City. The chief subjects discussed were problems confronting the railroads, trust regulation, free speech, academic freedom, chemical warfare, and the Russian situation. In 1922 the department on revolutionary movements made an interesting inquiry into the extent to which revolutionary forces had penetrated the church, the college, the press, women's clubs, trade unions, etc.; issued a symposium on Wells' *Outline of History*, and took up the "Youth" movement. A national committee on foreign relations was organized, with the function of educating the people of the country in foreign relations. In April, 1923, the annual meeting, held in New York City, took up the demand for the release of I. W. W. war prisoners, conditions in Soviet Russia, pacifist opposition to patriotic movements, and the citizen's duty to participate in party politics. In 1924, the annual meeting was held in New York City, April 23-24. The department on current economic and political movements reported on industrial, social, and civic progress in the past fifty years. The discussion embraced the new economic policy of the American Federation of Labor, Soviet Russia, pacifism and militarism, and practical politics. A very active women's department is connected with the Federation.

CIVIL SERVICE REFORM LEAGUE.

An organization founded in 1881, to establish and promote the merit system of appointment, promotion and removal in the civil service throughout the United States. Throughout the decade 1914-1924 the League was active in investigating conditions in the government, in protesting against violations of the law and urging the extension of the merit system. As a result of its findings on the sources of inefficiency in government departments during the War, President Wilson reorganized the Civil Service Commission in 1919. Clauses inimical to the civil service reform were struck out from the National Defense Bill, the Shipping and Defense Bills of 1916, and the 1920 Census Bill, though the Rural Credits Bill and the Volstead Bill were enacted without changes suggested by the League. A bill sponsored by the League which provided for the reorganization of the Foreign Service was enacted. The League conducted a successful campaign in Colorado in cooperation with the local committee, for a civil service amendment to the constitution and helped in securing civil service charters in several important cities. Under the Harding administration it protested the dismissal of the director and 30 employees of the Bureau of Engraving and Printing and the dismissal of A. P. Davis from the post of Commissioner of Reclamation. The programme of the League demanded the reclassification of the postal service; the inclusion of the prohibition enforcement bureau in the classified service and the elimination of provisions permitting appoint-

ment of "special experts" without examination. Richard Henry Dana was President of the League from 1913 to 1923. The officers in 1924 were: President, William Dudley Foulke; Secretary, Harry W. Marsh; Treasurer, A. S. Frisell. Headquarters were maintained at 8 West 40th Street, New York City.

CLAIR, MATTHEW WESLEY (1865-). An American bishop, born at Union, W. Va., and educated at Morgan College, Baltimore. He was ordained to the ministry of the Methodist Episcopal Church in 1889, and held various charges in West Virginia and in the District of Columbia until 1919, when he became district superintendent in Washington. In 1920, he was made bishop of Monrovia, Liberia.

CLAIRE, INA (FAGAN) (1892-). An actress and vocalist born at Washington, D. C., who opened her career by impersonations of Harry Lauder in vaudeville entertainment in 1907. She has spent her time between plays and vaudeville and is best known for her talent of mimicry. Some of her best parts included: Polly Shannon in *Polly with a Past* (1917); Jerry Lamar in *The Gold Diggers* (1919); and the wife in *Bluebeard's Eighth Wife*.

CLAPP, CHARLES HORACE (1883-). An American geologist, born at Boston, Mass. He was graduated in 1905 at the Massachusetts Institute of Technology, where in 1910 he received the Ph.D. degree. In 1905, he became instructor of geology at the University of North Dakota, and at the same time, assistant geologist of the State Survey. Two years later he returned to the Institute of Technology. During 1908-15, he was geologist on the Geological Survey of Canada, and then for three years was professor of geology at the University of Arizona. He was called in 1916 to the chair of geology at the Montana School of Mines; in 1918, became president of the School of Mines and in 1921, became president of the University of Montana. He has also been director of the Montana Bureau of Mines since 1919, and assistant geologist of the United States Geological Survey since 1914. His original investigations have to do with petrology and economic geology, on which subjects he has published many papers and reports.

CLAPP, EDWIN JONES (1881-). An American economist, born at Hudson, Wis., and educated at Yale University and at the University of Berlin, Germany. During the period 1910-12, he taught economics at Yale and at New York University. From 1912 to 1914, he was special traffic commissioner of the Directors of the Port of Boston. From 1914 to 1920, he was professor of economics in New York University, and afterwards was privately engaged in the study of economic problems. He wrote: *The Navigable Rhine* (1911); *The Port of Hamburg* (1911); *Economic Aspects of the War* (1915); *The Port of Boston* (1916); *Railway Traffic* (1917); *The Port of Charleston* (1921); *The Port of Baltimore* (1921).

CLARK, BARRETT HARPER (1890-). An author and editor born in Toronto. He is best known for his many books on the theatre, including *The Continental Drama of To-day* (1914); *British and American Drama of To-day* (1915); *Contemporary French Dramatists* (1915), and *How to Produce Amateur Plays* (1917). He was editor of *The World's Best Plays* series, 50 vols. (1913-18); four titles in the *Drama League's* series (1914-18); Walter

Prichard Eaton's *Plays and Players* (1916), and *Representative One-act Plays by British and Irish Authors* (1921). He is co-author of *The Rivet in Grandfather's Neck* (1921) and edited and translated many foreign plays. He was dramatic director of Camp Humphreys.

CLARK, CHAMP (1850-1921). An American politician (see VOL. V). From 1919 until his death, he was Democratic minority leader in the United States House of Representatives, having been Speaker in the House previous to that date. He was defeated in the election of 1920. He died in Washington, D. C., on Mar. 2, 1921.

CLARK, CLARENCE DON (1851-). An American senator (see VOL. V). He was appointed member of the International Joint Commission in 1919.

CLARK, GEORGE LUTHER (1877-). An American lawyer, born at Waynesville, Ohio. He graduated from Kenyon College in 1896, and studied law at Indiana University and at Harvard. From 1902 to 1904, he was instructor in law at Leland Stanford Jr. University, and from 1904 to 1909 was professor of law at the University of Illinois. He held the same position at the University of Michigan from 1909 to 1912, and in the University of Missouri from 1913 to 1921. He is author of *Equitable Servitudes* (1917); *Equity* (1919); and *Selected Cases on Equity* (1921).

CLARK, JAMES TRUMAN (1852-). An American railway official, born in Albany, N. Y. He was educated in the public schools of that city, and began his railway service as messenger boy with the New York Central Railroad in 1870. In 1873, he joined the Chicago and Northwestern Railroad and was rapidly promoted to important positions with that line, becoming vice president in charge of traffic in 1899. From 1916, he was president of the C. St. P. M. & O. Railway.

CLARK, JOHN MURRAY (1860-). A Canadian lawyer and scholar. He was educated at the University of Toronto. At one time he was president of the Royal Canadian Institute, the most important learned society of the Dominion. He was appointed by the government to codify the mining laws of Canada. Among his publications are: *The Law of Mines in Canada*; *Company Law*; *International Arbitration*; *The Future of Canada*; *Proportional Representation*; *Thermotics*; *Canada and the Navy*; *The Reign of Law*; *Canada's Gold and War Finance*; *Disallowance*; *The Virginia Experiment*; and *Canada and Virginia*, and others.

CLARK, LEON PIERCE (1870-). An American neurologist and psychiatrist, one of the world's leading authorities on epilepsy. Born at Ingleside, N. Y., he received his medical degree from New York University in 1892 and at once began his career as resident physician of the Craig Colony for Epileptics. After serving many years in this capacity, he settled in New York as a neurologist. In connection with the treatment of epilepsy he has of late years advocated psychotherapeutic measures as valuable and has made converts to this view in this country and Great Britain. He has written assiduously on the subject of epilepsy for nearly 30 years and has (1924) an exhaustive treatise on this disease nearly ready for publication.

CLARKE, SIR EDWARD GEORGE (1841-).

An English lawyer (see VOL. V). He retired from the bar in 1914. His recent works include: *The Book of Psalms: the Prayer Book Version Corrected* (1915); *The National Church* (1916); and *The Story of My Life* (1918).

CLARKE, JOHN HESSIN (1857-). An American jurist, born at Lisbon, Ohio. He graduated from Western Reserve University in 1877, and in the following year was admitted to the Ohio bar. From 1878 to 1880, he practiced at Lisbon, and from 1880 at Youngstown. He moved to Cleveland in 1897 where he remained until 1914. For many years he was general counsel of the New York Central and St. Louis Railroads. He served as United States district judge for the Northern District of Ohio from 1914 to 1916, and in the latter year was appointed associate justice of the Supreme Court of the United States. He resigned in 1923 in order to devote all his time to the interests of the League of Nations, of which he was an ardent supporter.

CLARKE, JOHN PALSON (1857-). An American geologist and palæontologist (see VOL. V). He was president of the Geological Society of America in 1916-17 and chairman of the Geological Committee of the National Research Council in 1917. The Permanent Wild Life Protection Fund awarded him a gold medal in 1920.

CLARKSON COLLEGE OF TECHNOLOGY.

A college for men founded in 1896 at Potsdam, N. Y. The number of students increased from 104 in 1914 to 251 in 1924, and the number of faculty members from 10 to 18. In 1924 the total endowment amounted to more than \$1,000,000, and the productive funds to \$500,000, with \$150,000 more pledged. Between its foundation and 1923 the institution granted 403 degrees. President, John P. Brooks, Sc.D.

CLARK UNIVERSITY. A nonsectarian institution for graduate studies at Worcester, Mass., founded in 1889. The enrollment of graduate students in 1923-24 was 55, and of special students, 44, as compared with 94 graduate students in 1914. During the same period the number of members of the faculty was increased from 21 to 35, and the library was increased from 60,000 to 104,000 volumes. The productive funds of the university were increased from \$2,400,000 to \$4,693,032. A graduate school of geography was established in 1921, and a department of geology was added to the university in 1922. Special emphasis was given in 1923 and 1924 to studies in history, international relations, economics, and geography. President, Wallace W. Atwood, Ph.D.

CLASSICAL PHILOLOGY. See PHILOLOGY, CLASSICAL.

CLAUDEL, PAUL (1868-). A French poet and dramatist, born in Champagne at Villeneuve-sur-Fère, and educated in Paris. He frequented the Symbolist circles, attending Mallarmé's famous Tuesdays. Later, he entered the French consular service and was sent successively to China, the United States, Germany, and Italy. During the War he was transferred to the diplomatic service, obtaining the post of minister to Brazil and afterwards minister to Copenhagen. In 1922, he was ambassador to Japan. He became after his conversion at 20, a poet of mysticism, and broke with the French classical tradition of analytic clarity. He excelled in giving an impression of ensembles and took no care for details. He had a literary

vogue both before and after the War, when his *Tidings Brought to Mary* was played on the Parisian stage. Claudel's works include: *Agamemnon*, trans. (1906); *La Connaissance de l'Est* (1900); *L'Arbre* (1900-01); *L'Otage*; *Cette Heure qui est entre le printemps et l'été*; *Art poétique*; *L'Echange*; *Le Partage de Midi*; *La Tête d'or*; *Le Repos du septième jour*; *La jeune fille Violaine*; *La Ville*; *La Connaissance du monde*; *Cinq grandes Odes*; *Le Pain dur*; *Le Père humilié*; *La Nuit de Noël* (1914); *Corona bénigatilis*; *Vers l'Exil*; *L'Annonce faite à Marie*; *Poèmes d'été*; *Poèmes de guerre*; *L'Ours et la lune*; *Feuilles de Saints*; *Les Euménides d'Eschylle*.

CLAXTON, PHILANDER PRIESTLEY (1862-). An American educator (see VOL. V). He resigned as United States Commissioner of Education in 1921, becoming provost of the University of Alabama. He is also known as a member of the League for the Enforcement of Peace and of other peace societies.

CLAYTON, HENRY DE LAMAR (1857-). An American jurist. He was born in Barbour County, Ala., and graduated from the University of Alabama in 1877, and from the law department of the university in 1878. He practiced law in several towns in Alabama from 1878 to 1914, and during that period also served as register in chancery of Barbour County, and as a member of the Alabama General Assembly (1890-1891). From 1893 to 1896, he was United States District Attorney, and in 1897 was elected to the 55th Congress; he served until May, 1914, when he was appointed district judge for the Middle and Northern Districts of Alabama. While in Congress, he was the author of the Clayton Act for the regulation of railways. In 1908, he served as permanent chairman at the Democratic National Convention.

CLAYTON ANTI-TRUST ACT. See **TRUSTS**; **UNITED STATES, History.**

CLEARING HOUSES. See **FINANCE AND BANKING.**

CLEARWATER, ALPHONSO TRUMPDOR (1848-). An American jurist. He was born at West Point, N. Y., and was educated in the public and private schools. In 1871, he was admitted to the bar and was elected District Attorney of Ulster County in 1877, being reelected several times. He was appointed justice of the Supreme Court to succeed Alton B. Parker, and was then chosen chief judge of the Court of Appeals. He held many important positions both in legal and civil life, and was many times a delegate to national, State and other conventions. He is the author of numerous papers and addresses on historical, patriotic and biographical subjects, and served on many important legal commissions.

CLEMEN, OTTO CONSTANTIN (1871-). A German theological historian born in Grimma. He studied theology and history, specializing on the Reformation. His principal works are: *Johann Pupper von Goch* (1896); *Georg Helke, Briefwechsel* (1907); *Alexian Chroniker* (1908); *Studien zu Melanckthons Reden und Gedichten* (1913); *Alte Einblattdrucke* (1911); *Beiträge zu deutschen Kulturgeschichte aus Mitau, Riga und Reval* (1919). Clemen is the editor of many pamphlets on the Reformation and the works of Luther.

CLEMEN, PAUL (1866-). A German writer born at Sommerfeld. He studied philoso-

phy and history, and later became professor of art history at Bonn and director of the art galleries of the Rhine provinces. In 1907-08 he was exchange professor at Harvard. He has written among other works: *Die Portraitdarstellung Karls des Grossen* (1889); *Der karolingische Kaiserpalast zu Ingelheim* (1890); *Merovinger und Karolinger Plastik* (1892); *Die Kunstdenkmäler der Rheinprovinzen* (1892); *Ruskin* (1900); *Die romanische Monumentalmalerei in den Rheinlanden* (1910); *Denkmalpflege in Frankreich* (1918); *Kunstschutz im Kriege* (1919); and *Belgische Kunstdenkmäler* (1921).

CLÉMENCEAU, GEORGES EUGÈNE BENJAMIN (1841-). A French statesman (see VOL. V). He had written and spoken about the possibility of war long before the War began, urging the realization of the artillery programme, and in September, 1914, his paper, *L'Homme Libre*, was suppressed on account of its violent criticism of the army medical services. Two days after its suppression, however, he issued *L'Homme Enchaîné*, in which, in spite of the censorship, he managed to fight the policy of the government. He fought also in the Senate. On the outbreak of war, he was president of the Foreign Affairs Committee. Later he became president of the Army Committee of the Upper Chamber. His policy was directly opposed to M. Caillaux's (q.v.), as he advocated fighting to the finish. On Nov. 16, 1917, he succeeded M. Briand as prime minister, and formed his "Victory cabinet," thus defeating the efforts of M. Caillaux. While he was in power during the War his policy was drastic, in regard both to the conduct of the War and to food restrictions. This policy was accepted without opposition as long as the War lasted, but after the Armistice his countrymen showed less confidence in him as a leader in peacetime. Attempts were made to drive him from office before the peace negotiations, but he remained in power until after the Peace Treaty was signed. He presided over the Peace Conference, as France's chief delegate. On Feb. 19, 1919, he was fired upon and wounded by a young anarchist, Emile Cottin. He was proposed as candidate of his party for the presidency in 1920, but withdrew his name when he saw that he stood little chance of success against M. Deschanel. He then retired from politics. He became a member of the French Academy in 1918, and was given the doctor's degree at Oxford in 1921. In 1922, he visited the United States unofficially, and was enthusiastically acclaimed.

CLEMENT, ERNEST WILSON (1860-). An American teacher in Japan and writer on Japanese subjects (see VOL. V). He was vice president of the Asiatic Society of Japan from 1916 to 1921. In 1920, he resigned as special correspondent of the *Chicago Daily News*. His recent works include: *A Short History of Japan* (1915) and *Constitutional Imperialism in Japan* (1916).

CLEVELAND. The fifth city in the United States. The population rose from 569,342 in 1910 to 796,841 in 1920 and to 912,502 by estimate of the Bureau of the Census in 1924. The area of the city increased from 51.83 square miles in 1914 to 68.9 in 1924. By charter amendment voted in November, 1921, and put in effect at the beginning of 1924, Cleveland became the largest city in the country

governed by the city manager-council plan. The council consisted of 25 members elected from one of four districts under a system of proportional representation. A number of municipal improvements were completed during the 10 years between 1914 and 1924. The double-deck Detroit-Superior viaduct, which was 3112 feet long and cost \$5,407,000, was dedicated in 1918. Clark Avenue viaduct, 6687 feet long, was built in 1917 at a cost of \$1,398,000, and the Brooklyn-Brighton concrete bridge of 18 arches costing \$571,057 was finished in 1916. The hospital, costing \$5,337,486 with the land, and holding 1200 beds, was nearing completion in July, 1924; other units comprised the nurses' home, the nurses' training school, affiliated with Western Reserve University (q.v.) the contagious ward, the tuberculosis ward, and the psychopathic ward. In 1922, the Public Hall, a unit of the group plan costing about \$6,500,000, was dedicated. It seated 12,000 persons and contained a \$100,000 five-manual organ of 10,010 pipes. It was voted in 1919 to allow the Cleveland Union Depot and Terminal, which, by the group plan was to have been built at the foot of the Mall, to be built on the Public Square. It was expected to cost \$75,000,000. The Van Sweringen merger of four railroads with total balance-sheet footings of \$1,500,000,000 was to be brought under a unified control with Cleveland as headquarters in the fall of 1924.

The Cleveland division of water increased its capital investment from \$14,870,666 in 1914 to \$43,293,164 in 1924. The Division Street pumping station, fed by a tunnel 10 feet in diameter, and the filtration plant, with a capacity of 150,000,000 gallons daily, were first operated fully in 1918. These units cost \$6,653,946. The Baldwin filtration plant, under construction in 1924, was estimated to cost \$20,000,000. Its reservoir, with a storage capacity of 130,000,000 gallons, was the largest covered reservoir in the world. Two sewage-disposal plants also were completed in 1922, and a bond issue of \$3,000,000 was authorized and contracts awarded for a third. The capital investment of the municipal electric light plant rose from \$3,021,135 in 1914 to \$8,000,000 in 1924. In 1914, the miles of track operated by the Cleveland Railway Company was 344.76 and the number of passengers carried 231,063,734; by 1923, this had risen to 425.7 miles of track and 417,405,905 passengers.

A city plan commission was named in 1916 by the mayor. By ordinance the commission was given power to supervise and control the design and location of public buildings, harbors and bridges, and the location, extension and platting of streets, parks, and other public places. In 1923, a seven-block extension of Carnegie Avenue was completed, and in 1924 property was being acquired for the widening of the same avenue from East 22d Street to East 55th Street, and construction was expected to be completed in 1925. Plans were also under way to widen and extend Chester Avenue from East 21st Street to East 40th Street, and widen St. Clair Avenue. County bonds to the amount of \$5,000,000 were authorized for the construction of the Lorain high-level bridge. An art museum was built in 1916, and a museum of natural history was founded four years later. Another unit, the new Public Library, costing \$4,500,000, was nearing completion in

1924. This will be the centre of a library system including 26 neighborhood branches and 29 school branches.

After reorganization of the school system in 1917, four new junior high schools, seven elementary schools, and several annexes were built. The school board also took over the supervision of a school for girls over 16 years of age which had been started in a local factory to combine cultural and trade instruction. This became the first trade school of the city. The council on educational institutions was formed of representatives of the institutions of higher education, the art and natural history museums, the libraries, and similar organizations. The union of several great educational institutions, including Western Reserve University and Case School of Applied Science (q.v.) was being worked out in 1924. The Cleveland Foundation, and the Welfare Federation of all the charitable organizations in the city, were organized.

CLEVELAND, FREDERICK ALBERT (1865-). An American economist, born at Sterling, Ill., and educated at DePauw University and at the universities of Chicago and Pennsylvania. From 1900-03, he taught finance in Philadelphia and New York City. Thereafter he served on many boards and commissions dealing with economics, and notably, since 1907, on the bureaus of municipal research in New York and Philadelphia. His works include: *The Growth of Democracy in the United States* (1898); *Funds and their Uses* (1902); *The Bank and the Treasury* (1905); *Chapters in Municipal Administration and Accounting* (1909); *Railroad Promotion and Capitalization* (1912); *A Handbook of Municipal Accounting* (1913); and *Organized Democracy* (1913). He also collaborated on the following works: *Railroad Finance* (with F. W. Powell, 1913); *Democracy in Reconstruction* (with Joseph Schafer, 1919); *The Budget and Responsible Government* (with A. E. Buck, 1920); *National Expenditures and Public Economy* (addresses and papers; with S. M. Lindsay, 1921); *Funds and their Uses* (1922).

CLEVENGER, GALEN HOWELL (1877-). An American metallurgist, born at Pike, N. Y. He was graduated at the South Dakota School of Mines in 1901. During 1901-05 he served professionally as a chemist and metallurgist to various mining companies, and then spent a year as instructor in metallurgy at Stanford, where after three years in consulting practice, he returned and held professorial relations with that university until 1918, when he again resumed his consulting practice. During the War he was chairman of the section on metallurgy of the National Research Council, and later became vice-chairman of the Division of Engineering on the Council. He has invented various processes for the treatment of ores and is an accepted authority on gold extraction and on manganese-silver ores, as well as on electric smelting.

CLIFFORD, SIR HUGH (CHARLES) (1866-). A British colonial administrator (see Vol. V). In 1914, as governor of the Gold Coast, he drew up, with the French Colonial authorities, an agreement for the provisional administration of Togoland. He was in charge of the administration of the British Sphere of Occupation in Togoland during and immediately after the War, and governor of the Gold

Coast until 1919, when he became governor and commander-in-chief of Nigeria. He was created Knight of the Grand Cross of St. Michael and St. George in 1921. His works during this period include: *The Further Side of Silence* (1916); *The German Colonies* (1918); and *The Gold Coast Regiment in the East African Campaign* (1920).

CLIFFORD, LUCY JANE (MRS. WILLIAM KINGDON C). An English author (see Vol. V). She wrote the novels: *The House in Marylebone* (1917); *Mr. Webster and Others* (1918); *Miss Fingal* (1919); and the plays: *A Woman Alone* (1915), and *Two's Company* (3 acts, 1915).

CLIMATE. See METEOROLOGY; GEOLOGY.

CLOCK MOTOR. See ELECTRIC MOTORS IN INDUSTRY.

CLYNES, JOHN ROBERT (1869-). British labor leader, born at Oldham, Lancashire, England. As a child he worked in a cotton mill. He became a trade union organizer, and later was elected president of the National Union of General Workers. In 1906, he entered Parliament and in 1921 was made chairman of the Parliamentary Labor party. During the War he was Food Controller (1918-19). He was a moderate of the trade union side of the British Labor movement, and in 1924 was made Lord Privy Seal of Ramsay MacDonald's Labor cabinet.

COAL. The coal industry throughout the world underwent many significant changes because of the War and resultant political and economic conditions. As a prime essential to modern industry coal was naturally important in the War; it was required on an extraordinary scale for the production of munitions. Some of the combatant nations were cut off from their ordinary sources of commercial supply and did not contain this essential within their boundaries.

In this period, the United States, which previously had become preëminent as a producer of coal, maintained its lead and increased its output. In Great Britain no notable increase was effected in production; labor and economic conditions rather restricted production. In France, destruction of the mines by the Germans resulted in a shortage which was in no way met by the amount of coal actually turned over under the terms of the Armistice. Germany's loss of the mines of Alsace and Silesia, and temporarily of those in the Saar Basin and the Palatinate, naturally cut down production; in 1913 Germany exported more coal than it imported, but in 1922 the imports were in excess of the exports.

000,000 metric tons, or approximately 38.5 per cent of the world's total. By 1916 this output had increased to 42.7 per cent, and in the following year, when the United States had entered the War, to 44.6 per cent, while in 1918, when the United States was making its maximum effort, it amounted to 46.4 per cent. In 1900 the coal production of the United States was but 270,000,000 short tons; in 1917 it amounted to over 650,000,000 short tons. Naturally the War led to increased exports of coal from the United States, a traffic which, though hazardous, was extremely profitable and in volume amounted to 20 per cent more in 1917 than in 1913.

When the United States entered the War, the industry was organized under government supervision to secure a maximum output and to stabilize prices. The coal committee of the National Council of Defense fixed a price in 1917; this was later repudiated by its chairman, Secretary of War Baker. After further consideration of the matter, on Aug. 21, 1917, President Wilson fixed a base price for coal, and on August 26, Dr. Harry A. Garfield was appointed fuel administrator. His work was done under many difficulties that year. Transportation facilities were inadequate, and it was a cold and heavy winter which began early. Some mines were shut down, and toward the end of the year there was a coal famine in the Middle West and in the East. Miners' wages were raised, and every effort was made to speed up both production and transportation of fuel, so that conditions gradually improved. Notwithstanding a decline in the number of miners through military service, coal production picked up in 1918 and more than enough to meet the needs of the country was produced.

The soft coal region was the scene of a serious strike in 1919, when the miners demanded the permanent continuance of war-time wages; it was officially terminated December 10. The industry became increasingly efficient in 1920, with the aim of making good the shortages caused by the strike of the previous year; this was achieved in the face of a railway strike and failure to allot and handle railway cars properly. In the following year, 1921, the coal industry shared in the general depression; production of anthracite increased, but bituminous coal fell to its lowest point since 1913. In 1922, conditions were still worse, with serious strikes in both the anthracite and bituminous fields. Anthracite production fell from 90,473,451 short tons to 54,683,022 short tons, a decrease of 35,550,429 short tons; this of course was due to the strike, which lasted from April 1 to September 11, 164 days, or one day less than the previous most serious strike, that of 1902. The production of bituminous coal, in 1922, was 407,894,000 short tons, as compared with 415,921,000 short tons in 1921, and 563,490,845 in 1920. In this year, however, through improved industrial conditions, the consumption of bituminous coal was approximately 400,000,000 short tons against 392,000,000 short tons in 1921.

During this period there was increased cost of coal, and this resulted both in greater conservation and improved furnace equipment and operation, as well as the substitution of other fuels, such as crude oil, which could be operated more efficiently. The bituminous strike in 1922 paralyzed the union coal fields, but on the other

WORLD'S PRODUCTION OF COAL
(In Metric Tons)

	Production in part (Estimated)	Per cent Produced by United States
1913	1,341,000,000	38.5
1914	1,208,000,000	38.5
1915	1,190,000,000	40.5
1916	1,257,000,000	42.7
1917	1,325,000,000	44.6
1918	1,332,000,000	46.4
1919	1,168,000,000	43.1
1920	1,319,000,000	45.3
1921	1,136,000,000	40.4
1922	1,208,000,000	34.6

Production in the United States. In 1913, the production of the United States was 1,341,-

hand, the non-union fields were able to produce as much as 5,000,000 tons a week, which could have been increased to possibly 6,000,000, or even 7,500,000 tons in case of a national emergency. Various attempts were made to end this strike, and conferences were called by the President of the United States, but without result. It was finally concluded with a victory for the United Mine Workers of America which forced the continuance all winter of the war-time wages. These strikes were accompanied by the usual amount of disorder, but a notable event occurred on June 22, 1922, when a mob stormed a non-union mine at Herrin, in Williamson County, Ill., capturing 48 and shooting and cutting 21 of them to death in a most brutal manner. This mine was a strip mine, six miles south of Herrin in Williamson County, which was said to have broken an agreement with the union, and attempted to operate with non-union labor under an armed guard.

In 1922 an Act of Congress provided for a coal commission which made an exhaustive study of the conditions attending the production and marketing of coal in the United States and made a series of recommendations for the better conduct of the industry in the preliminary report submitted on July 8, 1923. It was apparent that the American coal industry was being conducted under unusual conditions due to the conflict between capital and labor, as represented by the United Mine Workers of America, an efficient organization which had been successful in the strikes and negotiations it had undertaken. At the same time the consuming public suffered, even in this adjustment, as with increased wages the cost of coal was raised to the consumer.

ANNUAL COAL PRODUCTION OF THE UNITED STATES (Net tons)			
	Anthracite	Bituminous	Total
1913	91,525,000	478,435,000	569,960,000
1914	90,821,000	422,704,000	513,525,000
1915	88,895,000	422,624,000	511,619,000
1916	87,578,000	502,282,000	589,860,000
1917	99,812,000	551,790,000	651,402,000
1918	98,826,000	579,386,000	678,212,000
1919	88,100,000	465,860,000	553,960,000
1920	89,598,249	563,490,845	653,089,094
1921	90,473,451	415,921,950	506,395,401
1922	54,683,022	407,894,000	462,577,022

Mine Fatalities. The mining of coal continued as a hazardous occupation in the United States, but an encouraging decrease in the number of fatalities was recorded. In 1922 there were 1971 fatal accidents in the United States coal mines, which represented a reduction of 16 from the previous year. There were 13 accidents in each of which five or more men were killed, with a total loss of 272 lives. In 1921 only five similar accidents occurred, in which 34 men were killed. The following statistics from the United States Bureau of Mines indicates the decreased number of accidents in this field.

FATALITIES AT COAL MINES					
1917	1918	1919	1920	1921	1922
2,696	2,580	2,317	2,271	1,987	1,971

British Coal Industry. The outbreak of the War in Europe brought many problems to the British coal industry in the way of securing an adequate output and maintaining satisfactory conditions of labor and employment. In the fall of 1916 the British Board of Trade announced that it would take over the coal mines

for the period of the War and establish a new department of control for the industry. Later, matters connected with distribution, wages, production, and price of coal were concentrated in the Mines Control Department, which was established for this purpose. In order to relieve the traffic on the railways increased transport of coal by canal was provided for, and later Great Britain was divided into fuel districts to provide for inland distribution with a minimum of transportation.

In 1913 Great Britain had produced some 287,500,000 long tons of coal, and of this it had exported some 97,700,000 long tons, divided as follows: coal, 73,400,000 tons; coke and briquettes, 3,300,000; bunkers, 21,000,000; leaving available for home consumption 189,800,000 tons. During the War the production had fallen in amount, so that by 1918 the output was 226,000,000, of which 35,000,000 tons were exported as cargo and 25,000,000 tons as bunkers, while by 1921 there was a serious decline, with an output of but 163,000,000 tons, of which 37,200,000 were exported, leaving but 129,200,000 available for home consumption and requiring imports of 3,400,000 tons.

At the end of March, 1921, the policy of department control was ended in Great Britain, and the industry was restored to private ownership. This involved the reduction of wages and the abandonment of state subsidies. Already a point had been reached where, with the highest wages on record, there had resulted the lowest average output per miner ever recorded. Unemployment and strikes now developed in the industry, and readjustment was imperative; this, by the following year, was more or less satisfactorily accomplished. British wages this year decreased 46 per cent in the leading coal fields, and while coal was exported it was at prices that did not permit of profit. In the following year, 1922, however, the industry was restored to a more normal basis, producing 255,891,786 metric tons; and in 1923 this was increased to over 260,000,000 tons.

French Coal Industry. The systematic and complete destruction of the coal mines of France by the Germans in their ruthless invasion developed a condition not altogether compensated by the return of Alsace-Lorraine with its mines after the Armistice. The mines in northeastern France, especially those around Lens, which contributed a large part of the French coal production, were so completely destroyed, that by the year after the Armistice, France was facing an annual shortage of 20,000,000 tons, which was almost half of the total normal production. Nevertheless the French miners set to work assiduously to repair the damage and put their mines on a production basis, so that they were able to approach the 41,000,000 tons marking their pre-war requirements. The production of coal in France during the 10 years, 1913-23, follows:

PRODUCTION OF COAL IN FRANCE
(Metric Tons)

1913	40,844,218
1914	26,568,258
1915	19,523,863
1916	21,310,000
1917	28,891,728
1918	25,000,000
1919	22,476,766
1920	25,274,304
1921	28,940,473
1922	81,940,845

German Coal Industry. The unsuccessful outcome of the War was indeed serious for Germany so far as the coal industry was concerned in its bearing on manufacturing. In 1913 the German coal production was in excess of 190,000,000 metric tons of bituminous coal and 87,000,000 tons of lignite, in addition to coke and briquettes, as specified in the accompanying table. Of this amount Germany was able to export 34,598,408 tons, or an excess of 24,058,339 tons over domestic consumption. Naturally, during the War the exports of Germany were confined to adjacent neutral countries; after the Armistice, Germany was stripped permanently of coal lands which had been considered invaluable to its industry.

In 1922 the German inland requirements of bituminous coal were estimated at 150,000,000 tons, and for this, as will appear in the accompanying table, approximately 130,000,000 tons were available. The loss of coal production capacity in Germany was due first to the fact that rich coal areas in Upper Silesia, which in 1913 had produced 32,500,000 tons of coal, or 17 per cent of the entire product of the nation, were allocated to Poland, while Alsace-Lorraine, which in 1913 had produced 4,790,000 tons, was returned to France. In addition Germany lost the Saar Basin and the Palatinate for 15 years, at the end of which a plebiscite was to be taken to determine the sovereignty of these areas, which, in 1913, produced 12,223,000 tons of coal; in 1920, 9,410,433 tons, and in 1921, 9,574,602 tons. Furthermore, the German coal industry was restricted by reduced hours of labor, which were materially decreased from those prevailing before the War, while labor itself was marked by less efficiency.

PRODUCTION OF COAL AND FUEL IN
THE GERMAN EMPIRE
(Metric Tons)

	1913	1922
Bituminous	190,109,440	129,964,597
Lignite	87,283,084	137,207,125
Coke	34,630,391	29,664,291
Bituminous briquettes	6,992,499	5,562,811
Lignite briquettes	21,498,397	29,466,149

Belgian Coal Industry. In Belgium the coal mines were not damaged as were those in France, as the intentions of the Germans had not been to destroy them utterly but merely to render them temporarily incapable of operating, when they were not taken over immediately by the Germans themselves. Consequently all that was required was new machinery, and in 1920 an output of 22,388,700 metric tons was secured, which showed a slight diminution in the following years. At the same time, this was in excess of domestic requirements, which in 1921 amounted to about 17,000,000 tons, so that coal was available for export. This condition would not prevail with Belgian industry working on a pre-war basis, and imports of fuel probably would be necessary.

Consult current issues of *The Coal Age* and *Atlas of Commercial Geology, Part 1: Mineral Resources* (United States Geological Survey, Washington, 1921).

COAL LOADERS. See **ELECTRIC MOTORS IN INDUSTRY.**

COAL STRIKE. See **COAL.**

COAST DEFENSE. See **ARTILLERY.**

COATES, ALBERT (1882-). A British orchestral conductor, born (of an English fa-

ther and a Russian mother) at Petrograd. Although he had studied piano with an older brother, he did not decide on a musical career until he was 20. He then entered the Leipzig Conservatory, where his teachers were Teichmüller (piano), Klengel (cello) and Nikisch (conducting). He made his début as conductor with Offenbach's *Contes d'Hoffmann* in Leipzig. Upon the recommendation of Nikisch he was appointed principal conductor of the Elberfeld opera in 1906. After a short time as Schuch's assistant in Dresden he went to Mannheim as coördinate conductor with Bodanzky. Here the director of the Imperial Opera at Petrograd heard him and engaged him in 1911 for that institution, where Coates remained through the horrors of the revolution until 1919. In 1914 he made his first appearance in London, alternating with Bodanzky in the first performances of *Parsifal* in England. In 1919, he returned as conductor for Beecham's operatic company, directing also some concerts of the London Philharmonic Society and of the Symphony Orchestra. On Dec. 30, 1920, he made his American début with the New York Symphony Orchestra with emphatic success, and for two seasons he alternated with Damrosch. During the summer of 1923, he conducted a season of Russian opera at Barcelona, and in 1924, was the guest conductor of the Rochester Symphony Orchestra for the second half of the season. He is the composer of an opera, *Sardanapalus* (Petrograd, 1916), and of some orchestral works in smaller form.

COBB, FRANK IRVING (1869-1923). An American editor and writer, born in Shawnee County, Kan. He was educated in the public schools and at the Michigan State Normal School, beginning newspaper work for the Grand Rapids *Herald* when he was 21 years old. By reporting three national conventions and covering several sessions of the Michigan Legislature, he gained a wide acquaintance with political leaders and thus received an adequate preparation for his future work. Before being invited to New York by Joseph Pulitzer, he had been chief editorial writer on the Detroit *Free Press* (1900-04), having just previous to that been on the Detroit *Evening News*. Mr. Cobb directed the editorial page of the New York *World* for 20 years (1904-24), and became recognized as perhaps the strongest writer on the New York press since Horace Greeley. He has been described as a writer who shunned sophistry and wrote sincerely and simply. Though his editorials were not signed and were written for a paper that he did not own, he became a powerful personality in the United States. In October, 1918, Mr. Cobb was drafted into national service as an unofficial adviser at the Peace Conference, where he was an admirer of President Wilson and a firm advocate of the League of Nations. He was a Chevalier of the Legion of Honor and the Belgian Order of Leopold. He died in New York on Dec. 21, 1923.

COBB, IRVIN S (HREWSBURY) (1876-). An American author, born at Paducah, Ky., and educated at the common schools and in private academies. He began as a reporter for papers in Paducah and Louisville. From 1904, when he became editor of the humorous section of the New York *Evening Sun*, he was section editor or contributor to New York newspapers, notably the *World*. In 1911, he became a staff contributor to the *Saturday Evening Post*, for

which he was also war correspondent in Europe at intervals between 1914-18. Among his numerous works are the following: *Funabashi* (a musical comedy, 1907); *Mr. Busybody* (musical comedy, 1908); *Back Home* (1912, produced as a comedy, 1915); *Cobb's Anatomy* (1912); *The Escape of Mr. Trimm* (1913); *Cobb's Bill of Fare* (1913); *Roughing It de Luce* (1914); *Europe Revised* (1914); *Paths of Glory* (1915); *Old Judge Priest* (1915, 1923); *Fibble, D.D.* (1916); *Speaking of Operations* (1916); *Local Color* (1916); *Speaking of Prussians* (1917); *Those Times and These* (1917); *The Glory of the Coming* (1918); *The Thunders of Silence* (1918); *The Life of the Party* (1919); *From Place to Place* (1919); *Oh, Well, You Know How Women Are!* (1919); *The Abandoned Farmers* (1920); *A Plea for Old Cap Collier* (1921); *One Third Off* (1921); *Sundry Accounts* (1922); *Stickfuls* (1923); *A Laugh a Day Keeps the Doctor Away* (1923); *The Snake Doctor* (1923); and numerous series in periodicals. He also collaborated on dramatic productions.

COBB, T (YRUS RAYMOND) (1886-). Professional baseball player, born at Narrows, Ga. After a brief stay in the minors he joined the Detroit Club of the American League in 1905, becoming manager of that club in 1920. He is regarded as one of the best all-round players America's national game has ever developed, being especially renowned as a batsman and in his earlier career for his speed on the base paths.

COBERN, CAMDEN MCCORMACK (1855-). An American professor of theology, born at Uniontown, Pa., and educated at Allegheny College, at Boston University and in Europe. He was ordained to the ministry of the Methodist Episcopal Church in 1878, and was thereafter member of several conferences. In 1906, he became professor of the English Bible and the philosophy of religion in Allegheny College. Among his works are the following: *Ancient Egypt in the Light of Modern Discovery* (1892); *A Critical Commentary on the Books of Ezekiel and Daniel* (1901); *Bible Etchings of Immortality* (1905); *Recent Explorations in the Holy Land* (1914); *Studies of Immortality* (1916); and *The New Archaeological Discoveries and Their Bearing upon the New Testament and upon the Life and Times of the Primitive Church* (1917-1921).

COBLE, ARTHUR BYRON (1878-). An American mathematician, born at Williamstown, Pa. He was graduated at Pennsylvania College, Gettysburg, in 1897, after which he studied at Johns Hopkins University. He was instructor in mathematics at the University of Missouri in 1902-03. After a year of research work, he returned to Johns Hopkins as instructor in mathematics and continued there until 1918, attaining in 1909 an associate professorship. In 1918 he was called to the chair in mathematics at the University of Illinois. Among the subjects on which he has published the results of his studies are the theory of invariants, groups and correspondences, the quintic and sextic equations, symmetric binary forms and involutes, point set and cremona groups, and porisms. He was vice-president of the American Mathematical Society in 1917, and an associate editor of the *American Journal of Mathematics* during 1915-19.

COBURN, CHARLES DOUVILLE (1877-).

An actor-manager born at Macon, Ga. When he was 18, he became manager of the Savannah (Ga.) Theatre and two years later took up the stage as a profession. He played in stock through the Middle West and starred in *The Christian* and other plays. The Coburn Players were organized by him in 1905 for the production and promotion of the classic drama. He owns and controls the American and Canadian rights to *The Yellow Jacket* and *The Better 'Ole*. It was this last production which gave him his reputation. He created the rôle of "Old Bill" and later of "French Leone" (1920-21).

COCHIN, HENRY DENYS BENOIT MARIE (1854-). A French writer and legislator (see Vol. V). In 1914, he retired from the French Chamber of Deputies in favor of his son. He was for four years *Conseiller Général du Nord*. His works published since 1914 include: *Les deux guerres* (1916); *L'œuvre de guerre du peintre Albert Besnard* (1918); and *François Pétrarque* (published in the collection *Les cent chef-d'œuvres étrangers* 1920).

COCHIN-CHINA. See FRENCH INDO-CHINA.

COCHRAN, CHARLES B. (1873-). A theatrical manager born in Sussex, England. He was educated at Oxford, became an actor and made his first appearance in New York. Subsequently he was press representative to various theatres, circuses and exhibitions in the United States. For three years he was personal representative of the late Richard Mansfield. After 1917, he became responsible for the productions of the Oxford Theatre and produced *The Better 'Ole*. His other successes include: *In the Night Watch* (1918); *The Man Who Came Back* (1920); *The League of Nations* (1921); *As You Were* (1918). He has been interested in many of the best known English theatres either as lessee or licensee.

COCKRAN, WILLIAM BOURKE (1854-1923). A distinguished American lawyer and orator (see Vol. V.) He was active throughout his career in Democratic politics and was at the time of his death a member of Congress. Mr. Cockran was generally acknowledged to be one of the leading orators of his day, and was also one of the most prominent lawyers in the United States.

COCTEAU, JEAN (1891-). A French poet and pamphleteer born at Maison-Laffite, France. His work is a barometer of contemporary developments in art and music. Thus we have from his pen both Cubist and Dadaist poems, besides pamphlets in which he justifies his own evolution. He does not hesitate to condemn his own works after he has come to a new point of view in regard to the art of literary expression. He seems more at ease in the pamphlet than in any other type of writing, his most brilliant and successful work being perhaps, *Le Coq et l'Arlequin: Notes autour de la musique* (1918). His first novel, *Le Grand écart*, appeared in 1923. Like his poems, it is impressionistic. His other works are: *La Lampe d'Aladin* (poem, 1909); *Le Prince Frivole* (poems, 1910); *La Danse de Sophocle* (poems, 1912); *L'Art décoratif de Léon Bakst* (with Arsène Alexandre, 1914); *Prélude à l'après-midi d'un faune* (with others; 1915); *Le Cap de Bonne-Espérance; Potomak* (dedicated to Stravinsky, and condemned by the author afterward); *Parade* (a ballet with music by Eric Satie, 1917); and *Les Mariés de la Tour Eiffel*.

CODLING MOTH. See ENTOMOLOGY, ECONOMIC.

COD LIVER OIL. See FOOD AND NUTRITION.

CODY, HENRY JOHN (1868-). A British educator and clergyman (see VOL. V). In 1914-15 he was a member of the Ontario Commission on Unemployment. He was Minister of Education in the same province in 1918-19, and in 1921 chairman of the Commission on University Finances in Ontario. He was elected Archbishop of Melbourne, Australia, in the same year, but declined the office. Other offices held by him include: Chaplain of the Queen's Own Regiment, Toronto, Honorable Lieutenant-Colonel in the Canadian Militia, and member of the Board of Governors of Toronto University.

COE COLLEGE. An institution at Cedar Rapids, Iowa, founded in 1881. The student enrollment increased from 742 in 1918 to 924 in the year 1923-24, with 132 in the normal school and 262 in the college in the summer of 1923. The faculty was increased in the same period from 47 to 75 members, and the library from 15,920 to 21,000 volumes. Harry Morehouse Gage, D.D., LL.D., succeeded John Abner Marquis, D.D., LL.D., as president in 1921.

COFFIN, HENRY SLOANE (1877-). An American clergyman and author, born in New York, educated at Yale University, at New College, Edinburgh, the University of Marburg and the Union Theological Seminary, New York. He was ordained to the Presbyterian ministry in 1900, and after five years as pastor of the Bedford Park Church, New York, was appointed to the Madison Avenue Church in the same city in 1905. In the previous year he had been named associate professor of practical theology in the Union Theological Seminary. He was several times preacher to universities, including Yale and Harvard. Aside from editing and collaborating, he wrote a number of books, among them: *The Creed of Jesus* (1907); *Social Aspects of the Cross* (1911); *The Christian and the Church* (1912); *University Sermons* (1914); *The Ten Commandments* (1915); *Christian Convictions* (1915); *In a Day of Social Rebuilding* (the Lyman Beecher Lectures, at Yale University, 1918); *A More Christian Industrial Order* (1920), and *What is there in Religion?* (1922).

COFFMAN, DE WITT (1854-). An American naval officer, born in Shenandoah Co., Va. He graduated from the United States Naval Academy in 1876. During the Spanish-American War he served on the *Terror*. He was appointed lieutenant-commander in 1899; commander in 1905; captain in 1909, and rear-admiral in 1914. He served in many capacities, both ashore and afloat, and in 1916 was commander of the 3d Division of the Atlantic Fleet. Later in the same year he commanded the 6th Division of the Atlantic Fleet, and in June, 1916, he was promoted to be vice-admiral. He commanded the second battleship force in 1918 and in the same year was given the command of the 5th Naval District and Naval Operating Base at Hampton Roads. On Nov. 28, 1918, he was retired by operation of law. He was a member of the Board of Awards, Medals and Honors until Oct. 30, 1919.

COGHLAN, TIMOTHY AUGUSTINE SIN (1850-). An Australian statistician (see VOL. V). He was created Knight in 1914, and Knight Commander of the Order of St. Michael and St. George in 1918. He was again Agent-General for New South Wales in 1916-17, and

1920- . In 1918, he published a *History of Labour and Industry in Australia* (4 vols.).

COHAN, GEORGE MICHAEL (1878-). An American playwright and producer (see VOL. V). His recent successful plays and productions include: *Hit-the-Trail Holliday*; *Abie's Irish Rose*, written by Anne Nichols, *The Song and Dance Man*, and *The Rise of Rosie O'Reilly*, a satire on Cinderella.

COHEN, JULIUS HENRY (1873-). An American lawyer. He was born in Brooklyn, N. Y., and was graduated from the Law Department of New York University in 1896. In the following year he was admitted to the bar and began practice in New York City. He served as city attorney of the Transit Reform Committee of One Hundred (1900 to 1905), and as special counsel to the Public Service Commission, and to other civic organizations. He was a member of several legal societies and was the author of *Law and Order in Industry* (1916); *The Law—Business or Profession* (1916); and *American Labor Policy* (1918). He was a frequent contributor to legal periodicals.

COHEN, MORRIS RAPHAEL (1880-). An American professor of philosophy born in Minsk, Russia. He was brought to America when still a child, and was educated at the College of the City of New York. He pursued graduate studies in philosophy under Royce and James at Harvard and received the doctorate in 1906. He taught mathematics and philosophy at the College of the City of New York and at intervals at Columbia University, Johns Hopkins, and the New School for Social Research (New York). His writings, although limited largely to addresses before philosophical and mathematical bodies and to critical reviews in professional journals, exercised an influence beyond the ordinary. Professor Cohen also contributed polemical writings on political and social questions to the *New Republic* and other journals.

COHEN, OCTAVUS ROY (1891-). An American author, born in South Carolina where he received his secondary and college education. At first an engineer, he soon drifted into journalism, which he relinquished for authorship in 1915. He immediately became popular as a result of his stories printed in the *Saturday Evening Post* which concerned themselves with the adventures of the Southern Negro. If his people seemed to possess the usual mythical Negro qualities of drollery and miscomprehensions, his tales at any rate were spirited. Among others he wrote: *Polished Ebony* (1919); *Gray Dusk* (1920); *Come Seven* (1920); *Highly Colored* (1921); besides some plays and mystery romances.

COKE. In the period between 1914 and 1924 many important developments were recorded in the manufacture of coke which normally takes about 15 per cent of the bituminous coal produced in the United States and is essential for smelting the ores of iron and other metals, as well as for use in foundries, while it also finds application as a smokeless domestic fuel. In the United States the principal sources of coke had been the beehive oven, involving the loss of the many valuable by-products which could be obtained by the distillation of coal in a by-product oven where the valuable volatile content was preserved. The by-product oven of the Semet-Solvay type had been introduced in the United States in 1892, but its use had made slow progress until the beginning of the War, when

there was a considerable demand for benzol, toluol, and ammonia for use in the manufacture of explosives. These were produced at first for export but with the entry of the United States into the War in 1917 the demand increased so that in 1919, 56 per cent of all the coke manufactured in the United States was made in by-product ovens, and since that time the proportion has been even greater. See CHEMISTRY, ORGANIC.

The economic advantage of the use of the by-product oven is shown by the fact that a ton of coal of 2000 pounds so treated would yield approximately 19 pounds of sulphate of ammonia, 7.1 gallons of tar, 2.4 gallons of crude light oil, and 10,500 cubic feet of gas and 1425 pounds of coke. The ammonia thus obtained can be used in refrigeration and for the manufacture of the high explosive ammonium nitrate (see EXPLOSIVES), and for making the fertilizer ammonium sulphate. From the tar are derived many organic compounds, such as the aniline dyes, and the ultimate residue, coal tar pitch, is employed in road making, in making roofing and as a binder for fuel briquettes. In refining

dustry, with the exception of that in 1920, the last normal year. Compared with 1920, 1922 showed decreases of 29 per cent in the total production, 8 per cent in by-product coke, 58 per cent in beehive coke. The total production was less in 1922 than in any year since 1911, except 1921, when business was extremely depressed.

The exports of coke from the United States are principally to Canada, in 1923 totaling 1,104,770 tons, valued at \$11,889,897. The imports of coke into the United States in 1923 were 75,895 tons, valued at \$862,596.

COKE PRODUCTS. See CHEMISTRY, ORGANIC.

COKER, WILLIAM CHAMBERS (1872-). An American botanist, born at Hartsville, S. C. He graduated from South Carolina College in 1894 and took postgraduate courses at Johns Hopkins University and in Germany. He taught for several years in the summer schools of the Brooklyn Institute of Arts and Sciences, at Cold Spring Harbor, L. I., and in 1902 became associate professor of botany at the University of North Carolina. He was made professor in 1907 and Kenan professor of botany in 1920.

PRODUCTION OF COKE IN THE UNITED STATES

(Short Tons)
UNITED STATES GEOLOGICAL SURVEY

Years	Beehive	Per cent of total	By-product	Per cent of total	Total
1913	83,584,830	72.5	12,714,700	27.5	46,299,530
1914	23,335,971	67.5	11,219,943	32.5	34,555,914
1915	27,508,255	66.2	14,072,895	33.8	41,581,150
1916	35,464,224	65.0	19,069,361	35.0	54,533,585
1917	38,167,548	59.6	22,439,280	40.4	55,606,828
1918	30,480,792	54.0	25,997,580	46.0	56,478,372
1919	19,042,936	43.1	25,137,621	56.9	44,180,557
1920	20,511,092	40.0	30,833,951	60.0	51,345,043
1921	5,538,042	21.9	19,749,580	78.1	25,287,622
1922	8,573,000	22.0	28,551,000	78.0	37,124,000

the tar some crude light oil is obtained, but much more is secured by washing the coke oven gas. The crude light oil is valuable inasmuch as it yields benzol, the base of picric acid, and toluol, the base of the explosive trinitrotoluol, or TNT, which was employed so extensively in the War. The distillation of coal also yields illuminating gas.

Naturally the most important use of coke is in blast furnaces, foundries and metallurgical furnaces as a fuel for melting the charge of ore or metal, and in 1918 when there was a total production of 56,478,000 tons, about 88 per cent was used in this way. Coke also finds employment in the manufacture of water gas, in certain high-temperature manufacturing processes, as a steam boiler fuel, as a producer gas fuel and as a domestic heating fuel. In this last respect the use of coke was increasing because of the cost of coal.

As is shown by the accompanying table the production of beehive coke declined from 1913 to 1922, while that of by-product coke increased considerably, though in 1922 there was an increase in the production of beehive coke over the previous year due to the demand of the steel industry which in that year was very active. Of the total output of 37,124,012 net tons produced in 1922, only 23 per cent came from beehive ovens, as compared with 22 per cent in 1921, and 40 per cent in 1920; the amount produced being the smallest since 1888, except that in 1921. The output of by-product coke was the largest recorded since the beginning of the in-

In 1903, he was chief of the botanic staff of the Bahama Expedition of the Geographical Society of Baltimore. Professor Coker was a member of many scientific societies and the author of *The Plant Life of Hartsville, S. C.* (1912); *The Trees of North Carolina* (with H. R. Totten) (1916); and *The Saprolegniaceae of the United States* (1921). Besides these he contributed numerous articles on morphology and botany to scientific periodicals.

COLBY, BAINBRIDGE (1869-). An American lawyer and statesman, born at St. Louis, Mo., and educated at Williams College and at the Columbia and New York University law schools. In 1892, he began the practice of law in New York. From 1901, when he was elected a member of the New York Assembly, he took an active interest in State and national politics, being one of the founders of the Progressive National party. He served on numerous boards and commissions of the government, and in 1917 was a member of the American Mission to the Inter-Allied Conference, in Paris. In 1920-21, he was Secretary of State.

COLBY, EVERETT (1874-). An American lawyer (see VOL. V). He was a member of the Republican National Committee from 1916 to 1920. In 1917, he served in the United States Food Administration, was major in the Officers' Reserve Corps in 1918, and occupied the chairmanship of the Executive Committee of the League of Nations Non-Partisan Association founded in January, 1923.

COLBY COLLEGE. A coeducational institu-

tion at Waterville, Me., founded in 1813. The number of students increased from 440 in 1916 to 506 in 1923 and the library from 50,000 to 60,000 bound volumes besides pamphlets. Three buildings were erected or acquired in the 10 years between 1914 and 1924, including Hedman Hall, a dormitory for men; Foster House, purchased as a dormitory for women; and the Woodman Stadium, a memorial for the men of Colby who served in the War, given by Mrs. Eleanora Woodman. A fund amounting to \$500,000 was raised in 1920, of which \$150,000 was given by the Hon. Richard C. Shannon and \$125,000 by the General Education Board; in the three years following, the Board of Education of the Northern Baptist Convention gave \$100,000, and a campaign for a \$150,000 endowment was brought to a successful conclusion. President, A. J. Roberts, A.M.

COLE, LEON JACOB (1877-). An American zoölogist born at Allegheny, N. Y. He was educated at the University of Michigan (A.B., 1901) and at Harvard (Ph.D., 1906). He was assistant in zoölogy at Michigan (1898-02); Austin teaching fellow, Harvard (1903-06); chief of the division of animal breeding at the Rhode Island Experiment Station (1906-07); and instructor in zoölogy, Yale (1907-10). In 1910, Professor Cole went to the College of Agriculture, University of Wisconsin, where he was successively associate professor of experimental breeding (1910-14), professor (1914-18); and professor of genetics (1918-).

COLE, TIMOTHY (1852-). The foremost American wood engraver (see VOL. V). He published with his own illustrations, *Wood Engraving: Three Essays* (Grolier Club, New York, 1916), and *The Magic Line, a Study of the Technique of Wood Engraving* (New York, 1917).

COLEMAN, ARTHUR PHILEMON (1852-). Professor of geology in Toronto University (see VOL. V). He was president of the Geological Society of America in 1915, and of the Royal Society of Canada in 1921. He published, with W. A. Parks, *An Elementary Geology* (1922).

COLETTE, OR COLETTE WILLY (pseudonym of Mme. Henri de Jouvenel) (?-). A French novelist whose work includes: *Claudine à l'école*; *Claudine à Paris*; *Claudine en ménage*; *Claudine s'en va*; *L'Ingénue libertine*; *Dialogues de bêtes*; *L'Envers du Music Hall*; *La Retraite Sentimentale*; *En Camarades*; *Le Vagabonde*; *L'Entrave*; *La Paix chez les bêtes*; *Mitsou*; *Chéri*; *La Chambre éclairée*; *La Maison de Claudine*; *Le Blé en herbe*.

COLGATE UNIVERSITY. A nonsectarian institution at Hamilton, N. Y., founded in 1819. With the exception of the two war years, 1917-19, the university showed a steady growth for the decade between 1914-24. The student body increased from 518 to 771; the faculty from 47 to 57; the library, from 80,000 to 99,217 volumes; and the endowment, from \$2,000,000 to approximately \$3,000,000. A chapel and a dormitory housing 200 men were built in 1922. George Barton Cutten, Ph.D., D.D., LL.D., succeeded Elmer Burritt Bryan, LL.D., as president in 1922.

COLLEGES. See **UNIVERSITIES AND COLLEGES**.

COLLENS, CHARLES (1873-). An American architect, born in New York City and educated at Yale University and at the Ecole des Beaux Arts in Paris. He collaborated on

the plans for the buildings of the Union Theological Seminary in New York and of the Andover Theological Seminary in Cambridge, Mass.; also on those of the libraries of Ohio State University and Vassar College and of the Memorial Chapel of Williams College, as well as on the plans for Mrs. Eddy's Church in Concord, N. H., and for the Fifth Avenue Baptist Church, New York City.

COLLIER, WILLIAM MILLER (1867-). An American diplomat (see VOL. V). He was lecturer on international law at the New York Law School until 1918. In 1915, he held the same position at Wells College, and from 1916 to 1918 he lectured on diplomacy at George Washington University, of which he was president from 1917 to 1921. In 1914 he was appointed head of the American delegation to the International Conference at Christiania, to outline a government for the Islands of Spitzbergen. In 1917-18 he collaborated on *The Inquiry*, conducted by Col. E. M. House. He was a member of the Committee on Policies and Platform, authorized by the Republic National Committee in 1920. From 1916 to 1919 he was a national counselor of the United States Chamber of Commerce. In 1921 he was appointed Ambassador Extraordinary and Plenipotentiary to Chile. He was the recipient of several foreign decorations, during and after the War. He is author of: *The Law and the Higher Law* (1918); *George Washington's Will and George Washington University* (1918); and *College Influences Before the War and After the War* (1920).

COLLINS, CHARLES WALLACE (1879-). An American lawyer. He was born at Galion, Ala., and studied at the Alabama Polytechnic Institute, the University of Chicago, and Harvard. He was admitted to the bar in 1901 and for five years practiced in Birmingham, Ala. From 1915 to 1918, he was in charge of the Economic Section of the Legislative Reference Service of the Library of Congress, and the director of this section from 1918 to 1920. He assisted in drafting a bill for a national budget, and in 1920-21 was law librarian of Congress, serving also as counsel of the Bureau of the Budget. He wrote *The National Budget System in American Finance* (1915); *The British Budget System* (1920), and contributed articles on constitutional law and public finance to many law periodicals.

COLLINS, JOSEPH (1866-). An American neurologist, born in Brookfield, Conn. He received the degree of M.D. from New York University in 1888, and after some years of private practice took up the specialty of neurology; in 1907, he was made a professor of that subject in the New York Post-Graduate Medical School. He was later a co-founder and visiting physician to the New York Neurological Institute. In addition to his attainments as a practitioner of medicine, Dr. Collins has long been known in general literature. His major writings, medical and secular, are: *Letters to a Neurologist* (1908; second series 1910); *The Way with the Nerves* (1911); *Sleep and the Sleepless* (1912); *Neurological Clinics* (1918); *My Italian Year* (1919); *The Doctor Looks at Literature* (1923). He has also been an extensive contributor to periodical literature, both medical and secular.

COLLINS, ROSS ALEXANDER (1880-). An American lawyer, born at Collinsville, Mass.

He graduated from Kentucky University in 1899, and from the Law Department of the University of Mississippi in 1901. In the same year he began practice in Meridian, Miss. He was elected attorney general of the State in 1912 and was re-elected in 1915. In 1919, he was a candidate for governor in the Democratic primary. He was elected to the 67th Congress in 1921, and in 1922 was re-elected to the 68th Congress.

COLLITZ, HERMANN (1855-). An American philologist (see VOL. V), professor of German language and literature at Johns Hopkins. He is editor of *Hesperus: Schriften zur germanischen Philologie* and author of *Sammlung der griechischen Dialektschriften* (1884-1915).

COLLOIDAL STATE, COLLOIDAL DISPERSION. See PHYSICAL CHEMISTRY.

COLLOIDS. See CHEMISTRY; BOTANY; SOIL.

COLOMBIA. A South American republic situated in the northwestern part of the continent. Because of boundary disputes its frontiers were not definitely delimited in 1924. Its area is variously estimated at 435,000 square miles to 440,846 square miles. The population at the census of Mar. 5, 1918, was 5,855,077, of whom 158,428 were Indians. The population in 1912 was 5,072,604. The capital, Bogota, had 143,994. Other large cities with their populations were: Barranquilla, 64,543; Cartagena, 51,382; Medellin, 79,146; Cali, 45,525; Manizales, 43,203.

Industry and Trade. Coffee was the principal crop and chief article of export, for Colombia ranked second only to Brazil as a coffee producing country. The export totaled 235,368,038 pounds in 1922, with a value of \$35,705,780, the United States taking 191,848,984 pounds. The export in 1913 had been 134,136,000 pounds. Bananas were the second most important agricultural product, with exports in 1922 of 160,298 tons, valued at \$3,427,051. In 1913, 157,385 tons had been exported. Other important crops were rice, sugar, cotton, corn, tobacco and wheat, while vegetable ivory, rubber, gums, medicinal plants and dyewoods were important forest products. Gold mining, one of the oldest industries in Colombia, has been carried on since Spanish colonial days, and exports, which represented practically the entire production, were \$5,699,920 in 1922. The platinum mines, which furnished the greatest part of the world's supply, had an annual production worth some \$2,000,000. The emerald mines, controlled by the government, were the largest producers in the world. The petroleum industry was still in its infancy but promised to be of increasing importance. One foreign company opened a considerable number of producing wells, and it was reported that there were other deposits of value. The impetus given manufacturing during the War placed many small-scale industries in the towns on a stable footing, and progress was made in the production of cotton textiles, shoes, cigarettes, beer, flour, soap and matches. The making of Panama hats, a native industry requiring no machinery, prospered. The foreign trade of Colombia grew steadily. The balance of trade was favorable for many years, with the result that the Colombian peso, which is worth \$0.973, was in 1918 above par in New York, and in 1924 practically at par. Exports in 1922 were valued at \$52,390,199 compared with \$33,457,370 in 1913; and imports

for 1922 were \$42,978,101, compared with \$27,822,385 in 1913. The United States took on the average about 70 per cent of all exports and supplied some 47 per cent of all imports, so that it ranked first in Colombian foreign trade, with Great Britain second. Exports to the United States in 1922 amounted to \$36,064,000 as compared with \$15,714,000 in 1913, while imports from the United States were \$20,137,000, compared with \$7,647,000 in 1913. The chief exports were coffee, gold, bananas, platinum, and hides; and the principal imports, textiles, foodstuffs, machinery, and construction material.

Finance. The Colombian national debt as of May 31, 1923, was 45,698,382 pesos. This figure comprised 22,076,730 pesos of foreign debt and 23,621,652 of internal debt. The budget for the year 1924 showed estimated revenues of 38,285,397 pesos as against 12,043,145 pesos in 1912, and 42,965,953 pesos for expenditures, which amounted to 12,500,000 pesos in 1912. The deficit was to be covered by a \$5,000,000 foreign loan for the retirement of certain treasury bonds. Total currency in circulation as of Dec. 31, 1923, was 38,950,202 pesos. During July, 1923, the Colombian government used the first \$5,000,000 installment of the American payments on the \$25,000,000 guaranteed under the 1921 treaty to establish a central bank of issue modeled on the Federal Reserve Banks. This exerted a stabilizing effect on the finances and currency of the country. An American mission gave Colombia valuable assistance in its finances in 1923.

Communications. In 1922 there were 937 miles of railway, compared with 620 in 1911. Construction work was done during 1923 on the Pacific railway, so that this line was complete to Zarzal, a distance of about 200 miles from the port of Buenaventura. The 1923 Colombian congress passed laws providing for the expenditure of the remaining \$20,000,000 of American payments on the construction of 11 railroads and other public improvements.

History. The outstanding events in Colombia's history for the decade centred in the settlement of the Panama question with the United States. After the failure of the treaty of 1909 a new pact was drawn up in 1914 which contained a plain apology, attributed to the Secretary of State at the time, William J. Bryan, for the American part in the Panama revolution; the agreement gave Colombian citizens the same rights as those of American citizens in the use of the Canal Zone and the Panama Canal, and it provided for the payment of a \$25,000,000 compensation in five equal annual installments. Colombia ratified the treaty, but the American Senate, incensed at its apologetic tone, withheld its consent until 1921, when, under the Republican administration, the objectionable phrases were withdrawn. On Nov. 5, 1921, the Colombian Senate accepted the treaty as revised, and on Mar. 2, 1922, the House of Representatives finally acceded, so that in the fall Colombia received its first payment of \$5,000,000. From 1914 to 1918, José Vicente Concha served as president; and his minister for foreign affairs, Marco Fidel Suárez was elected to the office for 1918-22. A decree issued by President Suárez nationalizing oil resources caused considerable excitement in business circles but was declared unconstitutional by the Supreme Court. President Suárez resigned in 1921 because of opposition encountered in the Congress, and a

provisional president, Jorge Holguin, was appointed to fill out the term. For the years 1922-26, General Pedro Nel Ospina, Conservative, was elected. Colombia remained a neutral during the War. In 1920 it joined the League of Nations. Relations with Panama continued unfriendly in 1924.

COLORADO. Colorado is the seventh of the United States in size (103,948 square miles), and the thirty-third in population; capital, Denver. The population increased from 799,024 in 1910 to 939,629 in 1920, a gain of 17.6 per cent. The white population increased from 783,415 to 924,103; the number of native whites rising from 656,564 to 807,149, while the foreign-born white population decreased from 126,851 to 116,954. The Negro population decreased slightly from 11,453 in 1910 to 11,318 in 1920, while the number of Japanese increased from 2300 to 2464. The urban population rose from 404,840 in 1910 to 453,259 in 1920, the rural population from 394,184 to 486,370. The principal cities, with their population in 1910 and 1920, are Denver (q.v.), 213,381 and 256,491; Pueblo, 41,747 and 43,050; Colorado Springs, 29,078 and 30,105.

Agriculture. While the population of the State increased 17.6 per cent in the decade 1910 to 1920, the number of farms increased 29.8 per cent, from 46,170 to 59,934. In 1910 the acreage was 13,532,113; in 1920 it was 24,462,014, while the acreage of improved land in farms in those years was 4,302,101 and 7,744,757 respectively. The total value of farm property apparently increased in the decade, from \$491,471,806 to \$1,076,794,749, or 119.1 per cent; the average value of farm property, from \$10,645 to \$17,966. In interpreting these values, and indeed all comparative values for the decade 1914-24, the inflation of currency in the latter part of the period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of land used for agricultural purposes in 1910 was 20.4 per cent; in 1920, 36.9 per cent. The percentage of improved land in farms remained practically constant, being 31.8 per cent in 1910 and 31.7 per cent in 1920. Of the total of 59,934 farms in 1920, the number operated by owners was 45,291; by managers, 880; by tenants, 13,763. There was an increase in the decade of about 8300 owners, 93 managers, and 5370 tenants. The white farmers numbered 59,381 in 1920, as compared with 45,596 in 1910; foreign-born farmers, 9535, as compared with 8398; and colored farmers, including Negroes, Indians, Japanese and Chinese, 553 as against 574. There were 20,965 farms free from mortgage in 1920; 26,822 in 1910. Those under mortgage numbered 21,131 in 1920, compared with 9636 in 1910. The number of dairy cows rose to 233,747 in 1920, from 144,734 in 1910; beef cows to 691,731, from 405,884; sheep, to 1,813,256 from 1,305,596. Of the 59,934 farms in 1920, 28,756 were irrigated, as compared with 25,857 in 1910, the area irrigated increasing from 2,792,032 to 3,348,385 acres. The estimated production of the chief crops in 1923 was corn, 31,267,000 bushels; wheat, 16,157,000 bushels; oats, 6,677,000 bushels; barley, 5,009,000 bushels; potatoes, 16,786,000 bushels; hay, 2,393,000 tons; sugar beets, 1,890,000 short tons. Comparative figures for 1913 are: corn, 6,300,000 bushels; wheat, 9,080,000; oats, 10,675,000;

barley, 3,250,000; potatoes, 9,200,000; hay, 1,824,000 tons. Apple trees of bearing age numbered 1,688,425 in 1910 and 1,777,737 in 1920. In 1909, 3,559,094 bushels of apples were grown; in 1919, 3,417,682.

Education. The high standard always maintained in education in Colorado continued to be upheld in the decade 1914-1924. During this period a closer relationship was established between the various units of the school administrative forces. This has resulted in a marked progress along all educational lines, resulting in an increase in the number of centralized, consolidated and standardized schools. In 1914 there were 120 centralized and consolidated schools, and in 1920, 130. The standardized schools in 1914 numbered 337; and in 1923, over 600. Colorado was the first of the States to adopt Americanization as a part of its system of education, and was also the first to adopt modern tests and measurements. The legislature of 1921 passed measures providing for a minimum teachers' salary.

The enrollment in the grades below high school increased from 110,963 in 1914 to 195,828 in 1920. The high school enrollment increased from 17,676 in 1914 to 24,000 in 1920. In 1923 there were over 3000 grade schools, and 260 high schools. The total expenditure for the administration of the educational system increased from about \$7,000,000 in 1914 to approximately \$18,000,000 in 1922. The percentage of illiteracy decreased from 4.4 per cent in 1910 to 3.9 per cent in 1920; among the native white population from 2.4 per cent to 2 per cent. Among the foreign-born whites it increased from 11.3 per cent to 12.8 per cent.

Mining. Colorado is one of the most important of the mineral-producing States. Gold, however, was no longer its most important mineral resource, having latterly been superseded by coal. The products in the order of their value are coal, gold, silver and clay. The progress of the coal industry in the decade 1914-24 is shown by these comparative figures: 1914, production 8,170,559 short tons, value \$13,601,718; 1915, 8,624,980 and \$13,599,264; 1916, 10,484,237 and \$16,964,104; 1917, 12,483,336 and \$27,669,129; 1918, 12,407,571 and \$33,404,743; 1920, 12,278,225 and \$42,829,000; 1921, 9,122,760 and \$32,377,000; 1922, 10,019,597 short tons. The decrease in gold production is indicated as follows: 1914, 960,845 fine ounces; 1915, 1,084,323; 1916, 926,566; 1917, 760,901; 1918, 616,864; 1919, 478,266; 1920, 366,504; 1921, 330,659, and 1922, 308,314. As silver is derived chiefly from ores which are also gold-bearing, a decrease in production of that metal has accompanied that of gold. Figures for several of the years of the decade will indicate the progress of the silver mining industry. In 1914, 8,796,065 fine ounces were produced; in 1915, 7,027,972; in 1917, 7,304,353; in 1920, 5,409,335; in 1921, 5,631,657, and in 1922, 5,855,911. A considerable amount of copper is also produced in the State: in 1914, 6,639,173 pounds, valued at \$883,010; 1919, 3,560,207 pounds, \$662,198, 1922, 3,373,454 pounds, \$455,416. Other important minerals produced are lead and zinc, of which in 1922 23,477,200 and 23,258,000 pounds respectively were marketed. Colorado produces also a small quantity of petroleum. The total value of the mineral products in 1921 was \$54,045,056, compared with \$76,037,896 in 1920, and \$52,161,660 in 1914.

Manufactures. The manufacturing establishments of the State increased from 2034 in 1909 to 2126 in 1914, and to 2631 in 1919, while the number of persons engaged in manufacture rose from 34,115 to 33,715 and to 44,729. The capital invested in these three years, was \$162,667,801, \$181,776,339, and \$243,826,617, respectively. The value of the products apparently increased from \$130,044,312 in 1909 through \$136,839,321 in 1914, to \$275,622,335 in 1919; but this increase was largely due to the change in industrial conditions brought about by the War, and cannot be properly used to measure the growth of manufactures between the industrial censuses of 1914-19. The increase in the number of wage earners and the number of establishments, on the other hand, indicates a decided growth in the manufacturing activities of the State. The most important industries in point of value of products are those connected with slaughtering and meat packing, which were valued in 1909 at \$9,657,000; 1914, \$12,726,000; 1919, \$41,008,000. Flour and grist mill products in 1909 were valued at \$7,868,000; 1914, \$7,536,000; 1919, \$19,954,000. Car construction and repairing had a production in 1909 valued at \$6,559,000; 1914, \$6,822,000; 1919, \$15,130,000. Foundry and machine shop products in those years were valued at \$5,907,000, \$4,575,000, and \$17,778,000 respectively. Other important industries are the manufacture of butter, cheese and condensed milk, printing and publishing, saw mills and grist mills. The two most important manufacturing cities in the State are Denver and Pueblo. In Denver, the number of manufacturing establishments, with total value of their product, was in 1909, 765 and \$46,925,000; 1914, 885 and \$46,982,000; 1919, 1097 and \$125,411,000. Pueblo, in 1909, had 92 manufacturing establishments; in 1914, 108, and in 1919, 120. The value of the products in those years was \$3,009,000, \$3,324,000, and \$13,978,000.

Finance. For finance, see STATE FINANCES.

Political and Other Events. Much of political and industrial importance happened in Colorado in the decade 1914-24. In 1914 serious coal strikes in the southern coal mines of the State created a situation of national importance. The apparent inability of the State authorities to control it resulted in a call for Federal aid, and President Wilson, on April 28, ordered Federal troops to the State to prevent conflicts between the State militia and the strikers. These troops remained in the State throughout the year. See STRIKES AND LOCKOUTS. In the elections of 1914 the Democratic State administration was overthrown and George A. Carlson was elected governor. Senator Thomas, Democrat, was reelected. The State, by a small majority, voted for constitutional prohibition at this election. Conflicts between the State Legislature and Judge Ben B. Lindsey in 1915 attracted wide attention through the prominence of the latter as an authority on juvenile courts and the reformation of delinquent children. The Legislature attempted to pass laws abolishing the juvenile courts so as to remove Judge Lindsey from office. The attempt grew out of the refusal of Judge Lindsey to divulge on the witness stand confidential conversations with a boy of 12. He declared that the whole juvenile court was founded on the protection of children who gave their confidence to him. He was declared guilty of contempt of court and was fined \$500.

In 1916, in spite of a vigorous campaign waged by the Republicans and the assistance of Col. Theodore Roosevelt, President Wilson carried the State by the largest plurality ever given by the State and the entire Democratic State ticket was elected. President Wilson received 178,816 votes and Charles E. Hughes 102,308 votes. Julius C. Gunter, Democrat, was elected governor, and all the other State officers elected were Democrats. The Legislature, however, had a Republican majority of one. During 1917 the State subscribed over \$40,000,000 to Liberty Loans, and voluntary enlistments to the army and navy amounted to over 20,000. In 1918 elections for governor, congressmen, and State officers, were held. The Republicans returned to power, electing their candidate for governor, Oliver H. Shoup and sent Lawrence I. Phipps to the Senate. In December of this year, the State became "bone dry" in accordance with a constitutional amendment endorsed by the people. In 1920 Governor Shoup was reelected and S. D. Nicholson, Republican, was elected to the United States Senate. In the presidential election of this year, Warren G. Harding received 173,248 votes and James M. Cox 104,936. In June, 1921, cities in the central and southern part of the State suffered severely from devastating floods. At Pueblo, as the result of the breaking of a dam, over 350 city blocks were flooded. Many buildings were destroyed, and there were many deaths. The total damage amounted to nearly \$15,000,000. In November, 1921, as a result of a miners' strike in Huerfano County, Governor Shoup established martial law. In the elections in 1922 the Democrats again were successful. William E. Sweet was elected governor. This year witnessed a reaction from radical movements which had been more or less active in the State in the years previous. William Z. Foster, the radical labor leader, was ejected from the State. On Jan. 1, 1923, William E. Sweet, elected in the previous year, assumed the office of governor. As the result of failure of the Arizona Legislature to ratify the so-called Colorado River Compact, a difference arose between the governments of the two States. An alternative plan proposed by Arizona encountered strong opposition in Colorado. Samuel D. Nicholson, United States Senator, died in May, 1923, and on May 17, Alva B. Adams, Democrat, was appointed to succeed him.

Legislation. The Legislature meets biennially. Among the important measures passed during the period 1914-24 were those noted below. In 1915 a workmen's compensation law was passed. In 1917 a special session of the Legislature voted \$2,500,000 in war bonds. The Legislature in this year amended the liquor laws, passed a pure food law, and amended the laws relating to elections. The Legislature of 1919 ratified the Federal Prohibition Amendment and reenacted the workmen's compensation law amendments. In 1921 the Legislature referred to the electors an amendment prohibiting aliens from holding land in the State. Laws relating to corporations were amended and an inheritance tax measure enacted. A special session of the Legislature, held in April, 1922, provided for the creation of an improvement district against which bonds to the amount of \$6,720,000 were authorized for the construction of a railway tunnel through the mountains near James Peak, northwest of Denver, on the line of the Denver

and Salt Lake Railroad. A second act authorized the organization of a flood control district along the Arkansas River for the protection of Pueblo and other communities. The Legislature of 1923 passed measures to compensate veterans of all wars, beginning with the Civil War, to facilitate the cooperative marketing of agricultural products.

COLORADO, UNIVERSITY OF. A coeducational State institution at Boulder, Colo., founded in 1876. The student enrollment increased 100 per cent, from 1236 in 1914 to 2503 in 1923-24; the faculty increased from 200 to 268 in the same period, and the number of volumes in the library from 100,000 to 150,000. Twenty residence fellowships were established in 1922, and separate departments in journalism and anthropology were opened. The General Education Board gave \$700,000 to be used for the construction of a medical plant at Denver, and a yearly stipend of \$50,000 for its maintenance over a term of years; and the Liberal Arts Building, the Macky Auditorium, a University Hospital and Medical School, the State Psychopathic Hospital and Nurses' Home, the gymnasium, the engineering laboratory, a greenhouse, and a tunnel for the heat lines were built during the decade. In 1918 George Norlin, Ph.D., succeeded Livingston Farrand, LL.D., as president.

COLORADO COLLEGE. An institution at Colorado Springs, Colo., founded in 1874. The student enrollment increased from 561 in 1914 to 700 in 1923-24, the number of members in the faculty from 51 to 69, and the number of volumes in the library from 75,000 to 100,000. The endowment was increased from \$1,042,000 to \$1,689,000 during the same years and the annual income from \$85,165 to \$244,312. The General Education Board also promised to give \$300,000 to the endowment on condition that the college raise \$600,000 additional. A new system of honors courses permitting greater specialization and wider scope for individual investigation was established for members of the two upper classes who distinguished themselves in the work of the first two years. It included among its requirements papers embodying the results of individual reading and study, a final dissertation, and a comprehensive examination in the field of concentration. The entrance requirements were to be changed in the fall of 1924. C. A. Duniway succeeded William F. Slocum as president. Charles C. Mierow was acting president in 1923-24.

COLOR-BLINDNESS, TRANSMISSION OF. See HEREDITY.

COLORED METHODISTS. See METHODISTS, COLORED.

COLUM, PADRAIC (1881-). An American poet and dramatist, born at Longford, Ireland. One of the early leaders of the Irish literary renaissance, he soon gained prominence as editor of the *Irish Review* and a writer of charming lyrics. He came to the United States in 1914, where, in company with Ernest Boyd and others, he did much to familiarize Americans with the current trends in Irish literature. His later work was largely concerned with the preparation of children's books, done with that meticulous care and poetic sense so conspicuous in all his writings. Among his books were: *Wild Earth* (1907); *Three Plays* (1916); *The Adventures of Odysseus* (1918); *The Golden Fleeces* (1921); *Castle Conquer* (a novel, 1923).

COLUMBIA UNIVERSITY. A nonsectarian institution founded in 1754, whose principal buildings at Morningside Heights, New York City, comprise Columbia College, a college of liberal arts for undergraduate men; Schools of Mines, Engineering, Chemistry, Architecture, Journalism, Business, and Dentistry; the non-professional graduate faculties of political science, philosophy, and pure science; Barnard College, for undergraduate women; Teachers' College, including the quarters of education and practical arts; and the university library. The College of Physicians and Surgeons is on West Fifty-ninth Street and the College of Pharmacy on West Sixty-eighth Street. In addition to the regular session there is a thorough system of university extension, and in the summer, besides the summer session at Morningside Heights, a summer camp at Morris, Conn.

The enrollment of the university grew steadily from 14,098 in 1913 to 28,861 in 1923-24, including the 12,675 of the summer session of 1923 but excluding duplicates; and the number of members in the faculty was increased from 907 in the earlier year to 1830 in the later. The library was increased during the period from 550,000 bound volumes and 75,000 German dissertations to 863,341 volumes; the income from \$2,793,332.32 to \$6,403,808.99; and the productive funds from \$29,038,975.78 to \$47,537,200.94. An extensive building programme was laid out in 1919. By the close of 1923 the Faculty House was in use, and the new residence hall for women, the School of Business and the library for Teachers' College were all expected to be ready within a year. Work was begun on an additional residence hall for Barnard College. Plans for other buildings in the original programme were temporarily abandoned on account of the excessive cost of construction, which was estimated at a sum between \$10,000,000 and \$12,000,000. Approximately \$12,426,000 had been collected towards the \$15,000,000 called for by the plans for the new buildings for the College of Physicians and Surgeons, and a lot at Washington Heights was donated in 1919 for the joint use of the college and the Presbyterian Hospital. Women were admitted to the College of Physicians and Surgeons for the first time in 1918. In 1923 the College of Dental and Oral Surgery of New York was merged with the School of Dentistry, established in 1917. The school thus formed was known as the School of Dental and Oral Surgery of Columbia University and was located at 302 East Thirty-fifth Street and 309 East Thirty-fourth Street.

Lincoln School was established in 1917 under the direction of Teachers' College for the purpose of scientific experimentation and constructive work in the reorganization of elementary and secondary education. In 1919 psychological tests were instituted which might be substituted for entrance examinations for Columbia College, and a course in contemporary civilization for freshmen was given to take the place of courses formerly given in history, economics and philosophy. Home study courses were offered in the same year under the department of university extension. Institutes of educational research, cancer research and public health were founded in 1921. The faculty of law completed in 1923 the plan for the organization of advanced instruction and research in the field of public and private law, and in May the trustees created the degree of doctor of law (Doctor

Juris) to be conferred on practically the same terms as the degree of doctor of philosophy in other fields of knowledge. The objection that had been offered to the institution of this new degree, that it paved the way for an objectionable diversification of doctorate degrees, was met by the trustees of the university with the declaration that the degree of doctor would be confined to the four traditional academic groups, law, medicine, philosophy, and theology. Further to ensure uniformity in the awarding of the doctorate degrees in philosophy and law, a single representative committee drawn from the faculties of political science, philosophy, pure science, and law were to have direct supervision of the work of candidates for these degrees. Arrangements were made in 1919 for the preparation and publication through the Columbia University Press of the complete works of John Milton, under the editorship of members of the department of English and comparative literature. Early in the War a plan of mobilization of the university resources was drawn up, which the Bureau of Education of the Department of the Interior at Washington approved and submitted as a model to all the colleges and universities in the country. A war hospital of 1000 beds was organized and turned over to the government as United States Army General Hospital No. 1. More than 2000 students left the university before June 1, 1917, to enter the service, and leave of absence was granted in that time to approximately 200 members of the faculty for war work. President, Nicholas Murray Butler, LL.D. (Cantab.), D.Litt. (Oxon.), Jur. D. (Paris).

COLUMBUS. The capital of Ohio. The area of the city was increased from 14,570.2 to 15,824.5 acres by the annexation of Linden Heights village in 1921; the population increased from 181,511 in 1910 to 237,031 in 1920, and to 261,082, by the estimate of the Bureau of the Census, for 1923.

A new Federal plan municipal charter of the home-rule type, with nonpartisan ballot, preferential voting, recall of elected officials, the referendum, and a small council elected at large, went into effect in 1916. A city planning commission was created and carried on an active programme in 1920; its membership comprised the city engineer and director of public safety and citizens, including a professor of municipal engineering, a real estate man, an architect, and a newspaper publisher. Plans were developed for the establishment of an elaborate civic centre along the Scioto River. Extensive public works were constructed. The reservoir in the Scioto River was increased in capacity by raising the dam until it was capable of containing 5,833,000,000 gallons, and the purification and pumping works were enlarged. The cost of this was met by a \$3,000,000 bond issue voted in 1919. A second large dam was being constructed to increase the water supply. In 1921 three concrete arch bridges were opened to traffic to replace the bridges lost in the great flood of 1913. The Mound Street Bridge, 1050 feet long and supported by 9 arches, was built by the city at a cost of \$6,000,000; the others, at Broad Street and Town Street, were built by Franklin County at a cost of \$600,000 apiece. Nearly \$6,000,000 was expended on a school building programme. The value of manufacturing increased from \$70,000,000 in 1914 to \$100,000,000 in 1923.

COLVIN, SIR SIDNEY (1845-). An

English art and book critic (see VOL. V). Besides being a member of numerous learned and art societies, he is author of *John Keats, His Life and Poetry* (1917), and *Memories and Places* (1921).

COMBES, (JUSTIN LOUIS) EMILE (1835-1921). A French statesman (see VOL. V). He became a member of the Briand ministry without portfolio in 1915. He died on May 26, 1921.

COMETS. See ASTRONOMY.

COMFORT, WILL LEVINGTON (1878-). An American novelist, born at Kalamazoo, Mich., and educated in the public schools of Detroit. He served in the United States Cavalry during the Spanish-American War and in 1899 was war correspondent in the Philippines and China. In 1904 he was war correspondent in Japan and Russia. Besides numerous contributions to periodicals he wrote the following: *Routledge Rides Alone* (1910); *Fate Knocks at the Door* (1912); *Down Among Men* (1913); *Midstream* (1914); *Red Fleece* (1915); *Lot & Company* (1915); *Child and Country* (1916); *The Hive* (1918); *The Shielding Wing* (1918); *Son of Power* (1920); *This Man's World* (1921); and *The Public Square* (1923).

COMMISSION FOR RELIEF IN BELGIUM. See BELGIUM.

COMMISSION AND COMMISSION-MANAGER PLAN OF CITY GOVERNMENT. See MUNICIPAL GOVERNMENT.

COMMUNISM. As the type of socialist doctrine which, on the basis of the Marxian Communist Manifesto, strives for the attainment of the socialist aim by means of the dictatorship of the proletariat, communism is a recent development and quite different from the earlier interpretation. While the communists believe, like the socialists, in collective ownership of the means of production, they are unalterably opposed to any temporizing and to any coöperation toward this end with the bourgeois parties. The communists believe that the revolutionary working classes must seize the power and set up a dictatorship of the proletariat in preparation for the socialist state. This does not mean, however, that the communists reject democracy as such, but they hold that during the period of transition until the socialist state is achieved, majority rule is unfeasible and the struggle must be carried on by a class conscious minority. In their insistence on the ultimate application of majority rule and in their theory of the state, the communists are at variance with the syndicalists, who regard the militant minority as the tool of all progress and whose aim is the industrial society with the workshop as the basis of organization. The tactics of the communists are primarily political, those of the syndicalists exclusively industrial.

Modern communism is distinctly a fruit of the Russian Bolshevik revolution of November, 1917. Previous to the War two socialist groups, differing in aim and procedure, existed in Russia. The first group, the Revolutionary Socialists, regarded Russia as an agricultural country whose economic development must necessarily be different from that of western Europe. The second group, the Social Democratic party, stood squarely on the basis of the Marxian doctrine of the class struggle and held that Russia must first go through the industrial and capitalistic stage in order to attain the socialist ideal. It was this group or rather its majority element, the Bolsheviks, who through their

majorities in the Workmen's and Soldiers' Councils seized the power in Russia in November, 1917, organized the communist state, and elaborated the communist doctrine. To the Bolsheviks, Russia was the arena of the class struggle in which the conflict between the proletariat and the bourgeoisie had to be fought out. They set up a dictatorship of the proletariat—that is, of the communists—and suppressed all elements opposed to their rule. They had no illusions as to the advisability of applying their principles of liberty and democracy to existing conditions. In their opinion Russia was in a state of transition during which all opposition had to be wiped out ruthlessly and preparations had to be made to bring about the socialist state. The executive power of the Russian communist state was in the hands of the Board of People's Commissaries, which derived its authority from the All Russian Congress of Soviets, the members of which were communists, with very few exceptions. The Communist party in Russia, which wielded absolute power, seldom exceeded a membership of 700,000. It was the agency through which the government kept in contact with the trade unions and all other organizations.

Under the auspices of the Soviet government, the Third or Communist International was organized in March, 1919, at Moscow. At its second congress in Moscow, July, 1920, it was declared to be established for the purpose of organizing common action among the workers of various countries who are striving toward a single aim: the overthrow of capitalism, the establishment of the dictatorship of the proletariat and the International Soviet republic, the common abolition of classes, and the realization of socialism as the first step to the communist society. Twenty-one conditions of membership were laid down at this congress. The third congress was held in Moscow, June 22–July 12, 1921, with 510 delegates representing 48 countries. Having in the preceding congresses defined the sharp theoretical lines of demarcation between the revolutionary and the reformist elements of the proletariat of all countries, the Internationale devoted itself now to tactics and methods of organization of the Communist parties. At this time the organization had a membership of 2,800,000 in 51 countries. At the fourth congress, Nov. 7–Dec. 3, 1922, which was attended by 400 delegates from 62 countries, representing a membership of 2,200,000, further measures were taken to make the Third International the truly international communist party. Separate from the Third International, but connected with it, was the Young Communist International, which was organized in Moscow in December, 1919, and included most of the socialist youth in all countries.

Outside of Russia the Communists were strongest in France, Germany and Italy. After the French Socialist party had voted against affiliation with the Third International in 1921, the radical minority withdrew and formed the French Communist party. The party had 60,000 members in 1923 and secured 29 seats in the Chamber in the elections of May, 1924. The German Spartacists formed the German Communist party in December, 1918. At the end of 1923 it reported a membership of 300,000. It grew still further in strength during the early part of 1924 and obtained in the elections of May in the same year 60 seats in the Reichstag. The Italian Communist party was

born out of the secession of Bombacci and his followers from the Leghorn Congress, January, 1921. The party, which had 50,000 members at the time of its formation, reported only half that number at the end of 1922 and declined still further during a year and a half of Fascist rule. The Communist party of Great Britain, formed in August, 1920, out of the British Socialist party, a section of the British Socialist Labor party and other small groups, was negligible in membership and influence.

The radical dissenting elements of the American Socialist party established the American Communist party in September, 1919. A day later the Communist Labor party was founded by John Reed. The differences between the two groups were very slight, and a section of the Communist party united in 1920 with the Communist Labor party to form the United Communist party. The American government took strong action against the Communists, and as a result the movement in the United States was driven underground. When it became imperative to conduct activities publicly because of the great number of left wing Socialists who were joining the Communists, the Workers' party was formed in December, 1921, to give authoritative expression to the communist movement in the United States. But the Communist party continued to exist secretly and held in August, 1922, a convention in the woods near Bridgman, Mich., which was raided by Federal and State authorities. The participants in the convention were prosecuted. On April, 1923, the Communist party voted to dissolve and designated the Workers' party as its successor. The latter held three conventions, the last in Chicago, Dec. 30–Jan. 2, 1924. Its membership in 1923 was 15,233. See also SOCIALISM.

COMMUNITY MUSIC. See MUSIC.

COMPASS, EARTH INDUCTION. See NAVIGATION.

COMPANY. See ARMIES AND ARMY ORGANIZATION.

COMPASS, RADIO. See NAVIGATION; RADIO TELEGRAPHY.

COMPIÈGNE, OFFENSIVE AGAINST. See WAR IN EUROPE, *Western Front*.

COMPLEX, IDEA OF. See PSYCHOLOGY, ABNORMAL.

COMSTOCK, ADA LOUISE (1876–). An American educator, born in Moorhead, Minn. She studied at the University of Pennsylvania from 1892 to 1894, and at Smith College in 1897. She took postgraduate courses at Columbia, Mt. Holyoke and the University of Michigan. She served on the faculty of the University of Minnesota as professor and dean of women until 1912, when she was appointed dean of Smith College. She was a member of several societies and from 1921 was president of the American Association of University Women.

COMSTOCK, F. RAY (1880–). An American theatrical producer born in Buffalo, N. Y., who began as a producer for the theatre in 1900 and has been best known for his productions of *Very Good, Eddie*; *Oh, Boy!*; *Oh, Lady, Lady*; *Oh, My Dear*; *Chu Chin Chow*; *Mecca*.

COMSTOCK, HARRIET THERESA (1860–). An American author, born at Nichols, N. Y. She was educated at an academy in Plainfield, N. J. In 1885, she was married to Philip Comstock, of Brooklyn. Her books, mostly for children, had a very wide sale. They include:

Molly, the Drummer Boy (1900); *A Boy of a Thousand Years Ago* (1902); *Janet of the Dunes* (novel; 1908); *Joyce of the North Woods* (1911); *A Son of the Hills* (1913); *The Place Beyond the Winds* (1914); *The Vindication* (1917); *Mam'selle Jo: A Novel of the St. Lawrence Country* (1918); *Unbroken Lines* (1919); *The Shield of Silence* (1921); *At the Crossroads* (1922); and many others.

CONCRETE. See CEMENT; ROADS AND PAVEMENTS.

CONE, HUTCHINSON INGHAM (1871-). An American naval officer (see VOL. V). He commanded the United States Naval Aviation Forces from August, 1917, to October, 1918, and was wounded when his ship was sunk in the Irish Sea by a German submarine, in 1918. He received many foreign decorations and the Distinguished Service Medal of the United States Navy.

CONFLAGRATIONS. See FIRE PROTECTION.

CONGER, SEYMOUR BEACH (1876-). An American newspaper writer, born at Port Huron, Mich. He graduated from the University of Michigan in 1900, served on the staff of several papers in Michigan and from 1908 was connected with the Associated Press. He served this organization in St. Petersburg during the revolution of 1905 and the Russo-Japanese War. He was director of the Berlin bureau of the Associated Press from 1910 to 1917 and was war correspondent with the German and Austro-Hungarian forces until the United States entered the War. He represented the Associated Press at the Peace Conference at Paris. In 1918, he was foreign adviser to the War Trade Board in Washington, and following the War acted as chief correspondent of the *Public Ledger*, Philadelphia, in Central and Eastern Europe. During the Spanish-American War he served as private in the 32d Michigan Infantry.

CONGO, BELGIAN. A Belgian colony of Central Africa, with an estimated area, since 1919, of 928,000 square miles, and a native population estimated at 8,500,000 to 11,000,000. The white population on Jan. 1, 1922, numbered 9631; on Jan. 1, 1921, it was 8175, against 5465 in 1912. Of the population of 1921, 4706 were Belgians, 938 English, 303 Americans, 1047 Portuguese, and 351 Italians. The leading cities were Boma, the capital, Matadi, Banana, Leopoldville, Stanley Pool, and Elizabethville.

Industry and Trade. The rubber industry steadily dropped in importance. In 1921 only 786,436 kilos were exported as compared with 3,401,970 kilos in 1911. On the other hand, the palm-oil industry, exploited by British capital, made steady advances so that by 1921 the export of palm nuts was 45,876,469 kilos (5,573,630 in 1910), and of palm-oil, 8,970,173 kilos (1,963,637 in 1910). With the fall in rubber, attention was turned to the cultivation of cotton, cocoa, rice, and copal, whose export in 1911 amounted to 1,944,455 kilos. In 1921 this export amounted to 11,097,103 kilos. The development of the copper mines, too, increased enormously under the British penetration into Katanga. (See COPPER.) Furnaces were built for the smelting of the ore for shipment to the United Kingdom. In 1911, the shipment was about 909,090 kilos; by 1921 it had reached 30,464,000 kilos and in 1922, 43,362,000. Gold, diamonds, and ivory were other important products. Exports both general and special had been valued at 142,590,000 francs in 1912. Special exports

alone were worth 217,980,062 francs in 1921. Copper, palm-nuts, and oil were particularly important. Belgium, of course, absorbed most of the trade. Great Britain, United States, Rhodesia, Angola, France, were next in order. Leading imports were cotton, provisions, machinery, spirits, ships, and arms. Imports in 1913 were worth 71,590,781 francs; in 1920, 237,534,767; and in 1921, 276,027,218. In 1920, the countries of origin of imports in the order of value of goods, were Belgium, Great Britain, Union of South Africa, Rhodesia, the United States, and France. The United States imports were put at 10,844,247 francs, a tremendous increase over the 74,525 francs of 1913. By Jan. 1, 1921, the total length of railways had increased to 2663 miles. The most important project begun in 1921 was a line from Chilongo in the Katanga to Angola, 400 miles, to be linked eventually with the line to Lobito Bay on the Atlantic Ocean. This would give the Katanga mines direct connection with European markets. In 1911 a pipe line was laid from Matadi to Leopoldville for the purpose of transporting crude oil for the use of river steamers. In 1921 there were 2,085 miles of telegraph line, about twice as much as in 1912 (1145 miles), and 15 wireless stations (5 in 1912).

Finance. In 1922 receipts were 87,320,908 francs, against 40,418,100 for 1913; 1922 expenditures were 191,796,313 francs, against 50,933,004 for 1913. The public debt in 1919 was 349,847,446 francs, a gain of more than 100 per cent since 1912. Expenditures regularly exceeded receipts, with the result that the deficit steadily mounted and loans had to be made for its service. The estimates of the 1923 budget showed a deficit of 82,028,462 francs. In 1921 a loan of 500,000,000 francs was raised for an ambitious programme of public works.

History. Natives were employed in the fighting in East Africa and aided in the subjection of German East Africa. At the conclusion of the War, Belgium was given the districts of Ruanda and Urundi, formerly belonging to German East Africa, and the territory around Lake Kivu necessary to make it Belgian. All in all, 19,000 square miles were added to the Congo's territory. To facilitate the construction of the Cape to Cairo railway and more particularly a line from the Tanganyika Territory to Uganda, Belgium turned over to Great Britain portions of this new territory. The native population continued to express its dissatisfaction, from time to time, in revolts. In 1920 one of these manifestations took on a larger importance when the white civil servants went on strike.

CONGREGATIONALISM. Congregationalism traces its origin to both the Separatist and Puritan developments of the Reformation in England. Its polity represents adaptation to conditions rather than accord to a theory of church government. The local church is the unit and every church member has an equal voice in its conduct and is equally subject to its control. The membership increased from 750,193 in 1914 to 861,168 in 1923, and the number of Sunday school pupils from 701,460 to 780,375; but the number of churches declined from 6096 to 5716 and the number of ministers from 6066 to 5581. In October, 1923, the National Council, the representative body of the denomination, approved the proposals of the Interchurch Conference on Organic Union, that so soon as at least six denominations agreed, they

should merge under the name of the United Churches of Christ in America. The plan grew out of overtures made by the General Assembly of the Presbyterian Church in the United States of America in 1918 and was referred in 1921 to State conferences and district associations for action. The National Council in 1923 also expressed its willingness to confer with the Presbyterian Church with a view to immediate merger. A five year tercentenary campaign in celebration of the anniversary of the landing of the Pilgrim Fathers was carried on, 1915-20, one item of which was the subscribing of \$5,000,000 as an endowment of a pension system for ministers; a further movement was inaugurated to raise \$5,000,000 annually for missionary and educational purposes. Foreign missions were carried on throughout the period in 1600 centres under 14 flags, and home missions in 45 States and Territories of the United States. Nine theological seminaries and 40 colleges were affiliated with the denomination.

CONGREGATIONAL METHODISTS. This branch of the Methodist Church was organized in Georgia in 1872 as a protest against certain features of the episcopacy and the itinerancy, and for the purpose of securing a more democratic form of church government. By the figures issued by the Census bureau in 1916 there were 12,503 members of the denomination and 250 ministers; in 1924, according to a statement issued by an official of the church there were about 8497 members and 128 ministers.

CONGRESS POLAND. See **POLAND.**

CONKLING, GRACE WALCOTT HAZARD (?-). American author, born in New York City, educated at Smith College and abroad. In 1914, she went to Smith to teach English. Her collected volumes of verse included *Afternoons of April* (1915); *Wilderness Songs* (1920). In the period she attracted wide attention as the teacher of her little daughter, Hilda Conkling, whose *Poems by a Little Girl* (1920) displayed great ability.

CONNAUGHT, ARTHUR WILLIAM PATRICK ALBERT, DUKE OF (1850-). English statesman (see **VOL. V.**) In 1916, he retired from his position as Governor-General of Canada, and in 1920 went to India to represent the King of England in the inauguration of the legislative councils of Madras, Bengal, and Bombay. His only son, Prince Arthur of Connaught, was appointed Governor-General of the Union of South Africa in 1920.

CONNECTICUT. Connecticut is the forty-sixth of the United States in size (4965 square miles) and the twenty-ninth in population; capital, Hartford. The total population of the State increased, during the decade 1914-24, from 1,114,756 in 1910 to 1,380,631 in 1920, a gain of 23.9 per cent. The white population increased from 1,098,897 to 1,358,732; Negro, from 16,174 to 21,046; native white, from 770,138 to 982,219; foreign-born white, from 328,759 to 376,513. The urban population rose from 731,797 in 1910 to 936,339 in 1920; the rural, from 382,959 to 444,292. The growth of the principal cities was New Haven (q.v.), 133,605 to 162,537; Bridgeport (q.v.), 102,054 to 143,555; Hartford (q.v.), 98,915 to 138,036.

Agriculture. While the population of the State increased 23.9 per cent in the decade 1910-20, the percentage of rural population declined from 40.1 in 1900 and 34.4 in 1910, to 32.2 in 1920. The total area in farms decreased

13.1 per cent, from 2,185,788 acres in 1910 to 1,898,980 in 1920; the number of farms, from 26,815 to 22,655, or 15.5 per cent; the improved land in farms, from 988,252 acres to 701,086, or 29.1 per cent. The total value of farm property, on the other hand, apparently increased from \$159,399,771 in 1910 to \$226,991,617 in 1920; the average value per farm, from \$5944 to \$10,019. In interpreting these and all other comparative values for the decade 1914-24, the inflation of currency in the latter part of the period is to be considered. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of land used for agricultural purposes in 1920 was 61.6 as compared with 70.9 in 1910; the percentage of improved land in farms decreased from 32 to 22.7. Of the 22,655 farmers of 1920, 14,955 were native white, as compared with 19,841 in 1910; foreign-born white, 7625, compared with 6861; colored, 75, as compared with 113. Of the total number of farms in 1920, 19,666 were operated by their owners, as compared with 23,234 in 1910; managers operated 1070 farms in 1920 and 949 in 1910; tenants operated 1919 farms in 1920, 2632 in 1910. Farms free from mortgage in 1920 numbered 9597, 13,080 in 1910. Those under mortgage numbered 8920, compared with 9958. The number of all cattle on farms in 1920 was 173,764; in 1910, 195,318. The number of sheep decreased to 10,842 from 22,418. Tobacco growing showed a large increase in the decade, in production 50 per cent and in acreage nearly 68 per cent. The estimated production of the chief farm crops of 1923 was as follows: corn, 3,355,000 bushels; oats, 335,000; potatoes, 2,662,000; hay, 436,000 tons; and tobacco, 48,165,000 pounds. Comparative figures for 1913 are corn, 2,348,000 bushels; oats, 308,000; potatoes, 2,208,000; hay, 432,000 tons; and tobacco, 28,520,000 pounds.

Mining. Connecticut is not an important mineral-producing State, and its mineral products in the decade were chiefly non-metallic. In order of importance, they were clay, stone, lime, sand and gravel. The value of the clay products, lumped with those of Rhode Island, was \$1,229,037 in 1914. In 1920 the value for Connecticut alone was \$3,255,295; and in 1921, \$1,703,528. The annual value of the stone production was approximately \$1,500,000. The total value of the mineral products of the State was \$3,023,192 in 1914; \$3,501,460 in 1918; \$6,326,326 in 1920, and \$4,219,457 in 1921.

Manufactures. Connecticut is one of the most important of the manufacturing States. In 1920, 18 of its cities had more than 10,000 inhabitants, with a combined population of 865,943, or 62.7 per cent of the population of the State. In 1919, 71 per cent of the value of the State's manufactured products was reported from these cities. The number of manufacturing establishments in 1909 was 4251; in 1914, 4104; and in 1919, 4872. Persons engaged in manufacture in those years numbered 233,871, 254,499, and 338,033, respectively. The capital invested in 1909 was \$517,546,554; in 1914, \$620,194,294, and in 1919, \$1,232,324,318. The value of the products rose from \$490,271,695 in 1909, to \$645,471,517 in 1914, and \$1,392,431,620 in 1919; but this increase was largely due to changes in industrial conditions brought about by the War, and cannot be properly used to measure the growth of manufactures during the

census period, 1914-19. The increase in the number of wage earners indicates a decided growth in the manufacturing activities of the State. Foundry and machine shop products rank first in their value, which in 1909 was \$65,535,000; in 1914, \$67,009,000; and in 1919, \$203,626,000. Industries relating to the manufacture of brass, bronze and copper products rank second, with products valued at \$66,933,000 in 1909; in 1914, \$69,353,000, and in 1919, \$169,550,000. In the manufacture of textiles Connecticut is one of the most important of the States; it ranks first in the fur felt hat industry, fourth in silk, sixth in manufactured cotton, and sixth in the combined woolen and worsted goods industry. The value of cotton goods product in 1909 was \$24,232,000; 1914, \$30,809,000; and 1919, \$105,054,000. The silk goods were valued at \$21,063,000 in 1909; \$30,592,000 in 1914; and \$68,053,000 in 1919. The value of the woolen products fell from \$19,363,228 in 1909 to \$17,128,975 in 1914; in 1919 it had risen to \$53,814,059. The most important manufacturing cities of the State are Bridgeport, Hartford, New Britain, New Haven, and Waterbury. Bridgeport had 367 establishments in 1909; 405 in 1914, and 443 in 1919, with products valued at \$65,609,000, \$85,126,000, and \$208,090,000 in those years. In Waterbury, 169 establishments in 1909, 190 in 1914, and 253 in 1919, had products valued at \$50,350,000, \$50,659,000, and \$130,193,000, respectively. New Haven had 588 establishments in 1909, 538 in 1914, and 769 in 1919; producing a value of \$50,870,000, \$57,752,000, and \$125,456,000 in those respective years. In Hartford, which had 396 establishments in 1909, 380 in 1914, and 504 in 1919, the value of local products rose from \$40,680,000 in 1909 to \$42,831,000 in 1914, and to \$118,003,000 in 1919. New Britain counted 111 establishments in 1909, with a product valued at \$22,021,000; 1914, 120, with a product of \$23,227,000, and in 1919, 116, with a product of \$63,622,000. Other important manufacturing cities are Ansonia, Bristol, Danbury, Meriden, Middletown, New London, Norwalk, Torrington, Stamford, and Willimantic.

Education. Connecticut has always been one of the most progressive States in the development of its educational system. Legislation in 1913 provided for the codification of the school laws and for vocational guidance in schools. In 1917 an agreement was made with the Federal Board of Vocational Education, under the Smith-Hughes Act, for Federal assistance in vocational education. A measure passed in 1921 provided for a division of physical education and health; another bill created a division of special educational standards. Several important laws were passed by the Legislature of 1923. Provision was made for State aid for the transportation of elementary school pupils and for the penalizing of any town which unduly delays in providing adequate school facilities for children under 16. The department of Americanization, established in 1919, was changed to the Division of Adult Education. The registration in the public schools in 1913-14 was 211,975, with an average attendance of 168,060; in 1917-18, 243,870, with a 190,897 average; in 1921-22, 279,043 and 229,689. In the year mentioned last, registration in the elementary schools was 245,747, and in high schools, 33,182. The total expenditure for education in

1921-22 was \$20,800,637. The percentage of illiteracy in the State increased from 7.2 per cent in 1910 to 7.8 per cent in 1920, although among the population of native white parentage it decreased from 0.6 per cent in 1910 to 0.4 per cent in 1920, and among the Negroes, from 7.8 to 7.5 per cent. Among foreign-born whites it increased from 16 to 18.1 per cent.

Finance. For finance, see STATE FINANCES.

Political and Other Events. During the decade 1914-24, Connecticut remained Republican in politics, and few political events had national importance. In the elections of 1914, Marcus H. Holcomb, Republican, was elected governor, defeating Lyman T. Tingier. Senator Brandegee was reelected over Gov. Simeon E. Baldwin. Governor Holcomb was reelected in 1916, and George P. McLean was reelected senator. In the presidential election in 1916, Charles E. Hughes received 106,514 votes; President Wilson, 99,786 votes. In 1917 and the years following, the great industrial cities of the State were benefited by the activities following the entrance of the United States into the War. Manufactories were made over for war uses and additional factories were built. At the end of 1917 the State had about 9000 men in camp under the selective draft law and about 4000 volunteers. In 1918 Governor Holcomb was elected for a third term, together with the entire Republican State ticket. The total number of men drafted in the Federal service, 1917-18, was 23,533, with a total of 54,123 in the army and navy for the State. Ammunition factories and metal-working concerns continued prosperous during this year. In 1920 Everett J. Lake was elected governor, and Senator Brandegee was reelected. In the presidential voting of this year, Warren G. Harding received 229,238 votes and James M. Cox 120,721. In 1922 Charles A. Templeton, Republican, was elected governor, and Senator McLean was reelected to the Senate. Governor Templeton was inaugurated on Jan. 3, 1923. In his inaugural address he denounced the tendency to violate the prohibition law. He also proposed a commission to study and report on agricultural conditions with a view to their improvement.

Legislation. Sessions of the Legislature are held biennially. Among the more important matters acted on by the Legislature in the decade 1914-24 were the following: In 1915, the budget system was adopted and the State's financial policy revamped to provide a "pay-as-you-go" policy which virtually wiped out the State debt. In 1915, the woman suffrage amendment was rejected by the Legislature, but the State, after steadfastly opposing it, suddenly ratified in 1920 when doubt about Tennessee's ratification seemed likely to threaten the validity of the forthcoming presidential election, barely thirty-six States having ratified. The Legislature rejected the prohibition amendment in 1919. Demand for a soldiers' bonus resulted in the establishment of a \$2,500,000 State fund, the income from which is paid to an ex-service men's organization, for the aid of needy men who served in the War, or their dependents. In 1921, a child welfare bureau and a juvenile court system were established; a new motor vehicle law enacted, basing registration fees on piston displacement and putting a tax of \$01 a gallon on gasoline; a uniform system of accounting for all State departments and institutions set up, and persons accused of crimes given the right

to choose whether to be tried by the court instead of by jury. In 1923, the Legislature passed a bill to facilitate cooperative marketing of agricultural products and made provision for the creating of associations for this purpose; amendments were made to the income tax laws and a resolution passed by the Legislature for a constitutional amendment to allow the governor to veto single items in appropriation bills, subject to reconsideration by the Legislature if it is in session.

CONNELLEY, WILLIAM ELSEY (1855-). An American author (see VOL. V). His recent works include *History of Kansas* (5 vols., 1917), and *History of Kentucky* (5 vols., 1922).

CONNELLY, MARC (MARCUS COOK) (1890-). An American playwright born at McKeesport, Pa. He began his writing as a reporter for the *Pittsburgh Sun*. He has contributed verse and articles to *Life*, *Everybody's* and other magazines and has written lyrics for several musical comedies including: *Dulcy*; *To the Ladies*; *Little Old Millersville* (in collaboration with G. S. Kaufman, 1921-22); *The Beggar on Horseback* (with Kaufman, 1923), founded on P. Apel's *Hans Sonnenstössers Höllenfahrt*.

CONNOR, WILLIAM DURWARD (1874-). An American soldier, born at Beloit, Wis. He graduated from the United States Military Academy in 1897, and was appointed second lieutenant. He served in the Philippines campaign and during the Filipino Insurrection in 1898 and for several years following was engaged in engineering capacities, serving also with the General Staff from 1912 to 1916. In 1917, he served with the General Staff of the A. E. F. as assistant chief of staff. He was appointed chief of staff of the 32d Division in 1918, and in the same year commanded the 63d Infantry Brigade of that division. In 1918-19, he was chief of staff of the Service of Supply, and was commanding general of the American forces in France to Jan. 7, 1919. In 1921, he was chief of the Transportation Service and in the same year acted as assistant chief of staff. He received decorations and honors from the British and French governments.

CONRAD, JOSEPH (1856-1924). An English novelist. (See VOL. V). The following works by Conrad were published over the period surveyed: *Within the Tides* (1915); *Victory* (1915); *The Shadow-Line* (1917); *The Arrow of Gold* (1919); *Rescue* (1920); *Notes on Life and Letters* (1921); *The Rover* (1923). Early in 1924 he made a short visit to the United States. He died in August, 1924.

CONSCIOUSNESS AND THE UNCONSCIOUS. The conception of consciousness was revolutionized in the period 1914-24 by the action of two antithetical extremist movements. These movements were behaviorism and the new psychology centering around psychoanalysis and clinical investigations of abnormal psychology. The theoretical principles in the name of which they took the field against the old-fashioned structural psychology were diametrically opposed, but the new schools were at one in their dissatisfaction with experimental introspection as a method for dealing with the practical problems of psychology.

The systematic position of structural psychology was expressed in the doctrine of psycho-physical parallelism; this doctrine not only gave a certain theoretical clearness to the problems of psychology, but what is more important,

it lent itself to a vast experimental programme. Psychical phenomena were regarded not as in any sense caused by physical or physiological phenomena but as running parallel with the lower series. The hypothesis of parallelism dates back to the seventeenth century, when it was used as a metaphysical theory to explain the entire structure of the universe. In its modern form the hypothesis was less pretentious. It took psychological and physical experience at their common-sense face value and postulated as a method of investigation and comparison the non-interaction of the two series. In order to compare consciousness with physiology it was necessary to analyze its structure. This was done by the method of introspection; in opposition, that is, to the method of logical reflection under which philosophers down to Kant had decomposed the mind into abstract categories or faculties. The analysis of consciousness was carried on under experimentally controlled external conditions, and in this manner consciousness was first decomposed into sensations as elements, and when this theory proved untenable, into attributes as the fundamental units. These attributes, such as extensity, duration, clearness, quality and intensity, were aspects of conscious life corresponding to specific alterations of physical or physiological conditions. By the method of controlled introspection experimental psychology was designed to avoid the Scylla of the subjective faculty psychology and the Charybdis of materialistic mechanism. But in the view of its opponents structuralism sinned in both directions. In actual practice the theory of psycho-physical parallelism was held to approach more and more the doctrine known as epiphenomenalism, according to which consciousness was only a phosphorescence peculiar to the biological behavior of the neuron particles. Structuralism certainly failed to satisfy the common-sense belief in the efficacy of mind on the material world. On the other hand its preoccupation with defining mental life in terms of a logical system drew on it the wrath of those who were growing impatient at the failure of psychology to become a science like other sciences. Add to this the failure to deal adequately with perception and with the higher thought processes, and its rather uncertain stand in the case of instincts and the general substratum of our conscious life, and we are in a fair way to appreciate the significance of the revolt against structuralism as a psychological doctrine.

If one should employ a metaphor drawn from politics, the revolt of behaviorism might be characterized as a revolt from the left; that is, in the direction of more mechanical objectivity. The revolt of the psycho-analytic movement would then be a push from the right. Behaviorism (q.v.) developed out of the objective methods of animal psychology and biology and in theory sought to abolish consciousness as anything but a functional relation of physiological reflexes. It achieved thereby unity of method but only at the expense of ruthlessly exterminating the chiaroscuro of mental life. Behaviorism, whatever its significance in psychological experimentation, marked a return to the metaphysics of the man-machine with the addition of the notion of the conditioned reflex. It is this conditioned reflex, the phenomenon that we observe so frequently in gymnastic training, that is the unconscious saving grace of behav-

iorism, for willy-nilly it imports into the rigid materialistic mechanism the principle of contingency. Several attempts have been made to combine behaviorism with a realistic metaphysics for the evident purpose of eliminating consciousness as a directing principle in the universal drama. Typical of these are the works of E. B. Holt (*The Concept of Consciousness* and *The Freudian Wish*) and articles by Prof. R. B. Perry. On the other hand the English Neo-Realist, Prof. S. Alexander, while postulating a general monistic position, yet refuses to reduce the quality of consciousness to any of the lower levels of existence. To him, it is a quality over and above the nervous system in much the same manner that life is something beyond the physico-chemical reactions of the living plant or animal.

The line between the scientific aspects of the problem of consciousness and the radiating metaphysical speculations is always difficult to draw, and it is still more difficult to maintain in the concept of the unconscious. The importance of this notion has arisen from its growing use in clinical psychiatry, where it serves to explain and to link together facts which cannot be organized on the old hypothesis of parallelism. The unconscious might have remained merely a romantic idea dear to the metaphysicians of Schopenhauerian descent had not the French school and the psychoanalytic group developed it into a systematic theory of neuroses and psychoneuroses. It is in vain, therefore, that Knight Dunlap protested (*Mysticism, Freudianism and Scientific Psychology*) against the unscientific nature of the new movement. The theory of the unconscious is much less rigorous than the theories employed in the physiological branch of psychology, and it is moreover based on a different method of approach and different type of word symbols; hence arise problems of liaison between the so-called old and new psychology. But withal, the Freudian theory of the unconscious, despite its admitted lack of rigor and its tendency to degrade into extravaganzas, is preferable to a refusal to organize the phenomena of abnormal psychology at all.

In brief, what is postulated by the theory of the unconscious is a hierarchic continuity of psychic life extending indefinitely back into the history of the individual, the history of the race, and ultimately into the history of life itself. Whereas we ordinarily explain the sensations of consciousness by the presence of physical stimuli outside the body, the theory of the unconscious explains a great part of conscious phenomena, particularly those which are not explained by the first method, by past history. In dream life very little correlation can be traced between the mental phenomena and the physical stimuli affecting the person; much more interesting correlations can be obtained between the events of a dream and the past history, or even the future, of the individual. Even in normal consciousness, there appears to be much more in the mind than the stimulus which has given rise to the sensory experience, and the residue is generally explained on the basis of memory. The parallelistic hypothesis is unable to account for the impulse to action save by the intervention of a new mechanism, from which consciousness is excluded, the mechanism of reflexes, instincts, and habits. The theory of the unconscious is an effort to unify the three schemas of sensory perception, memory, and instinctive

response into a single chain. What we regard as full or clear consciousness is merely the end product of an historical evolution. As an end product it contains the cumulative story of the past, a story which can be recovered by the proper analytic method.

The method of analysis parallels the comparative method of biology in searching for vestigial traces. Obviously it cannot be mere external observation by the microscope and the scalpel, since that form of observation is insufficient to detect even the grosser biological evolution. The analysis has to be within consciousness, or within the lower levels of consciousness manifested in hypnosis or in dreams, and when this is insufficient, selected facts from the history of the individual are introduced. The event of breaking a leg is not generally of much importance to the subsequent morale of the individual, but a childhood fear, long since forgotten, may be the missing link which accounts for a present psychological condition. The daring genius of Freud has consisted very largely in seizing on certain facts as significant which to other observers seemed irrelevant. Prof. Pierre Janet in recent years elaborated a theory of various levels of psychological tension, according to which there are stable gradations of plateaus in the continuity from psychological automatism to the highest levels of reflective conscious activity. These levels are interestingly correlated with the physical metabolism of the organism. Thus the execution of a conscious and deliberate act was found to demand a greater expenditure of physical energy than the same act executed as a reflex. This theory serves also to make more understandable not only the phenomena of sleep and hypnosis but the fluctuations in the behavior of psychopathological cases.

Another ramification in the theory of the unconscious is the problem of multiple personalities. The clinical evidence on this subject shows all gradations from what might be regarded as metaphorical divisions of personality to genuine cleavages in conscious activity. Impressed by these phenomena, Dr. Morton Prince and Prof. William McDougall have fought for a recognition of pluralism. Professor McDougall's method of meeting the problem is through a revision of the Leibnizian monadology. From the point of view of positive science, this problem, in reality the metaphysical problem of the one and the many, is quite irrelevant. Whether the individual be regarded as a distinct consciousness or as a collection of conscious instincts or monads, it is evident that here is no escape from the paradox of unity and diversity. In cases of multiple personality, it is the type of unity and the type of diversity which differ from those to be found in a normal conscious personality with multiple interests. The relation of consciousness and the unconscious to the instincts or hereditary tendencies is equally a problem of the one and the many. Freudian psychologists often identify the unconscious with the sex instinct, and at other times they speak of the sex instinct as an instinct among other instincts. At other times they split the unconscious into two warring entities. These ambiguities are practically unavoidable in the attempt to give dialectic movement to the life of the psyche. The physical instinct of sex, because it is in the generality of men the strongest of the discreet physical urges as well as the most mysterious, has very fre-

quently been employed as a symbol for the entire drive of life. Plato's Eros is an instance in point. But the symbol qua symbol of an underlying reality cannot be confounded with the symbol qua independent entity. The whole theory of sublimation hinges on the distinction between symbol and reality; for it is not sex, regarded as a discreet instinct, that is sublimated into intellectual or artistic activity; it is rather the *élan vital* expressed in the sex instinct which has found new channels. Yet from a phenomenological view it would seem as if there were a real conversion or substitution.

From the foregoing discussion it is evident that the representative theory of consciousness, according to which the mind carried a point-to-point image of a physical reality, must now be regarded as obsolete. If our psychological life is made up of images, then our physical experience too is made up of images or symbols. The latter symbols or images are more stable and conventional than the so-called fainter images of the subjective consciousness, but they are not different in kind. If consciousness be regarded as the phenomenon of knowledge or intelligible awareness, it follows that we never escape that phenomenon in all human experience. But if consciousness be employed in another sense to denote the subjective level of experience, then the phenomena of consciousness form a distinct subject matter of science, a subject matter paralleling biology but not reducible to it. And this science has now been organized by means of the unconscious as a concept of continuity. The unconscious must not be hypostasized into an entity, for like the concept of an imaginary number in mathematics it makes trouble when it is set up against concrete physical experience, although it remains perfectly intelligible in its scientific setting.

It is useful for many purposes to correlate one level of experience with another, and in this respect there will always be room for a science of physiological psychology which uses the method of controlled introspection. This science is analogous to the sciences of biochemistry (q.v.) and biophysics, but like the latter it can only make correlations and cannot reduce the facts of one level to those of a lower level. Under the view here exposed there is justification for all the prevailing methods of investigating the phenomena of consciousness, but the justification cannot be extended to the metaphysics which is consciously or subconsciously brought in with each method. Thus behaviorism as a metaphysic means materialistic monism, but this extrapolation of the doctrine is not at all necessary to the positive method of charting individual behavior and thereby predicting conduct. The same principle applies to structuralism and the psychoanalytic methods of investigating consciousness. Whatever conflict arises exists between rival metaphysical dogmas and not in the positive intellectual organization of facts.

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CONSTANT, FRANK HENRY (1869-). An American engineer, born at Cincinnati,

Ohio, on July 25, 1869. He was graduated in 1891 at the University of Cincinnati, and at once entered upon the practice of his profession, as assistant engineer of the King Bridge Company. In 1893-95, he was with the Osborn Engineering Company. In 1895, he became assistant professor of structural engineering at the University of Minnesota and two years later was made full professor. In 1914, he was called to the chair of civil engineering and made head of the department at Princeton. The degree of Sc.D. was conferred on him by Cincinnati in 1915 and by Lafayette in the same year.

CONSTANTINE I, KING OF GREECE (1868-1923). (see VOL. V.) His connection with the German Imperial family (his wife was the sister of the former German Emperor) and his known sympathies for German methods generally, prompted him to maintain Greek neutrality in the War. The ensuing struggle between him and Venizelos, who was disposed toward an alliance with the Allies, in large part makes up the history of Greece in the eventful years 1914-17. The occupation of Saloniki by an Allied army, the formation of a Venizelist "Provisional government," the capture of Athens by English and French contingents, all combined to seal Constantine's fate. He yielded to the Allied demand and on June 11, 1917, relinquished his throne in favor of his second son Alexander. To December, 1920, he lived in exile. The death of his son and the overthrow of Venizelos in the election of November, 1920, resulted in his triumphal reëntry into his capital, and it was largely to rehabilitate his fortunes that he embarked on the Anatolian adventure (June, 1921). The disastrous defeat that his armies suffered in the Græco-Turkish War (1921-22) and the consistent refusal of the Allies to support or recognize his aspirations again combined to bring him low. He was forced to abdicate a second time, Sept. 27, 1922, and took refuge at Palermo. Here he died, Jan. 11, 1923. He was succeeded on the throne by his son, George II, who, in turn, on Dec. 18, 1923, was compelled to leave the country. On Apr. 13, 1924 the Greek people expressed themselves as overwhelmingly in favor of a republic. See GREECE, *History*.

CONSTANTINOPLE. See DARDANELLES AND BOSPORUS STRAITS.

CONSTITUTIONAL LAW. See LAW, PROGRESS OF THE.

CONSUMERS' COÖPERATION. See CO-OPERATION.

CONTRACT, LIBERTY OF. See LAW, PROGRESS OF THE.

CONTRACTS. See LAW, PROGRESS OF THE.

CONTROL INSTRUMENTS. See PHYSICS.

CONVOY. See WAR IN EUROPE.

CONWAY, SIR (WILLIAM) MARTIN (1856-). An English art critic (see VOL. VI). He became trustee of the Wallace Collection (1916), director general of the Imperial War Museum (1917), and president of the Kent Archaeological Society (1923). His recent books include *The Sport of Collecting* (1914); *The Crowd in Peace and War* (1915); *The Abbey of St. Denis* (1916); *Mountain Memories* (1920), and *The Van Eycks and Their Followers* (1921).

COOK, GEORGE CREAM (1873-). An American author, born at Davenport, Ia., and educated at the universities of Iowa, Harvard,

Heidelberg and Geneva. In 1895-99, he taught in the University of Iowa and for a short time in Leland Stanford Jr. University. In 1911, he became associate literary editor of the *Chicago Evening Post*, and in 1915 director of the Provincetown Players. His works include: *In Hampton Roads* (1899); *Roderick Taliaferro, a Story of Maximilian's Empire* (1903); *Evolution and the Superman* (1906); *The Chasm* (1911); *Battle-Hymn of the Workers* (1912); *The C. T. U.* (1914); *Suppressed Desires* (1920; first written as a play in 1915); and *The Spring* (1921; produced as a play and published).

COOK, PHILIP (1875-). An American Protestant Episcopal Bishop of Delaware, born at Kansas City, Mo. He was graduated at Trinity College in 1898 and from the General Theological Seminary in 1902. He was ordained to the priesthood of the Protestant Episcopal Church in 1902, and after serving as a missionary in North Dakota for two years, became vicar of the Chapel of the Incarnation in New York City. In 1911, he was called to other pastorates, going to Baltimore in 1916, where he remained until 1920, when he was elected Bishop of Delaware and was consecrated on October 14 of that year. He was a delegate to the General Conventions of the Protestant Episcopal Church in 1913 and 1919. During the War, he served in France with the 77th Division of the American Expeditionary Forces as Y. M. C. A. secretary.

COOKE, MARJORIE BENTON (?-1920). An American author, born at Richmond, Ind. She began writing for magazines at an early age, and won success for her monologues, which she delivered throughout the country after 1902. Three one-act plays by her were produced on the stage. *Bambi*, a novel produced in 1914, had an immediate and remarkable success. She also wrote: *Modern Monologues* (1903); *Dramatic Episodes* (1905); *Plays for Children* (1905); *The Girl Who Lived in the Woods* (1910); *Dr. David* (1911); *The Dual Alliance* (1915); *Cinderella Jane* (1917); *The Threshold* (1918); *The Clutch of Circumstance* (1918); *The Cricket* (1919); *Married?* (1921). She died in 1920 while in Japan on a world tour.

COOKE, MORRIS LLEWELLYN (1872-). An American engineer, born at Carlisle, Pa. After having served as a reporter on various Philadelphia, Denver, and New York newspapers he was graduated from Lehigh University (M.E., 1895). He practiced his profession with various corporations until 1905, after which he devoted himself to consulting practice until 1911. Then, for four years, he was director of the Department of Public Works in Philadelphia. During the Spanish-American War he served in the United States Navy as assistant engineer, and during the recent War he was in Washington engaged as chairman of the storage system of the War Industries Board of the Council of National Defense (1917) and as assistant to the chairman of the United States Shipping Board (1918). He frequently lectured on scientific management and municipal administration, and is the author of *Academic and Industrial Efficiency* (1910), *Snapping Cords* (1915), and *Our Cities Awake* (1918).

COOK ISLANDS. See PACIFIC OCEAN ISLANDS.

COOLEY, MORTIMER ELWYN (1855-). An American engineer (see VOL. VI). He was elected president of the Federated American En-

gineering Societies in 1921, and was also an officer in a number of scientific societies.

COOLIDGE, ARCHIBALD CARY (1866-). An American university professor (see VOL. VI). In 1918, he was sent as special agent of the State Department to Sweden and Northern Russia. The following year he was chief of the mission attached to the Peace Conference which spent five months in Vienna and three months in Paris. In 1921, he became a member of the American Relief Administration in Russia. He is author of *The Origins of the Triple Alliance* (1917), and translator of the English edition of *Secret Treaties of Austria-Hungary*, 1879-1914, by Alfred Francis Pribram (2 vols., 1920-21).

COOLIDGE, CALVIN (1872-). A President of the United States, born at Plymouth, Vt. He graduated at Amherst College, Mass., and practiced law at Northampton, Mass. He held various local offices and served in the Massachusetts State Senate (1912-15). He was lieutenant-governor of Massachusetts (1916-18) and governor (1919-20). He first became nationally known through his intervention in the Boston police strike of 1919, when his prompt action in calling out the State troops prevented serious trouble and ended the strike. He was hailed throughout the nation as a strong champion of law and order, and his selection as candidate for the vice-presidency was felt to add greatly to the chances of Republican success at the polls. At the convention he was nominated by acclamation. When President Harding died on Aug. 2, 1923, Calvin Coolidge became president, taking the oath of office on August 3. He announced that he would follow in general the policies of his predecessor. Toward the end of the year 1923, the so-called "oil scandals" caused him much embarrassment. The criticisms launched against Attorney-General Daugherty and Secretary of the Navy Denby finally forced their resignations from the cabinet and relieved the situation somewhat. But Congress proved more and more independent of his leadership by passing the bonus bill over his veto, changing the Mellon tax bill, and refusing to accede to his request in regard to postponing the operation of the Japanese exclusion part of the immigration bill. He was nominated at the Republican National Convention in June, 1924, as candidate for the presidency to succeed himself. *The Price of Freedom*, a collection of his speeches, was published in 1924.

COOPER, COLIN CAMPBELL (1856-). An American artist (see VOL. VI). He won a gold medal for oil painting and a silver medal for water color at the Panama Pacific International Exposition (1915) as well as other prizes in 1918 and 1919. One of his best recent pictures was "Broadway in War Time" in the Pennsylvania Academy of Fine Arts.

COOPER, DEAN THOMAS POE (1881-). An American agriculturist, born at Pekin, Ill. From 1902 to 1907, he was statistical agent of the Minnesota Experiment Station and special agent of the Bureau of Statistics, United States Department of Agriculture. He graduated from the University of Minnesota in 1908 and until 1911 was assistant in farm management and agricultural economist at that university. From 1914 to 1917, he was director of the North Dakota Experiment Station and in 1918 became dean and director of the Agricultural College of the University of Kentucky. He was a member

of several scientific societies and wrote on farm management and agricultural economics.

COOPER, IRVING STEIGER (1882-). An American bishop of the Old Catholic Church, and theosophist, born at Santa Barbara, Cal., and educated at the University of California and at Madras, India. He was consecrated regionary bishop for the Liberal Catholic Church in 1919. He published the following works: *Methods of Psychic Development* (1911); *Ways to Perfect Health* (1912); *The Secret of Happiness* (1912); *Theosophy Simplified* (1915); *Reincarnation, the Hope of the World* (1917).

COOPER, JAMES (1846-). A British theologian (see VOL. VI). In 1916, and again in 1921, he was president of the Scottish Logical Society, an office which he had held at various times previously. He was Moderator of the General Assembly of the Church of Scotland in 1917. In 1922, he retired from his professorship in church history at the University of Glasgow, an office which he had held since 1899. His later works include: *Our Sacred Heritage* (closing address as Moderator, 1917), and *Reunion, a Voice from Scotland* (1918).

COOPER, LANE (1875-). An American university professor (see VOL. VI). He was acting associate professor during the summer term of 1914 at the University of Illinois. The following year he became full professor of English language and literature at Cornell University, and was professor elect at Smith College. He was acting professor during the summer quarter at Stanford University in 1918, and at the University of California the following year. Among his later works are: *Methods and Aims in the Study of Literature* (1915, 1921); *A Concordance to the Works of Horace* (1916); *Louis Agassiz as a Teacher* (1917); *The Greek Genius and its Influence* (1917); *George Meredith, an Essay on Comedy* (1918), and *Two Views of Education, with Other Papers* (1922).

COÖPERATION. The decade 1914-24 witnessed a growth in all forms of coöperation. This development was not equal in all countries; consumers' coöperation was still most important in England; coöperative credit was outstanding in Germany and India; producers' coöperation was most manifest in Holland and Denmark. In the United States which had never been friendly soil for the coöperative movement, significant tendencies toward coöperative effort appeared.

Credit Unions in the United States. Alphonse Desjardins was responsible for the passing of the first general law in North America which authorized the organization of coöperative credit associations. This was in 1906. His plan was a combination of the Luzzati system of Italy and the German Raiffeisen plan of coöperative credit. Many French Canadians who had become acquainted with the operation of credit societies in Canada emigrated to the factory towns in New England. The first coöperative credit association in the United States was established in Manchester, N. H., by Desjardins at the end of 1903. Almost all the members were French. In 1924, it was still operating under a special charter granted by the Legislature in 1909. Massachusetts, however, was the first State to consider the possibilities of coöperative credit seriously. Desjardins was invited to describe the working of the credit associations of Quebec before the Twentieth Century Club of Boston; and in 1900, Massachusetts

passed an act similar to the Quebec act. The first society opened was the Myrick Credit Union of Springfield, which began its work in May, 1910. Literature was published and scattered broadcast to explain the advantages of coöperative credit associations. The cause was advanced by addresses delivered before the Ohio Bankers' Association in 1910 and before the American Bankers' Association in 1912. In 1913 the First National Conference on Marketing and Foreign Credits met in Chicago. From that time on, the agitation for legislation authorizing the establishment of credit societies was more pronounced, and after 86 different bills had been submitted by members of Congress, the Farm Loan Bill was finally passed, July 17, 1916. This bill was not entirely coöperative in its nature, but was a combination of coöperation and Federal aid. During this time 19 States passed laws which permitted the States to lend money to the farmers and provided for rural savings banks. The characteristics of credit associations differ somewhat in the various States, but the main principles are common to the majority.

1. In Massachusetts, New Hampshire, New York, Rhode Island, Florida, North Carolina, the associations are called credit unions; in Wisconsin and Nebraska they are called coöperative credit associations.

2. The control is usually exercised by the banking department of the State. North Carolina is an exception.

3. The number of members necessary to form a union as authorized by the different States ranges from 5 in Rhode Island to 15 in Nebraska.

4. The par value of each share is low so that any person of good character may become a member. The range of share values is from \$5 in New Hampshire, South Carolina and Utah to \$25 in Texas, New York, North Carolina and Oregon.

5. Only members may receive loans from the credit unions, and most States provide a limit to the amount that may be borrowed by one individual. Some States do not permit loans greater than \$50.

6. Most credit unions operate on the limited liability plan, although it is possible for them to adopt the unlimited liability plan current in Germany, if their by-laws permit.

7. Credit unions may receive deposits from members in all States, and in Utah, North Carolina and South Carolina from non-members.

Massachusetts had 81 credit unions in 1921 with 32,226 members and a share capital paid in during the year over \$1,000,000. More than 12,000 members borrowed a total of \$3,000,000 from the unions. \$83,000 was paid as dividends. New York had 68 credit unions at the end of 1920, with 22,490 members, about one-third of whom were women. These unions lent \$4,511,000 during 1920. There was an increase each year in the number of unions formed. North Carolina had 22 credit unions in 1921, with 1000 members, and during that year lent \$84,000 to 290 borrowers.

The success of the credit unions must not be judged by the number of unions. The most important aim of the States in encouraging the formation of coöperative unions was to furnish relief to farmers. This object had not been fully attained. North Carolina had the most conspicuous success in meeting the demand for rural credit. The reasons were obvious. The

unions should not have been under the control and protection of the State banking departments, since these departments seemed to rest content with assuring themselves that the unions fulfilled the requirements of the law for banks, while European experience had definitely proved that coöperative rural credit required encouragement and direction. North Carolina was able to provide this service. Coöperative credit is a form of self-help which should be divorced from financial aid. If the poor farmers of South Germany and the indigent ryots of India could, by combination, meet their own needs, it seemed that the farmers of America should be able to do as well. It is a fundamental principle of Raiffeisenism that governments should not furnish financial assistance but only supervision and sympathetic direction. See AGRICULTURAL CREDIT.

Consumers' Coöperation in the United States. The latest official report for the United States, from the United States Bureau of Labor Statistics Bulletin 313 (1920), stated that there were 2600 unions in the United States. Perhaps 50 per cent were operated on strict coöperative principles. Consumers' coöperation was reported to be particularly strong among the Finns and the coal miners of Illinois and Pennsylvania. The bulletin referred to reports that 650 consumers' societies sold \$65,000,000 worth of goods. There seemed no reason to suppose that there would be any rapid development of consumers' coöperation in the United States.

Producers' Coöperation in the United States. While this form of coöperation made great progress in the United States during and immediately after the War, its exact growth could not be gauged because of the overlapping of consumers' and producers' coöperation. For example, rural societies often purchase coöperatively and market collectively their own output. In 1920, the latest year for which figures were available, the Bureau of Labor Statistics reported that the United States had 63,351 members of such associations with a paid-in share capital of 11,079,945. See COTTON and AGRICULTURE.

Coöperation in Other Countries. Outside of the United States were reported over 60,000 coöperative societies with a membership of more than 25,000,000. The Coöperative Union of the United Kingdom comprised 1472 societies in 1921, 91 per cent of them consumers' societies. There were 102 producers' and 3 wholesale associations. The total membership of the union was 4,598,737, of which number 3,838,000 were members of consumers' societies in England and Wales and 662,885 in Scotland. The coöperative wholesale societies had become very prosperous, owning their own fleet of vessels and more than 29,000 acres of tea plantations in Ceylon and India. The National Federation of Consumers' Societies of France had 1,360,000 members. Besides this group there were reported to be as many societies which were not affiliated, and also a considerable number of coöperative credit societies, some organized according to the Luzzatti system and many more on the Raiffeisen plan. The Federation of Coöperative Societies of Belgium had over 231,000 members. There were also several people's banks organized on the Schulze system. There had been a partial change from unlimited to limited liability. This system differs from that of Germany in having no central bank. India made great prog-

ress in the development of coöperative credit. In many districts the power of the money lenders over the poor farmers was broken. Latest reports showed 42,000 agricultural credit societies with 1,400,000 members. The 1921 data from official sources in Russia showed 1082 consumers' unions and 7500 agricultural and over 6000 industrial societies. The All Russian Central Union of Consumers' Societies, comprising 98 federations and representing a membership of 6,000,000, had a wholesale trading organization, and published a daily and a weekly paper.

COÖPERATIVE BANKS. See LABOR BANKS.

COÖPERATIVE MARKETING. See COÖPERATION; COTTON; AGRICULTURE and AGRICULTURAL CREDIT.

COÖPERATIVE MORTGAGE BANKING. See AGRICULTURAL CREDIT.

COOVER, JOHN EDGAR (1872-). An American psychologist born at Remington, Ind. He was educated at the Colorado State Normal School and Leland Stanford Jr. University. After 1910, he was a member of the psychology department of the last named institution, becoming full professor in 1921. He is the author of *Investigation with a Trumpet Medium* (American Society for Psychical Research, 1915), *Formal Discipline from the Standpoint of Experimental Psychology* (1916), and *Experiments in Psychical Research* (1917). He is also the contributor of a number of articles on psychology, psychical research, education, and statistical methods, published in professional journals.

COPEAU, JACQUES (?-). A French actor-manager and director of the Théâtre Vieux Colomblie. He is a reformer in the theatre, and of the various theatrical experiments in Paris, his seem to be the only ones which have resulted in a completely modern self-dependent institution established on a basis of stability and organized so that all resources may be directed toward an idealistic aim. He has successfully waged war against decrepit tradition but he has kept traditions which are still full of life and richness. The classics, for the most part, form his repertory. Among his performances are: Dostoevsky's *The Brothers Karamazov*, a very moving production; *Twelfth Night*, one of the plays most frequently presented; and André Gide's *Saul*, one of his most important theatrical achievements of recent years. In 1919, the Vieux Colomblie came to New York City, and he took the part of Washington in Percy Mackaye's *Washington*.

COPELAND, ROYAL S (AMUEL) (1868-). Physician and ophthalmologist, and United States Senator from New York. Born in Dexter, Mich., he received his M.D. from the University of Michigan, 1889, and in 1905 was made ophthalmologist to his alma mater. He moved to New York in 1908 to occupy the same chair and assume the deanship of the New York Homeopathic Medical College and Flower Hospital. He began his political career as mayor of Ann Arbor in 1901-03 and was president of the local Board of Education in 1907-08. In 1918, he became Commissioner of Public Health and president of the Board of Health, New York City, resigning in 1923 to assume the duties of senator. In 1906, in collaboration (Copeland and Ibershoff) he published the work *Refraction*.

COPPER. The War naturally had an important effect on the production of copper as this metal was required in large quantities for muni-

tions. The world's production in 1913 was 2,181,253,000 pounds, but with the stimulation of the War it began to increase, reaching a maximum of 3,150,552,000 pounds in 1918, when almost 2,000,000,000 pounds were produced in the United States alone. From this time, however, the production dwindled until 1921 when but 1,234,576,000 pounds were produced of which 505,586,098 pounds were the output of smelters in the United States. This was considerably less than the annual production for the period of 1916-17-18, but in 1922 the output was larger amounting to 1,851,864,000 pounds, while in 1923 the United States alone had a smelter

WORLD PRODUCTION OF COPPER

(In Pounds)

1913	2,181,253,000
1914	2,054,090,000
1915	2,330,886,000
1916	3,037,236,000
1917	3,150,552,000
1918	3,148,499,000
1919	2,191,372,000
1920	2,112,007,000
1921	1,234,576,000
1922	1,851,864,000

America, which, as will appear from the accompanying table of the world's production was the source of the greater amount of the copper used in industry. As a consequence the price of this

WORLD'S PRODUCTION OF COPPER BY COUNTRIES—(Smelter Output), 1919-1923*

(In metric tons)

U. S. GEOLOGICAL SURVEY

Where no footnotes are given, figures are taken from official publications. For countries from which ore or matte was exported for smelting, official figures have been converted to figures showing the quantity of copper recoverable by the smelters.

Country	1919	1920	1921	1922	1923
Canada	34,044	37,014	21,600	19,450	39,890
Cuba	7,500	8,400	8,200	11,800	11,000
Mexico	56,172	49,192	15,228	26,978	53,372
United States	583,516	548,426	229,332	431,047	650,912
North America	681,232	643,032	274,360	489,275	755,174
Bolivia	9,524	9,982	10,592	5,661	(*)
Chile	79,580	98,952	59,239	129,575	175,460
Peru	39,230	32,982	33,284	36,408	(*)
Venezuela	188	400	800	1,700	(*)
South America	128,522	142,316	103,915	173,344	(*)
Austria	648	1,645	4,277	4,581	(*)
England	146	129	73	104	(*)
Finland	730	460	200	750	(*)
Germany	15,861	14,976	19,000	17,000	(*)
Italy	1,374	635	356	319	310
Norway	437	556	1,348	80	(*)
Portugal	650	1,000	1,600	(*)	(*)
Rumania	14	165	108	111	(*)
Russia	(*)	3,751	4,668	(*)	(*)
Spain	23,419	22,458	36,345	25,139	(*)
Sweden	8,558	1,289	1,149	(*)	(*)
Jugo-Slavia	(*)	2,436	4,144	5,354	(*)
Europe	52,827	49,500	73,268	58,438	(*)
China	554	191	958	318	(*)
Japan	78,443	67,792	54,092	54,126	62,100
Taiwan	884	592	1,197	(*)	(*)
Asia	79,881	68,575	56,247	55,339	(*)
Algeria	60	430	800	430	560
Belgian Congo	23,019	18,962	30,464	43,362	56,479
Rhodesia:					
Northern	185	132	200	181	132
Southern	2,732	2,820	2,794	8,074	2,697
Southwest African Protectorate	2,400	4,870	7,400	8,900	(*)
Union of South Africa	3,577	1,075	92	665	7,980
Africa	31,973	27,789	41,250	51,612	(*)
Australia	19,491	27,022	11,147	12,040	(*)
Grand Total	1,094,000	958,000	560,000	840,000	(*)

* In addition to countries shown it is reported that Chosen (Korea) produced 2288 metric tons of crude copper in 1919 and 5368 metric tons in 1920. Just what material this "crude copper" includes can not be determined.

† Preliminary

‡ Estimated by the U. S. Geological Survey.

§ Consulate General of Mexico, *Engineering and Mining Journal-Press* of Apr. 19, 1924.

|| Figures not yet available.

¶ Figures from Imperial Mineral Resources Bureau.

||| Consular Report, Nov. 25, 1923.

|||| According to the American Bureau of Metal Statistics.

||||| Figures not yet available, but an estimate is included in the total.

||||| For the year ending March 31 following that stated in the heading of the column.

||||| *Mining Journal* (London) of Apr. 8, 1922.

||||| Includes estimate for countries for which information is not yet available.

||||| Exports of ingots and slabs.

||||| *L'Echo de Mines*.

production from domestic ores of 1,434,990,962 pounds. For the World's production in pounds for the years 1913-22 see next column.

Naturally with the extensive use of copper for cartridge cases and other munitions of war the outbreak of hostilities in 1914 stimulated activity in the copper industry, especially in

metals mounted, and in the United States there was great activity both in the mining and in the refining and manufacture of copper. The British government at this time considered shipments of copper to neutral countries contraband, on the ground that it was destined for the Central Powers. Accordingly some 45,000,000

pounds of copper were thus seized. On the other hand the Allies were large consumers of American copper.

By March, 1917, a maximum price of 37 cents a pound was secured in the United States, and when the American government entered the War it received adequate supplies of copper from the producers, though the question of price was deferred. On September 6th the War Industries Board of the United States bought about 77,000 pounds of copper for the Allies which advanced the price, but finally a price of 23½ cents was fixed by agreement between the War Industries Board and the copper producers. There were strikes in Montana and Arizona at this time which curtailed production, but these were adjusted and during the War copper in adequate amount was forthcoming.

With the great demand due to the War, production of copper by the United States was carried on at an extraordinary rate. Naturally with the termination of hostilities there was no further call for this metal for munitions, and at the beginning of 1919 the copper producers held some 839,510,000 pounds of unsold metal. In addition the allied governments at the same time held over a billion pounds of virgin copper bought for war purposes but not required after the Armistice. Furthermore there was twice that amount of scrap copper and held copper accumulated by various war manufacturing plants. Such conditions naturally had their effect on the industry which was slow in adjusting itself.

However, conditions improved very slowly through 1921, and during 1922 the world's surplus stock of copper was being slowly absorbed. At the end of 1922 secondary copper stocks were so far reduced that they ceased to be considered as a menace to the industry, and new production was entered into on a much larger scale. Copper mining in 1922 in the United States employed approximately 100,000 men. The industry during the year improved as in connection with the refining of copper; gold and silver were also recovered.

During 1923 the smelter production of primary copper from domestic sources in the United States amounted to 1,434,999,962 pounds, an increase of approximately 51 per cent over 1922. The value of smelter production increased approximately 64 per cent in 1923 over 1922, this increase in value being mainly due to the high prices prevailing during the first quarter of the year, for at the end of the year prices were at a lower level than the average for 1922. The average price of 2,404,768,102 pounds of copper delivered during the year, as reported to the Geological Survey by selling agencies, was 14.71 cents a pound, as against 13.5 cents in 1922. Smelter production of copper in Arizona increased from 428,200,624 pounds in 1922 to 615,493,561 pounds in 1923; in Montana from 165,341,414 pounds to 224,353,764 pounds; and in Utah from 79,665,563 pounds to 210,118,291 pounds. Most of the large companies in 1923 and 1924 were maintaining production at a rate somewhat below capacity, which they stated was because they did not wish to reduce their reserves at prices which do not yield an adequate return. In 1922-23 the Calumet & Hecla, the Ahmeek, the Allouez, the Centennial, and the Osceola companies formed the Calumet & Hecla Consolidated Copper Co., and the Kennecott Copper Corporation absorbed the Utah Copper Co.

Domestic production of new refined copper

from domestic and foreign sources, in 1923 was at a higher rate than that maintained during any previous year, except the abnormal years of 1916, 1917, and 1918. Domestic consumption also kept pace with production and except for the years mentioned was also at the highest rate, but because of unfavorable conditions in Europe, which had retarded consumption in the important consuming countries there, and the increased production in South America and Africa, which tended to increase competition in European and other markets, stocks by 1924 had increased, and prices were below what the producers had confidently expected they would be. The American producers sought to offset the low selling price of copper, so far as they were able, by decreased costs of production. These decreases were obtained by increased efficiency of operation, by improved labor, by consolidation of mining companies, and by closer coöperation between producers and manufacturers.

COPPER PRODUCED IN THE UNITED STATES
FROM DOMESTIC ORES, 1923
(Smelter output, in pounds fine)

State	1923
Alaska	68,648,368
Arizona	615,493,561
California	27,042,835
Colorado	4,343,418
Georgia	
Idaho	3,664,079
Michigan	137,691,306
Missouri	217,449
Montana	224,353,764
Nevada	63,495,928
New Mexico	57,521,171
North Carolina	61,913
Oregon	1,182,437
Pennsylvania	1,121,573
South Dakota	47
Tennessee	18,721,932
Texas	4,216
Utah	210,118,291
Washington	839,254
Wyoming	87,686
Undistributed	390,734
Total	1,434,999,962

In the above table the production is apportioned to the States in which the copper was mined. The figures represent the content of fine copper in the blister produced, the smelter output of ingot, and anode copper from Michigan.

It was realized that additional uses for copper could be developed with advantage to producers and manufacturers, and in 1921 the Copper and Brass Research Association was organized to promote a more general knowledge of the availability of copper for various purposes. This body made a survey of dwelling house construction and found that in this field alone 150,000,000 pounds of copper were used, and more would be required with the resumption of active building construction. Accordingly a campaign was put under way to increase the use of copper in this field.

In the period under consideration there had been heavy investments of American capital in South America in copper properties, particularly in Chile where the mines at Chuquicamata, Raicagua and elsewhere were receiving the attention of well organized and financed companies.

Likewise an important development with a considerable bearing on the copper situation of the world was the opening and exploitation of the copper deposits in the Katanga region of the Belgian Congo Free State owned by the Union Minière du Haut Katanga, said to be the largest in the world. This was a Belgian

SOME SALIENT COMPARATIVE FIGURES OF THE COPPER INDUSTRY IN THE UNITED STATES
1913-1923 (In pounds)
U. S. GEOLOGICAL SURVEY

Year	Smelter production (domestic ores)	Refinery production of primary copper (domestic and foreign sources)	Imports (un- manufactured)	Exports of metallic copper	Withdrawn from total supply on domestic ac- count (new)
1913	1,224,484,098	1,615,000,000	409,000,000	926,000,000	812,000,000
1914	1,150,137,192	1,533,800,000	306,000,000	840,000,000	702,000,000
1915	1,388,009,527	1,634,200,000	316,000,000	682,000,000	1,137,000,000
1916	1,927,850,548	2,259,400,000	462,000,000	784,000,000	1,479,000,000
1917	1,886,120,721	2,422,000,000	556,000,000	1,128,000,000	1,395,000,000
1918	1,908,533,595	2,394,000,000	576,000,000	744,000,000	1,662,000,000
1919	1,286,419,329	1,770,000,000	429,000,000	516,000,000	914,000,000
1920	1,209,061,040	1,526,000,000	486,000,000	623,000,000	1,054,000,000
1921	505,586,098	951,000,000	350,000,000	628,000,000	611,000,000
1922	950,285,947	1,256,000,000	541,000,000	743,000,000	897,000,000
1923	1,434,999,962	1,980,000,000	676,000,000	829,000,000	1,300,000,000

STATISTICS OF THE COPPER INDUSTRY IN THE UNITED STATES IN 1922 AND 1923
U. S. GEOLOGICAL SURVEY

Summary of features of the copper industry in the United States in 1922 and 1923

		1922	1923
Production of copper:			
Smelter output	pounds...	950,285,947	1,434,999,962
Mine production	do.	964,583,894	(^a)
Refinery production of new copper:			
Electrolytic	do.	766,944,838	1,302,454,492
Lake	do.	122,545,126	137,691,306
Casting and pig	do.	15,180,723	24,019,197
Total domestic	do.	904,670,685	1,464,164,995
Total domestic and foreign	do.	1,255,515,959	1,979,835,616
Total new and old copper	do.	1,927,000,000	2,802,000,000
Ore produced:			
Copper ore	short tons.	26,893,247	(^a)
Average yield of copper	per cent.	1.74	(^a)
Other ore yielding copper	short tons.	52,370	(^a)
Average price per pound	cents.	13.5	14.7
Imports (unmanufactured)	pounds.	541,013,220	676,473,338
Exports of metallic copper ^b	do.	742,755,957	828,854,827
Withdrawn from total supply on domestic accounts:			
Total new copper	pounds.	896,633,833	1,300,473,331
Total new and old copper	do.	1,568,000,000	2,122,000,000
Stocks of refined copper ^c	do.	216,000,000	264,000,000
Stocks of blister and materials in solution ^c	do.	361,000,000	432,000,000
Value of production in the United States	do.	\$128,289,000	\$210,945,000
World's production	pounds.	1,851,864,000	(^a)

^a Figures not available when table was compiled.

^b Total exports of copper, exclusive of ore, concentrates, and composition metal, and for 1923, unrefined material, which can not be separated from ore and concentrates.

^c At the end of the year.

company in which the Tanganyika Concessions, a British corporation, owned a 39 per cent interest. With its mines, local smelters and refineries the Union Company was the largest copper producer in the world in 1921, with an output of 67,012,000 pounds, which was exceeded in 1922 when the production was estimated at 92,400,000 pounds. The official estimate of the ore reserves at the 12 great mines of the eastern group of the Union Minière was 2,800,000 tons of copper contained in 6-per cent ore aggregating some 49,000,000 tons. The other group of mines under development by this corporation was said to include 1,700,000 tons of metal in 8- to 9-per cent ore.

Large refining and reducing works have been erected in proximity to the mines, and hydroelectric power from the Lubira and Luabala rivers was to be installed, inasmuch as other copper deposits have been found in Katanga, as well as elsewhere in Africa, the advent of which into the world's copper production was an important factor.

The rapid development of the copper industry in the Belgian Congo by 1923 had reached a point where the production amounted to some 57,000 metric tons as compared with 43,302 tons in 1922. The leading copper mines under operation were the Star of the Congo, Kambove, Likasi

and Luishia. The Star of the Congo had been exhausted three times, but in 1922 large reserves of ore were found. A smelter at Lumumbashi handled the ore and concentrates, some of which were prepared at the mines. There were reverberatory furnaces and electrocathodes were produced. The copper was sent to Europe by way of Beira ordinarily, but in 1923 some went out by Dar-es-Salaam, as the cost of transportation was slightly less. Half of the black copper produced in the Belgian Congo was shipped to America for refining, while the rest was treated in Europe, but there was under construction an electrolytic refinery to handle this ore near Antwerp.

CORAL REEF FORMATION. See GEOL. OGY.

CORBIN, JOHN (1870-). An American dramatic critic and author (see Vol. VI). He wrote *The Edge* (1915) and until 1916 was secretary of the Drama Society of New York. From 1917 to 1919, he was dramatic critic of the *New York Times* and after 1919 editorial writer for the same paper. He produced Shakespeare's *Tempest* (with full text in the Elizabethan manner) in 1916, and in 1922 published *The Return of the Middle Class*.

CORELLI, MARIE (1864-1924). An English novelist (see Vol. VI). Her later publications

include: *Innocent, Her Fancy and His Fact* (1914, 1921); *The Young Diana* (1917); *My Little Bit, a Record of War Work* (1919); *The Love of Long Ago* (1920); *The Secret Power* (1921), and *The Treasure of Heaven: a Romance of Riches* (1921).

COREY, WILLIAM ELLIS (1866-). An American capitalist, born in Braddock, Pa. He was educated in the public schools and at Duff's College, Pittsburgh. He entered the Edgar Thompson Steel Works at the age of 16, and became superintendent of the plate mill at the Homestead Steel Works in 1899. He succeeded Charles M. Schwab as general superintendent at these works in 1897. From 1901 to 1903, he was president of the Carnegie Steel Company, and from that year to 1911 was president of the United States Steel Corporation. In the latter year he resigned this post to become chairman of the board of the Midvale Steel and Ordnance Company. He was a director and official in many important financial institutions.

CORFU DECLARATION. See JUGOSLAVIA.

CORFU GOVERNMENT. See SERBIA.

CORFU INCIDENT. See ALBANIA; GREECE; ITALY.

CORN. According to the census of 1920, corn was produced on three-fourths of the farms in the United States. The average annual production of the country for the years 1914-23, inclusive, was 2,883,000,000 bushels. The average annual production of the leading corn states for the same period was as follows: Iowa 402,000,000 bushels, Illinois 320,000,000 bushels, and Nebraska 205,000,000 bushels. The average acre yield in the United States increased from 24.1 bushels for the ten-year period 1890-99 to 26.1 bushels for the ten-year period 1910-19. It was estimated that 40 per cent of the corn crop was fed to swine on farms, 20 per cent to horses on farms, 15 per cent to cattle on farms, and 10 per cent was used for human food. About 4,000,000 acres of corn each year were made into silage, over 2,500,000 acres were cut for fodder and more than 2,000,000 acres were pastured off with hogs. About four years after the War, corn production in southeastern Europe had practically regained its pre-war status. The corn area of Russia in 1923 was 3,548,000 acres, as compared with 2,223,000 acres in 1913. Largely as a result of the War, corn production in Argentina was increased to a considerable extent, although the yield in 1923 was below the average for the years 1909-13, which was 174,502,000 bushels.

The average annual total value of the corn crop of the United States for the five-year period 1910-14 was \$1,577,000,000, but the higher price of corn from 1916 to 1919 raised the value for that period to \$3,024,000,000. The 1920 crop was the largest ever harvested, but prices were receding and its total value was only \$2,150,000,000, while in 1921, with a yield only 4 per cent under the crop of 1920, prices had dropped so low that the total value was only \$1,303,000,000, or only 43 per cent of the annual value during the war period and about 16 per cent less than the pre-war value although the crop was 10 per cent larger than the pre-war average. During the war the average farm price of corn rose above \$1.90 per bushel; but the price began to decline in 1920 and reached the low point at the end of 1921, reducing the purchasing power of corn far below that of any other year. A marked

rise in the cost of production occurred from 1914 to 1920, and the rise in price was even greater and more rapid. The cost of production was far from declining in the same proportion as the price of corn, and this was one of the principal factors leading to the agricultural economic crisis beginning in 1920 and continuing for several years.

The United States Grain Standards Act of Aug. 11, 1916, required that in all interstate buying and selling of corn the grades used shall be the Federal grades established by the Secretary of Agriculture. According to these grades, based on condition and quality, the best corn is graded Number One and corn lower in quality is given numerical grades down to and including Number Six, while a "sample grade" is added for corn too low in quality for the numbered grades. To the insect pests attacking the corn crop in the United States was added the European corn borer. This insect, first reported within the United States near Boston in 1917, became established during the following six years in eastern New York and in a narrow strip along the shores of Lake Erie in New York, Pennsylvania and Ohio. By that time the insect infested, in Ontario, Canada, an area extending from Lake Erie northward and equal to the area infested in the United States. Quarantine regulations were put in force to prevent its spread and Congress appropriated money for its control. The diseases of corn which have become troublesome in recent years are the brown spot disease, characterized by brown spots usually on the leaf, the leaf sheath and the stalk, and root rot of corn which results in the partial or total decay of the root system causing the plant to lodge, and which attacks also the stalk and the ear.

Corn Oil. Corn oil, derived largely from the germ in the corn kernel and produced economically only in connection with the manufacture of corn products from which the germ is excluded, is of growing importance. Formerly used mainly in the manufacture of soaps and paints, it is now refined and used for food in the form of lard and butter substitutes, salad and cooking oils, shortening, and other similar substances. With the increase in the manufacture of corn products during the War, due in part to flour substitute regulations, the annual production of corn oil rose to 118,000,000 pounds but later receded to about 90,000,000 pounds. Corn oil is used also in making rubber substitutes. Corn cobs are utilized in paper-making, the production of adhesives, the manufacture of fibre board and wall board, and for other similar purposes. In some of the manufacturing processes employed, furfural, a compound used for technical purposes and also as a germicide and fungicide, is recovered as a by-product. Consult *United States Department of Agriculture Yearbook*, 1921. See AGRICULTURE.

CORN BORER, EUROPEAN. See ENTOMOLOGY. ECONOMIC.

CORNELL, KATHARINE (?-). An American actress who made her first appearance in 1916 with the Washington Square Players in *Bushido* and remained with that company some time, playing *The Death of Tintagiles*, *Plots and Playwrights*, etc. In 1918, she was with the Jessie Bonstelle stock company at Buffalo and subsequently toured in *Cheating Cheaters* and *The Man Who Came Back*. In 1919, she played Jo in *Little Women* in London and the next year toured in *The Man Outside*. One of

her best characterizations in New York was the part of Eileen Baxter-Jones in *Nice People* (1921).

CORNELL UNIVERSITY. A nonsectarian, coeducational institution at Ithaca, N. Y., established in 1865. The university's annual income available for current expenses increased during the decade between 1914 and 1923-24 from \$3,000,000 to \$4,500,000. Besides augmented income from invested funds, somewhat higher tuition fees, and increased State appropriation for the State College of Agriculture and Veterinary College, this increment included some \$100,000 given annually by alumni, \$100,000 from rents of new residential halls, and \$200,000 from the United States for research and extension instruction in agriculture. A campaign for new endowment, begun in 1919, yielded subscriptions of more than \$6,000,000, mainly for increased salaries for faculty members. The enrollment of students in 1923-24 was 5153, as compared with 5015 in 1914, and the faculty numbered 949, an increase of 199 over 1914. The number of volumes in the library was multiplied by almost one-half. The Baker Laboratory of Chemistry, for which George F. Baker gave \$1,500,000, and a \$400,000 State building for the department of dairy industry, were completed in 1923. Gifts received within the decade were \$500,000 from August Hecksher to endow research, \$50,000 from Mrs. Sarah Manning Sage for medical research, and an anonymous gift of \$200,000 for pediatrics. The library received from Charles W. Wason a collection relating to China, with a \$50,000 endowment. Col. Oliver H. Payne's bequest of \$4,500,000 to endow the medical college, which is situated in New York City, became available in 1914. The New York State Drill Hall was completed in 1917 and was used during the War by an army school of military aeronautics. Livingston Farrand succeeded Jacob Gould Schurman as president in 1921.

CORPS. See **ARMIES AND ARMY ORGANIZATION.**

CORTISSOZ, ROYAL (?-). An American journalist, born in New York City. For many years he was literary and art editor of the *New York Tribune*, and was a frequent contributor to magazines on art subjects and also lectured much on art. He was the author of *Augustus St. Gaudens* (1907); *John LaFarge* (1911), and *Art and Common Sense* (1913). He edited many classics, including *Don Quixote* and *The Autobiography of Benvenuto Cellini*. He also edited Whitelaw Reid's *American and English Studies*. He was a member of the National Institute of Arts and Letters.

COSGRAVE, WILLIAM THOMAS (1880-). An Irish statesman, born at Dublin. He was educated at the Christian Brothers' Schools, and, engaging in business in Dublin, amassed a fortune. He was a member of the secret revolutionary organization called the Irish Republican Brotherhood. In 1900, he was elected to the Dublin City Council. He was a leader in the Sinn Féin ranks, and on May 5, 1916, he was arrested, brought to trial, and sentenced to death. His sentence was changed to imprisonment for life, but he was released in the general amnesty of 1917. In the fall of 1917, he was elected to Parliament, but because of his Sinn Féin principles, did not take his seat. In May, 1918, he was again arrested and taken to England. He returned in 1919, was again arrested and deported. Upon his return to Dublin this

last time, he became minister of local government in the Dail Eireann. In January, 1922, he put through a plan to spend £1,000,000 on housing within the year. On the death of Arthur Griffith and of Michael Collins, Cosgrave became head of the Provisional Government. The constitution of the Free State was ratified, and in December, 1922, the Provisional Government came to an end. Timothy M. Healy became the first governor-general of the Irish Free State, and Cosgrave was elected president of the Executive Council. He also became Minister of Finance.

COSMOGONY. See **ASTRONOMY.**

COSTA RICA. A Central American republic situated between Nicaragua and Panama. Its area, variously estimated at 18,691 to 23,000 square miles, seated in 1922 an estimated population of 576,581 (population in 1911, 388,266). Immigration in 1920 was 6040 (1911, 9537) and the emigration, 5280 (1911, 8170). The populations of the largest cities, as estimated in 1920, were: San José, with suburbs, 51,395; Cartago, 17,402; Heredia, 13,885; Alajuela, 11,908; Limón, 10,231.

Industry and Finance. Agriculture continued to prosper. The coffee planters in 1922 had the best year in the history of their industry. In 1913, exports totaled 13,019,059 kilos, at a value of \$3,605,930; in 1922, 18,616,803 kilos, at \$6,677,762. Exports for 1923 and 1924 were large and commanded excellent prices. The 1924 crop was very good. In 1913, Great Britain took 82 per cent of the total; the United States, 6 per cent. During the War the United States displaced Great Britain from her commanding position, only to be compelled to yield up first place once more in 1922, when she bought 34 per cent, and Great Britain, 59. The sugar industry showed great advances. In 1913, production was 2,869,429 kilos with only an insignificant amount exported. In 1920, the export was 5,107,251 kilos, and in 1922, 2,608,678 kilos. Production in 1923-24 was placed at 19,000,000 pounds. The banana industry, worked for the most part by the United Fruit Company, ranked second in importance in point of export value. In 1912, the number of bunches shipped was 10,647,702; in 1922, 7,671,619, (with a value of \$5,003,455). Production was decreased somewhat in 1923 by blight. Cacao production assumed economic importance during the decade. Exports in 1913 were 845,931 pounds; in 1922, 7,236,378. Mining, on the other hand, decreased because of the exhaustion of the known ore bodies. Exports of gold and silver bullion for 1905-14 were worth an annual average of \$706,457; in 1922, \$491,188. Commerce over the whole period showed imports of \$8,687,280 for 1913; for 1922, \$8,344,670; exports for 1913 and 1922, \$10,234,149 and \$14,224,332. In 1912, 46 per cent of the imports came from the United States; in 1922, 61 per cent. Exports to the United States increased from 55 per cent to 56 per cent in 1922. They had reached 68 per cent in 1921. Government accounts fluctuated over the period. The year 1922 was the first to show a surplus since 1912. Expenditures in 1913 were 10,184,261 colones; in 1922, 17,311,165 colones. Revenues for the same years were 9,612,533 and 18,971,023 colones. Largely as a result of the deficits, the internal debt increased from 3,829,783 to 40,050,901 colones. The external debt increased in the same period from \$7,869,295 to \$13,035,862. The par value of the colon

is \$0.465 (2.15 colones to the dollar). In 1922 the colon was worth 4.4 to the dollar, so that the government was compelled to fix the legal rate of exchange, in October, 1922, at 4 colones. During 1923 there was a fluctuation in value, the colon going as high as 4.54 to the dollar, but the exceptionally good coffee crop and high prices of 1924 increased the gold exchange and made possible the regulation of the rate at 4 colones again.

History. President Alfredo González, elected in 1914, was confronted by serious disturbances in 1917 on his attempt to inaugurate a radical financial programme and was compelled to relinquish his office. His successor, Federico Tinoco, leader of the revolutionists, was refused the recognition of the United States, with the result that his waning influence ended with his overthrow in 1919 at the hands of Julio Acosta García. The latter served as president, 1920-24, and during his administration the country regained the stability for which it had formerly been celebrated in Spanish America. Under a small and satisfied land-owning class, prosperity prevailed. In 1917 Costa Rica severed relations with Germany and in 1918 assumed the rôle of an Associate Power on the side of the Allies. In 1920 the suffrage was extended to women. In 1921 the administration was thwarted in its attempt to join the newly-formed Central American Union by the negative vote of the National Assembly. (See CENTRAL AMERICAN UNION). In 1923 Secretary of State Hughes announced that it was the intention of the United States to recognize Costa Rica's rights in the use of the San Juan River for the Nicaraguan Canal route. The question had arisen out of Costa Rica's protest against the Bryan-Chamorro treaty of 1916 and her subsequent suit before the Central American Court of Justice, on the ground that the route, in being run through the San Juan River, alienated her territorial rights. For the presidential term 1924-28 Ricardo Jiménez was elected in May, 1924.

COST OF LIVING IN THE UNITED STATES. The cost of living index numbers given by the United States Bureau of Labor Statistics show the changes in the cost of living throughout the United States during 1914-24 in comparison with the average cost in 1913. Retail prices of food are secured directly from 15 to 25 dealers in each of 51 cities, and prices are also secured for coal, wood, gas, electricity, and kerosene from dealers in a number of cities. Other data on retail prices are secured by special agents. Rental figures are for 400 to 2000 houses and apartments in each city, according to its population. The costs of clothing, furniture, and miscellaneous items are determined from four quotations from each city on each of a large number of items; in Greater New York five quotations were secured instead of four. In the calculation of the index number the prices for the different articles of food are weighted according to the relative values shown in the budgets of over 12,000 families secured by the United States Bureau of Labor Statistics in its investigation during 1918-19. The different types of expenditure are weighted according to their relative values in total expenditure, as shown also in this budget investigation, but prices within the budget divisions are not weighted except for food. The following weights are used for the different budget divisions in the calculation of the cost-of-living index num-

ber for the United States: food, 38.2; clothing, 16.6; housing, 13.4; fuel and light, 5.3; furniture and furnishings 5.1; and miscellaneous, 21.3.

As shown by the figures given above, there were marked differences in the rate of increase, in 1913-24, in the six budget divisions. Food costs increased rapidly and also decreased rapidly; food costs after May, 1921, were nearer the cost level of 1913 than any of the other budget divisions. The cost of housing increased but slowly and was still showing a tendency to increase, and the cost of house and furnishing goods was also rising during the latter few years, after a rapid decrease from its peak in 1920. The cost of clothing remained well above the level of 1913, as did also the cost of fuel and light and the cost of miscellaneous items. The total cost of living shows amounts of change quite different from those indicated by any of the budget divisions separately.

In addition to the cost-of-living index number for the United States, the Bureau of Labor Statistics publishes data on the change in the cost of living in 32 cities. In 19 of these cities comparison is made with prices prevailing in December, 1914; in 13, with prices prevailing in December, 1917. Each of these index numbers is weighted according to the proportionate expenditure for the different budget divisions shown by the budgets collected in the city during the 1918-19 investigation. The food expenditure, however, is weighted according to the average expenditure shown in all budgets collected in the geographical division in which the city is located, rather than according to that shown in the budgets secured in the particular city. As will be seen by reference to the accompanying table, there is considerable variation among the cities in the amount of change in the total cost of living, variation being partly from differences in weights and partly from differences in retail prices. In all instances, however, living costs increased slowly at first, and then more rapidly until the highest point was reached in June, 1920. The decrease was fairly rapid until March, 1922, and since then there has been a tendency in some instances toward a slight decrease and in others toward a slight increase. Monthly prices for 43 articles of food are secured by the Bureau in 51 cities and are published at quarterly intervals in the *Monthly Labor Review*, separately for each article in each city, and also combined to show the change in the cost of food for a family, the same system of weighting being used as in the calculation of the cost-of-living index numbers. There is also quarterly publication of retail prices of coal, gas, and electricity, and until November, 1923, of retail prices of dry goods. Other index numbers of the cost of living are those of the National Industrial Conference Board and the Massachusetts Commission on the Necessaries of Life, the first based on data on prices from all sections of the United States and the second on price data secured in Massachusetts.

Two interesting index numbers for the period 1909-19 were prepared by the National Bureau of Economic Research in connection with the study of income in the United States (*Income in the United States: Its Amount and Distribution, 1909-1919*, vol. ii). It was felt that an index number of the cost of living based on the goods and proportionate expenditure of families with small incomes might not measure accurate-

CHANGES IN COST OF LIVING IN THE UNITED STATES FROM DECEMBER, 1913, TO MARCH, 1924
 UNITED STATES BUREAU OF LABOR STATISTICS
 Per cent of increase from 1913 (average) to March, 1924

Item of Expenditure	Dec. 1914	Dec. 1915	Dec. 1916	Dec. 1917	Dec. 1918	June 1919	Dec. 1919	June 1920	Dec. 1920	May 1921	Sept. 1921	Dec. 1921	Mar. 1922	June 1922	Sept. 1922	Dec. 1922	Mar. 1923	June 1923	Sept. 1923	Dec. 1923	Mar. 1924
Food	5.0	5.0	26.0	57.0	87.0	84.0	97.0	119.0	78.0	44.7	53.1	49.9	38.7	41.0	39.3	46.6	42.0	44.3	49.3	50.3	43.7
Clothing	1.0	4.7	20.0	49.1	105.3	114.5	168.7	187.5	158.5	122.6	92.1	84.4	75.5	72.3	71.3	71.5	74.4	74.9	76.5	76.3	75.9
Housing	1.0	1.5	2.3	1.1	9.2	14.2	25.3	34.9	51.1	59.0	60.0	61.4	60.9	61.1	61.9	62.4	63.4	64.4	64.4	66.5	67.0
Fuel and light	1.0	1.0	8.4	24.1	47.9	45.6	56.8	71.9	94.9	81.6	80.7	81.1	75.8	74.2	83.6	86.4	86.2	80.6	81.3	84.0	82.3
House and furnishing	4.0	10.6	27.8	50.6	113.6	125.1	163.5	192.7	185.4	147.7	124.7	118.0	106.2	102.9	102.9	108.2	117.4	122.2	122.4	122.4	121.9
Miscellaneous	3.0	7.4	13.3	40.5	65.8	73.2	90.2	101.4	108.2	108.8	107.8	106.8	103.3	101.5	101.1	100.5	100.3	100.3	101.1	101.7	101.1
All items	3.0	5.1	18.3	42.4	74.4	77.3	99.3	116.5	100.4	80.4	77.3	74.3	66.9	66.6	66.3	69.5	68.8	69.7	72.1	73.2	70.4
No change																					

CHANGES IN COST OF LIVING IN 19 CITIES FROM DECEMBER, 1914, TO MARCH, 1924
 Per cent of increase in cost of all items from December, 1914, to March, 1924

City	Dec. 1915	Dec. 1916	Dec. 1917	Dec. 1918	June 1919	Dec. 1919	June 1920	Dec. 1920	May 1921	Sept. 1921	Dec. 1921	Mar. 1922	June 1922	Sept. 1922	Dec. 1922	Mar. 1923	June 1923	Sept. 1923	Dec. 1923	Mar. 1924
Baltimore	1.4	18.5	51.3	84.7	84.0	94.3	114.3	96.8	77.4	76.5	73.2	67.9	67.6	67.2	70.9	70.2	72.0	74.7	74.8	71.9
Boston	1.6	15.7	38.1	70.6	72.8	92.3	110.7	97.4	74.4	72.8	70.2	61.2	59.6	60.9	65.1	63.9	63.5	67.9	69.4	64.6
Buffalo	3.5	24.1	31.1	80.9	84.2	102.7	121.5	101.7	80.3	78.4	76.8	69.9	68.6	71.0	73.9	72.5	74.1	78.2	78.6	75.1
Chicago	2.0	19.5	41.8	72.2	74.5	100.6	114.6	93.3	78.4	75.3	73.8	65.1	65.0	65.6	68.0	65.5	69.6	73.2	73.7	72.0
Cleveland	1.4	19.1	42.9	71.4	77.2	98.2	120.3	107.3	87.5	82.4	78.8	68.5	68.9	68.1	72.9	73.3	77.1	79.9	79.6	77.3
Detroit	3.5	22.3	49.9	78.0	84.4	107.9	136.0	118.6	93.3	88.0	82.4	74.6	73.3	75.6	79.4	79.4	81.7	88.5	84.7	83.0
Houston	1.3	16.4	44.9	75.7	80.2	101.7	112.2	104.0	79.7	75.0	73.6	67.2	65.9	65.4	68.4	66.5	67.2	83.7	80.6	67.7
Jacksonville	1.9	14.7	41.6	71.5	77.5	101.5	116.5	106.2	85.8	78.7	75.1	68.0	65.7	65.0	67.8	67.4	67.7	69.9	71.9	69.7
Los Angeles	1.3	17.7	28.9	58.0	65.1	94.5	107.0	93.3	70.8	67.2	63.6	55.8	58.3	55.5	58.8	58.0	58.6	60.5	62.6	59.5
Mobile	4.4	13.8	43.2	71.4	76.6	94.5	107.0	101.4	81.7	78.7	79.3	69.9	70.7	69.7	74.2	72.2	72.6	75.4	77.1	77.4
New York	2.0	14.9	44.7	77.3	79.2	103.8	119.2	101.8	81.7	79.7	79.3	69.9	70.7	69.7	74.2	72.2	72.6	75.4	77.1	77.4
Norfolk	1.6	14.7	45.2	80.9	76.2	96.5	113.5	100.7	79.8	76.0	74.3	68.2	68.2	68.5	68.1	69.9	69.5	71.1	74.2	70.9
Philadelphia	1.2	14.7	43.3	73.7	78.2	93.7	107.6	93.1	72.1	72.0	69.2	60.7	59.7	61.5	64.1	64.4	63.3	65.8	66.9	64.1
Portland, Me.	4.4	13.8	38.0	72.2	74.3	91.6	107.6	93.1	72.1	72.0	69.2	60.7	59.7	61.5	64.1	64.4	63.3	65.8	66.9	64.1
Portland, Ore.	3.1	6.1	31.2	64.2	69.2	83.7	100.4	80.3	62.1	62.0	58.3	52.3	52.1	54.2	56.1	56.4	54.6	57.8	57.8	55.3
San Francisco and Oakland	1.7	8.3	28.6	57.8	65.6	87.8	96.0	85.1	66.7	64.6	63.2	57.5	56.8	57.1	58.8	56.5	57.6	60.4	62.1	58.0
Savannah	2.2	14.6	42.5	75.0	79.8	98.7	109.4	98.7	77.6	71.3	68.2	56.9	56.8	55.0	56.8	57.0	55.6	56.1	55.9	54.1
Seattle	1.0	7.4	31.1	69.9	76.9	97.7	110.5	94.1	80.2	75.5	71.5	67.4	67.0	66.5	66.7	61.9	66.4	68.4	68.5	66.3
Washington, D. C.	1.0	14.6	47.3	73.8	71.2	87.6	101.3	87.8	67.1	66.2	63.0	56.8	57.6	56.9	59.5	58.2	60.9	62.9	63.2	59.9

* Decrease. * April, 1919. * November, 1919.

ly the change in the cost of living of families with larger incomes, and special indexes were prepared based on the goods and proportionate expenditure estimated for families spending \$5000 and \$25,000 per annum on consumption goods. In both cases the increase in the cost of living was less marked during the latter part of the period than that shown by the index number of the cost of living of families with smaller incomes. Quantity budgets descriptive of the living standard of families at different economic levels have been used in a number of instances in determining wage rates for different classes of employees under local living conditions and also in making changes in wage rates in accordance with changes in local prices. Such quantity budgets have been published by the United States Bureau of Labor Statistics for the family of a government employee in Washington, D. C., and also for the family of a workman; the level is described as one of "health and decency." The Philadelphia Bureau of Municipal Research prepared a very detailed estimate of the expenditures required for the maintenance of a fair standard of living among city employees and has issued periodic statements of the amount necessary for the maintenance of this standard at current prices in Philadelphia.

Quantity budgets at higher economic levels were issued in 1923 by the California State Civil Service Commission. In these, the estimated expenditures of families of executives and of clerical workers were given in great detail as well as the estimated expenditures of the families of laborers. Quantity budgets for the lower economic levels have been prepared in a number of places by social agencies as the basis for relief grants to dependent families. Budgets for women workers have been used frequently by Minimum Wage Commissions as the basis for the establishment of minimum wage rates. Two types of problems seem to need solution in connection with the measurement of the cost of living. It is necessary to know the amount of change in the cost of living because of changes in the price level, it being assumed that the standards of expenditure have remained relatively unchanged. It is also necessary to know the cost of maintaining a specified living standard under given conditions of living costs. The first type of problem is being solved by the availability of index numbers which measure the change in the living cost in many localities in the United States. The second type of problem is being solved by the use of quantity budgets. Along both lines much progress has been made in the United States. See WAGES.

COTTON, MANUFACTURES OF. See TEXTILE MANUFACTURING.

COTTON. The cotton situation of the world. in 1924 was unsatisfactory from almost every standpoint. As a result of recent investigations new industrial uses for cotton have been developed and the quantity required for automobile tires, artificial leather, pyroxylin, which has many uses, etc., is very large. This new demand, coupled with diminishing world supplies of cotton, has made it difficult if not impossible for spinners and weavers to keep their spindles and looms fully employed. On the other hand, the growers of cotton in many countries have been hard put to produce their crop at a profit on account of insects, diseases, unfavorable climatic, soil, and labor conditions, and in some cases, lack of adequate transportation. The

maximum world's production of cotton was attained in 1914 when a crop of 24,800,000 bales of 500 pounds each was marketed. Of this total, 15,934,000 bales, or nearly 65 per cent, was produced in the United States. In 1923 the estimated world's production of commercial cotton was 17,600,000 bales, of which 10,160,000 bales, or 58 per cent, was grown in the United States. Following the year 1920 there was a surplus of commercial cotton for a few crops and there was a large carry-over, but reduced production and growing demand had so drawn upon the reserve that in 1924 there was every prospect of a deficient supply. This was shown in the greatly depressed condition in the spinning centers of many countries.

Boll Weevil. In the United States the reduced production was due to a number of causes, the principal of which is the boll weevil, *Anthonomus grandis*. The boll weevil, which is a native of Central America and Mexico, made its appearance near Brownsville, Tex., about 1892. It advanced toward the north and east at an average rate of about 100 miles a year until in 1923 practically all the old cotton belt from Texas and Oklahoma to North Carolina was infested. So severe were its ravages that the production of upland cotton was greatly curtailed and the crop of Sea Island cotton was reduced from a maximum of 119,000 bales in 1911 to less than 1000 bales in 1923. The presence of the boll weevil necessitated the adoption of modified methods of growing the crop that materially increased its cost. Early maturing varieties are more extensively grown, and heavy applications of fertilizers are recommended to hasten the maturity of the crop. Poisoning the weevils with calcium arsenate has been extensively adopted and more than 1,000,000 pounds of this material were employed in 1923. Where the land is sufficiently fertile to produce at least half a bale to the acre the use of calcium arsenate has proved very profitable. By the combination of these methods it has been found entirely practicable to grow cotton in regions of heavy boll weevil infestation. See ENTOMOLOGY, ECONOMIC.

Distribution of Production. There was a very considerable extension of the cotton area of the United States between 1914 and 1924. Arizona and California became important producers of cotton, with a production in 1923 of more than 132,000 bales. In Arizona, the industry was largely built up around strains of Egyptian cotton, and in 1920 the production of Egyptian-American cotton was in excess of 100,000 bales. This cotton is of a special type, having very long and fine lint, and it is suited to special manufactures. The overproduction in 1920 resulted in a fall in price and a reduced planting of these varieties. In 1923 only about 22,000 bales of this type of cotton were grown, while there was a decided increase of short staple cotton both in Arizona and in California.

In Egypt, one of the great cotton producing countries, there was a steady decline in the yield of cotton per acre, and although there was a large area brought under cultivation by the construction of the great Assuan Dam, the total production of cotton showed little increase. Several commissions studied the situation and the reduced production per acre was attributed to various causes, among them changed cultural methods, rise of water table due to overirrigation, extensive planting of varieties of low pro-

duction but yielding fine lint, and the spread of pests, especially the pink bollworm.

For many years Great Britain has been the greatest consumer of cotton, about 35 per cent of all the spindles devoted to cotton spinning being in that kingdom. In order to make English spinners less dependent upon the United States for supplies of cotton, an active campaign was started to increase the growing of cotton within the British Empire. In 1902 there was organized the British Cotton Growing Association. In 1919 the Empire Cotton Growing Corporation was chartered and it is supported by contributions from the government and by a tax of 6d. per bale on all cotton imported into and spun in the United Kingdom. Through the activities of these organizations the growing of cotton has been stimulated in many parts of the British Empire. In some countries subsidies have been granted to growers, gins have been erected, experiment stations and seed farms established, and irrigation works constructed, all with a view to increasing cotton production. While no large amounts of cotton were added to the world's production, the possibilities of successful cotton growing in some countries seemed assured. Parts of Africa, particularly the Sudan, Uganda and Nigeria, were considered very promising. In Australia the climate and soils appeared favorable, and it was believed a profitable industry could be built up. Efforts were being made to improve the cotton situation in India, and a fund derived from a tax of 2 annas (about \$.08) a bale on all cotton grown in the country was devoted to research in the cotton industry. Brazil had a 1923 crop estimated at 660,000 bales. An international commission visited Brazil in 1922 and reported favorably on the possibilities for cotton growing and suggested means whereby production might be greatly increased.

Although active efforts were made by European agencies to increase the production of cotton in order that there might be larger supplies for the old spinning centres, there has been a rapid expansion of spinning in new territories and it is considered doubtful whether the desired object will be attained. Japan, reporting nearly 5,000,000 spindles in 1922, became an important consumer of raw cotton. In Brazil, as cotton production has increased, manufacturing it into yarn and cloth has grown. India is consuming more of its crop in domestic manufactures and the exports are not increasing very appreciably.

In February, 1924, there were in the United States 37,742,000 spindles, an increase of about 15 per cent since 1914, indicating a material increase in cotton consumption within the country. There was a decided movement of cotton spinning toward the cotton growing States, and while there were still about 2,000,000 spindles more in the northern than in the southern States, the number of active spindles and spindle hours per month in the cotton growing States were greater in the South in February, 1924. See **TEXTILE MANUFACTURING**.

Coöperative Marketing. An important development in cotton marketing in the United States took place soon after 1920. Coöperative marketing was established on an extensive scale through state-wide agencies, associations having been organized in Texas, Oklahoma, Georgia, North Carolina and South Carolina. These were federated into a Cotton Growers' Coöperative Association. In 1922 about 700,-

000 bales were marketed coöperatively, and of the crop of 1923 it is claimed that more than 1,500,000 bales were so handled. A selling organization known as the American Cotton Growers' Exchange was established in 1923. In connection with the Cotton Standard Act of March 4, 1923, the United States Department of Agriculture has established standards for American cotton that have become widely adopted, and on Aug. 1, 1924, they became the universal standards for grade and color. See **AGRICULTURE**; and the articles on individual States which lie in the Cotton Belt.

COTTON, HENRY ANDREWS (1869-). An American psychiatrist widely known in connection with the relief of certain forms of insanity through surgical intervention. Born in Norfolk, Va., he graduated at the Baltimore Polytechnic Institute in 1894 and took his medical degree at the University of Maryland in 1899. He studied psychiatry in Europe during 1905-07, being active in the laboratories of Professors Kraepelin and Alzheimer, at Munich. Upon his return he was placed at the head of the New Jersey State Insane Asylum. In 1921, he delivered a course of lectures at Princeton on the relation of focal infection to insanity. His views and experience are set down in his book *The Defective, Delinquent and Insane* (1921).

COTTON, JOSEPH POTTER (1875-). An American lawyer, born at Newport, R. I. He graduated from Harvard in 1896 and from the Harvard Law School in 1900. After 1915, he served as counsel to the New York Commission on Workmen's Compensations, and was consulting counsel of the Federal Reserve Board and of the United States Shipping Board. He was chief of the meat division, United States Food Administration, in December, 1917, and in the following year was European representative of the Federal Food Administration. He was also a member of the Inter-Allied Finance Council. He edited *Constitutional Decisions of John Marshall* (1906).

COTTON BOLL WEEVIL. See **ENTOMOLOGY, ECONOMIC**.

COTTRELL, FREDERICK GARDNER (1877-). An American chemist (see **VOL. VI**). During 1920-21, he was director of the United States Bureau of Mines, and also chairman of the Division of Chemistry and Chemical Technology of the National Research Council. He was also a member of many important chemical and engineering societies.

COTTRELL PROCESS. The Cottrell process for precipitating fine particles of solid matter in smoke, gases, and furnace fumes was very widely applied in American metallurgical plants. Not only does it greatly reduce smoke and fumes exhausted from chimneys, but in some cases it recovers material of very great value, as in metal smelters. The process consists of passing the fumes between two conductors maintained at a unidirectional difference of potential of from 50,000 to 100,000 volts. For this purpose high potential alternating voltages are rectified by means of a mechanical rectifier or more recently by means of a hot cathode two-electrode vacuum tube known as a kenotron.

COUÉ ÉMILE (1857-). A French psychologist, born at Troyes, France. At 19, he became an apprentice in a pharmacy, and at the end of three years, went to Paris and took his Ph.D. in Pharmacy, helping to pay his way by

winning a competition for government fellowship of 1200 francs a year. Later, a druggist at Troyes offered him a partnership. This druggist soon died, leaving the store to his young partner. Coué married the daughter of a wealthy horticulturist of Nancy. He became a hypnotist, then an autosuggestionist. Later he had a sanitarium where he practiced without charge to his patients. After a somewhat sensational career in France and England, he came to the United States early in 1923 and held many clinics in New York City and throughout the country. Coué's theory was that the subconscious mind may be trained to direct the diseased organ to do the thing that will make it better. The subconscious mind was trained by repeating many times each day: "Every day in every way I am getting better and better." A National Coué Institute was organized under the auspices of Col. A. Woods, Mrs. W. K. Vanderbilt, and others.

COULTER, JOHN LEE (1881-). An American statistician (see VOL. VI). During 1917 and 1918, he was a member of the West Virginia State Council of Defense, also expert for the National Exports Council, and of the War Industries Board. He was with the Army Overseas Educational Commission during 1918 and 1919.

COUNCIL OF FIVE. See PEACE CONFERENCE AND TREATIES.

COUNCIL OF NATIONAL DEFENSE. See UNITED STATES, History.

COUNCIL OF TEN. See PEACE CONFERENCE AND TREATIES.

COUNTY, ALBERT JOHN (1871-). An American railway official, born in Dublin, Ireland. He entered the railway service with the Great Southern and Western Railway of Ireland, in 1885. Removing to the United States, he became clerk in the secretary's department of the Pennsylvania Railroad, and in the years following served in various important capacities with that road and with its subsidiary lines. In 1916, he was appointed vice-president in charge of accounting and corporate work of the Pennsylvania and affiliated roads and was also director and president of most of the branch and affiliated lines of the Pennsylvania Railroad Company. He was also an official and director in many important financial institutions and was a member of many learned societies.

COUPERUS, LOUIS (1863-1923). A Dutch novelist, born at The Hague, where he was educated. His youth was spent in Batavia, Greece, Italy, and the south of France. His publications began to make an impression in foreign countries as early as 1891, when *The Footsteps of Fate* was published in England. His first venture was a volume of verse, *Een Lent van Vaerzen* (1884). After the publication of *Orchideeën* (1887), he wrote only fiction. Many of his later works show the influence of his Italian experience, and indicate a lighter view of life. The first to be rendered into English by the official translator of his works, Alexander Teixeira de Mattos, was a short love story entitled *Ecstasy* (1891), which appeared in the United States in 1919. This was followed by English versions of *Majesty*; *Universal Peace*; *Psyche*; *Fidessa*; *Babel*; *God and the Gods*; and a series of four novels entitled "Books of the Small Souls," namely, *Small Souls*; *The Later Life*; *The Twilight of the Souls*; and *Dr. Adriaan*, which reached a wide public in the United

States. He also published at intervals historical novels which reflected his researches in the Greek and the Italian past, including *The Mountain Light*, a study of the emperor Heliogabalus, and *The Comedians* (*De Komodianten*, 1906), which deals with two young actors in the reign of Domitian. These were held back by the translator as unsuitable for an English version. Another, *The Tour*, of which the scene is laid in Egypt in the reign of Tiberius, was published in the United States in 1920. His other historical romances are *Abu-Abdallah the Unfortunate*; *The Flying Chessboard*; and *Xerxes or Pride*. He also wrote two mythological romances, *Dionysus* and *Heracles*, which were being translated in 1923. Meanwhile he wrote another story of modern life called *Old People and the Things that Pass*, issued in the United States in 1919. In addition, he published volumes of travelers' impressions, sketches, short stories, and a number of novels whose scenes are laid in the Dutch East Indies. He died at Amsterdam, July 16, 1923.

COURLAND. See BALTIC PROVINCES; LITHUANIA; LATVIA.

COURTENAY, WILLIAM (1875-). An American actor born at Worcester, Mass., who attracted notice first as a member of the late Richard Mansfield's company. He played in various places in the United States and made his most notable recent successes in: *Under Fire* (1915); *Pals First* (1917); *General Post* (1917); *The Maid of the Mountains* (1918); *Cappy Ricks* (1919); *Civilian Clothes* (1920); *Honors Are Even* (1921).

COURT OF INDUSTRIAL RELATIONS. See LABOR ARBITRATION; KANSAS.

COURT TENNIS. See TENNIS.

COUSE, E. IRVING (1866-). An American painter (see VOL. VI) whose specialty is the portrayal of Indian life. He recently won many prizes for his Indian paintings including a silver medal from the Panama Pacific International Exposition (1915), the Altman prize from the National Academy of Design (1916), Isidor prize from the Salmagundi Club (1917), the Ranger Fund Purchase Prize from the National Academy of Design (1921), and the Lippincott prize from the Pennsylvania Academy of Fine Arts (1921).

COVENEY, CHARLES CARDEN (1874-). An American architect born in Boston. He received his professional training in an architect's office and during travel in Europe. His principal architectural achievements are the Christian Science Church and the Burrage residence in Boston, the Memorial Church in Fairhaven, Mass., and the Messiah Home in New York.

COWL, JANE (?-). An American actress, born in Boston. She began her stage career as an extra girl, one of her early small parts being in *The Music Master*. She had her first big leading rôle in David Belasco's production, *Is Matrimony a Failure*, and then she played stock. This was followed by *The Gamblers*, her first great success, and by *Within the Law*, *Common Clay*, and other successes. She turned her attention to playwriting also, and wrote *Daybreak* with Jane Murfin, then *Lilao Time and Information, Please*. Her most notable triumph has been Juliet, in *Romeo and Juliet*, which she played in 1923 and 1924. She began to study this rôle when she was 13, and her interpretation of her part was given great praise. During the 1923-24 season she ap-

peared also in *Pelléas and Mélisande* and in *Antony and Cleopatra*.

COWLING, DONALD JOHN (1880-). An American university professor and college president, born at Trevalga, Cornwall, England. He was brought to America by his parents in 1882 and was educated at Lebanon Valley College, Yale and Baker Universities. He received the honorary LL.D. degree from Knox, Williams and Oberlin Colleges. After teaching philosophy at Baker University, he became, in 1909, president of Carleton College. Dr. Cowling was a leader in religious education, and was trustee of the Congregational Foundation for Education and of the Chicago Theological Seminary. In 1918, he was president of the Association of American Colleges and in 1919, served on the American Council on Education.

COWS. See DAIRYING, LIVE STOCK, VETERINARY MEDICINE.

COX, HAROLD (1859-). An English editor and economist (see VOL. VI). He was a member of the Bryce Commission on German Outrages in 1915, a member of the Committee on Public Retrenchment (1916), and of the Royal Commission on Decimal Currency (1919). He published *Economic Liberty* in 1920.

COX, JAMES M. (1870-). An American politician (see VOL. VI). He was Governor of Ohio for the terms 1913-15, 1917-19, and 1919-21. In 1920, he was Democratic nominee for President of the United States, but was defeated by the Republican candidate.

COX, SIR PERCY ZACHARIAH (1864-). A British High Commissioner of Iraq (Mesopotamia). He was educated at Harrow and Sandhurst. After a few years in the British army he was appointed to the Indian political department, and acted as consul on the Somali Coast, at Berbera, in Arabia, and on the Persian Gulf. In 1914, he was secretary of the foreign department of the Government of India, and acting British minister to Persia from 1919 to 1920. His administration of Iraq as high commissioner (1920-23) covered the transition from military rule through a provisional government to the time when Feisal, a son of the King of the Hejaz, was made king by the British in 1921. He had considerable trouble with cabinet crises which arose because of objections to the acceptance of the British mandate.

COXE, WILLIAM GRISCOM (1869-). An American marine engineer, born in Reading, Pa. He received his engineering education in Germany and for several years was with a marine construction company in Scotland. He acted as foreign representative and assistant general superintendent for the Cramp Shipbuilding Company from 1898 to 1904, and built for them several large battleships for Russia and other countries. He was president and official in many shipbuilding and engineering corporations. During the Spanish-American War he served as lieutenant in the United States Navy and from 1917 to 1920 was district manager of the Emergency Fleet Corporation, Delaware River District. He was president of the Atlantic Coast Shipbuilders' Association from 1917 to 1920.

CRACKING OF PETROLEUM. See CHEMISTRY, ORGANIC; PETROLEUM.

CRAFTS, WILBUR FISK (1850-1922). An American clergyman (see VOL. VI). He was United States delegate to the Purify Congresses

in 1915, 1916, and in the same years was a member of the Union National Commission to frame an amendment for Constitutional Prohibition. In 1917, he became a member of the Presbyterian Social Service Commission and of the United Committee of War-time Activities. At the time of his death he was superintendent of the International Reform Bureau at Washington, D. C. Among his later works are: *The Bible in School Plans in All Lands* (1914); *Bible Stories and Poems* (1914); *Dress Reform* (1918); *Why Dry? Briefs for Prohibition, Local, State, National and International* (1918, 1919); *Made in Mayflower Land* (1920); *That Boy and Girl of Yours, and Other Addresses* (1921).

CRAIG, AUSTIN (1872-). An American historian, born at Eddytown, N. Y., and educated at Cornell University, the University of Rochester and Pacific University, Ore. From 1895 to 1898, he was school superintendent in Oregon. In the latter year, he was admitted to the bar and began the practice of law. In 1904, he entered the Philippine Civil Service. In 1912, he became assistant professor of history in the University of the Philippines, and in 1918, Rizal research professor and head of the department of history. His works include: *The Story of José Rizal* (1909); *Los Errores de Retana* (1910); *The Lineage, Life and Labors of José Rizal* (1912), and *The Story of the Philippine People* (1919). He also edited the following: *The Rizal Translations* (1912-14); *Pre-Spanish Philippine History, A.D. 43-1521* (1915); *The Former Philippines through Foreign Eyes* (1915); *The Beginnings of Philippine Nationalism* (1916); *Famous Filipinos* (1916); *Rizal's Own Story* (1919); *The Filipinos' Part in the Philippines' Past* (1921).

CRAIG, CHARLES FRANKLIN (1872-). An American bacteriologist (see VOL. VI). Dr. Craig was appointed curator of the Army Medical Museum in 1918, resigning to accept in 1920 the chair of bacteriology, parasitology and preventive medicine at the Army Medical School, Washington, D. C. He was also appointed director of laboratories. His monograph, *The Wassermann Test*, was published in 1918.

CRAIG, EDWARD GORDON (1872-). An English actor (see VOL. VI). His recent publications on the theatre include *The Theatre Advancing* (1921) and *Scene* (1923).

CRAMER, JOHN LUTHER (1871-). An American railway official, born in Burlington, Iowa. He was educated in the schools of that city and began his railway career with the Chicago, Rock Island and Pacific Railway as clerk, in 1883. In the years immediately following, he served in various capacities with the Montana Central and other roads in the West and Northwest. From 1889 to 1902, he was auditor of the Great Northern Railway and was assistant comptroller of the Rock Island System from 1902 to 1904. From 1904 to 1911, he was vice-president and comptroller of the C. H. & D. Railway Company, and from 1904 on served in various offices with the Pere Marquette Railroad Company; in 1920, he became vice-president and treasurer of that company.

CRANE, CHARLES RICHARD (1858-). An American business man and diplomat, born at Chicago and educated in the public schools of that city. He early entered business and

from 1894 to 1914 was vice-president or president of the Crane Company of Chicago. In 1917, he was a member of the President's Special Diplomatic Commission to Russia, and in 1919 was American Commissioner on Mandates in Turkey. In 1920-21, he was American Minister to China.

CRANE, FRANK (1861-). An American journalist (see VOL. VI). His recent works include: *War and World Government* (1915); *Adventures in Common Sense* (1916); *The Looking Glass* (1917); *Christmas and the Year Round* (1917); *Dr. Frank Crane's Opinion of Astrology* (edited by F. T. Allen, 1918); *Lighted Windows* (1918); *400 Four Minute Essays* (10 vols., 1919), and *The Crane Classics* (10 vols., 1920). He also translated, with Arthur Crane, *Bhavadgita, or The Battle of Life—the Ancient Poem of India* (1918).

CRANE, WALTER RICHARD (1870-). An American mining engineer, born at Grafton, Mass. He was graduated in 1895 at the University of Kansas, took post-graduate courses there in 1896 and then studied at Columbia, obtaining his Ph.D. in 1901. In 1898, he became assistant professor of mining at Kansas and seven years later returned to Columbia, where he taught until 1908, when he accepted a call to the chair of mining at the Pennsylvania School of Mines and Metallurgy, also serving as dean. In 1918, he went to Washington and became mining engineer with the United States Bureau of Mines, and in 1920 he was chief engineer of the War Minerals Relief Commission. In 1921, he became superintendent of the Southern Mining Experiment Station in Birmingham, Ala. Dr. Crane also served on the United States Geological Survey during 1902-05. In addition to many other technical papers, he is the author of *A Treatise on Gold and Silver* (1908), *Index of Mining Engineering Literature* (1909), and *Ore Mining Methods* (1910).

CRANES, ELECTRIC. See **ELECTRIC MOTORS IN INDUSTRY.**

CRAPSEY, ALGERNON SIDNEY (1847-). An American author and former Protestant Episcopal clergyman (see VOL. VI). Included among his later works are: *The Rise of the Working Class* (1914); *The Ways of the Gods* (1920), and *The Last of the Heretics* (1924).

CRAVATH, PAUL DRENNAN (1861-). An American lawyer, born at Berlin Heights, Ohio. He was educated abroad and at Oberlin College, graduating in 1882. He graduated from the Law Department of Columbia University in 1886, and in the same year was admitted to the bar. He was advisory counsel of the American Mission to the Inter-Allied Council on War Purchases and Finance, in London and Paris, in 1918, and was awarded the Distinguished Service Medal for exceptionally meritorious service during the War. He also received decorations from the French and Italian governments. He was a member of many legal and other societies.

CRAVEN, FRANK (?-). An American actor and dramatist who played in the United States until 1913, when he went to London in *Bought and Paid For*. He returned to the United States with his own play, *Too Many Cooks*, in which his acting established his reputation, and which he took to London in 1919. Other plays in which he has acted are: *This Way Out* (his own play, 1917); *Going Up*

(1917); *The Girl from Home* (1920); *The First Year* (His own play, 1920). In collaboration with George V. Hobart he wrote *The Little Stranger*. He also wrote *Spite Corner* (1921).

CRAWFORD, WILLIAM HENRY (1855-). An American educator (see VOL. VI). He was appointed National War Work Council secretary of the Y. M. C. A. in 1917, and went to France in 1917-18. In 1920 he resigned as president of Allegheny College, becoming president emeritus. He is the author of *The American College* (1915).

CREDIT, COÖPERATIVE. See **COÖPERATION.**

CREDIT BANKS. See **AGRICULTURAL CREDIT.**

CREDIT UNIONS. See **COÖPERATION.**

CREEL, GEORGE (1876-). An American editor and author, born at Blackburn, Mo., and educated in the public schools. From 1899 until 1913, he was successively editor of *The Kansas City Independent*, *The Denver Post* and *The Rocky Mountain News*. In 1917-19, he was chairman of President Wilson's Committee on Public Information. His works include: *Quatrains of Christ* (1904); *Children in Bondage* (1913); *Wilson and the Issues* (1916); *Ireland's Fight for Freedom* (1919); *How We Advertised America* (1920); *The War, the World and Wilson* (1920); *Police Commissioner Enright Replies to His Critics* (1921), and *Uncle Henry, Anonymous* (1922. Introduction by Irvin S. Cobb).

CREIGHTON, JAMES EDWIN (1861-). An American philosopher. Both as editor of the *Philosophical Review* and as professor at the Sage School of Philosophy (Cornell University), he continued to exercise a strong influence in the direction of idealism. On the occasion of the twenty-fifth anniversary of his service to philosophy, a testimonial volume of essays was published by former pupils of the Sage School (1917).

CREWS, LAURA HOPE (?-). An American actress born in San Francisco, who made her first appearance on the stage as a child. She appeared later in stock and played with Frances Starr. Her recent characterizations, which have been among her best, include: Mrs. Deane in *Peter Ibbetson* (1917); Mrs. Sherman Fessenden in *On the Hiring-Line* ("The Wrong Number") (1919); *The Wife in Tea for Three* (1920); *Olivia in Mr. Pim Passes By* (1921).

CRICKET. See **SPORTS.**

CRILE, GEORGE WASHINGTON (1864-). An American surgeon (see VOL. VI). Dr. Crile was very active throughout the War, and before the participation of the United States was at the head of the Lakeside Hospital Unit attached to the British Expeditionary Force in France. After the entry of the United States, he was again in France in the capacity of senior consultant in surgical research and was made colonel of the Medical Officers Reserve Corps. In 1921, with others, he founded the Cleveland Clinic, an institution for clinical and research activities in Cleveland. He has written the following books since 1914: *The Origin and Nature of the Emotions* (1915); *A Mechanistic View of War and Peace* (1915); *Man as an Adaptive Mechanism* (1916); *The Kinetic Drive* (1916); *A Physical Interpretation of Shock* (1921); *Surgical Shock and the Shockless Operation* in collaboration with Lower (1920).

CRIMINOLOGY. See **PENOLOGY.**

CRISP, ARTHUR (1875-). An American painter. He was born at Hamilton, Ont. and studied with Bryson Burroughs and Frank Dumond at the Art Students' League, New York City. His art is essentially decorative, and he is best known as a mural painter. Among his most important murals are the decorations of the Belasco Theatre and the Playhouse, in New York City, and of the Houses of Parliament in Ottawa, Canada, besides many private residences in the United States. His best known recent canvases are "British Recruiting on Boston Common," in the Commons' reading room of the House of Parliament, Ottawa, and "L'Encore," Canadian National Gallery. He was elected Associate of the National Academy of Design in 1911, won the first Hallgarten prize at the National Academy in 1916, and the gold medal at the New York Architectural League in 1923.

CROATIA. See JUGO-S. AVIA; SLAVONIC LITERATURE.

CROCE, BENEDETTO (1866-). An Italian philosopher born at Pescasseroli, Aquila, Italy. Although he accomplished his mature work between his 30th and 50th years, his reputation in Anglo-Saxon countries has developed very largely since the War. The publication of a biographical volume in English by Piccoli (1923) has corresponded to the growing interest in a philosopher who, like Bergson, is able to combine popular appeal and intellectual insight. His theory of aesthetic as the expression of intuitions found literary champions in America in Mr. Joel Spingarn and his group, and this part of his philosophy is by far the most widely read. At the close of the War, Signor Croce took an active part in Italian politics. He attacked the humanitarian ideals of President Wilson, which he regarded as shortsighted and dangerous to Italian interests. He was made senator, and in 1920 served as minister for education in the cabinet of Giolitti. His works published since 1915 include a volume of *New Essays on Aesthetics* (English translation 1921); *Pagine sparse* (3 vols., 1919-20); *La Poesia di Dante* (1921; English translation, 1922); *La Spagna nella vita italiana durante la rinascenza* (1917); *Storia della Storiografia italiana* (1921), and *Ariosto, Shakespeare and Corneille* (1920). See AESTHETICS and ITALIAN LITERATURE.

CROCKER, BOSWORTH (MRS. LUDWIG LEWISOHN). (?-). A playwright born in London. She was brought to the United States as a child and educated in America. She is best known for her plays, *The Dog*, produced by the Bryden Road Players (1915); *The Last Straw* (1917); *Pawns of War* (1918); *The Baby Carriage* (1919); *Humble Folk*, a collection of one-act plays with a foreword by Ludwig Lewisoohn (1923). She also wrote a novel, *Don Juan's Wife* (1924) and contributed verse and critical articles on the drama to contemporary magazines.

CROISSET (JOSEF MARIE) ALFRED (1845-1923). A French philologist (see VOL. VI). He is the author of *L'effort de la France* (1916), *Les democracies antiques* (1916) and *History of Latin and Greek and Democracy* (1919). He has also edited *Otero José Pacifico: L'Argentine devant l'histoire* (1921).

CROISSET, MAURICE (1846-) (see VOL. VI). A French philologist. He is the author of *Les civilisations helléniques* (1922) and has

translated into Spanish *Homer: la Odissea* (1921) and collaborated with his brother on a translation of *Euripides*.

CROKER, BITHIA MARY (SHEPPARD) (?-1920). An English novelist (see VOL. VI). She died in London on Oct. 21, 1920. Her works written since 1914 include: *Lismoye* (1914); *Her Own People* (1914); *Babes in the Wood* (1915); *Given in Marriage* (1916); *Johanna* (1917); *Bridget* (1918); *The Chaperon* (1920), etc.

CRONAU, RUDOLF (1855-). A German journalist and author born at Solingen. He has spent a great part of his time in New York. Among his works are: *Geschichte der Solinger Klingenindustrie* (1885); *Unter dem Sternbanner* (1887); *Das Buch der Reklame* (1889); *Im wilden Westen* (1890); *Amerika, Geschichte seiner Entdeckung* (1890); *Our Wasteful Nation* (1908); *Drei Jahrhunderte deutschen Lebens in Amerika* (1909); *The British Black Book* (1915); *Our Hyphenated Citizens* (1915); *German Achievements in America* (1916), and *Woman Triumphant, the Story of Her Struggles for Freedom* (1919).

CROOKS, WILLIAM (1852-1921). An English labor leader (see VOL. VI). In 1916, he was appointed Privy Councillor. He died soon after his retirement from Parliament in 1921.

CROSLAND, THOMAS W (WILLIAM) H (ODGSON) (1868-). A British editor and author (see VOL. VI). His later works include: *The Chant of Affection* (1915); *The Showmen* (1915); *The Soul of a Crown Prince* (1915), and *The English Sonnets* (1916).

CROSS, (CHARLES) WHITMAN (1854-). An American geologist (see VOL. VI). In 1918, he was president of the Geological Society of America, and an officer of the National Research Council. He was also author of geological reports and maps published by the United States Geological Survey.

CROSS, WILBUR LUCIUS (1862-). An American university dean (see VOL. VI). In 1916, he became dean of the Graduate School of Yale University, and in 1921, professor of English, resigning from a similar position in the Sheffield Scientific School. He is the author of *A History of Henry Fielding* (1918), and editor of the following: *Sterne's Political Romance* (1914); *Lounsbury's Life and Times of Tennyson* (1915), and *Shakespeare's Love's Labor's Lost* (Yale Shakespeare, 1918).

CROTHERS, RACHEL (?-). An American playwright born at Bloomington, Ill., who directs the production of her own plays. The quality of her work is good and her plays are exceptionally well known in the United States. They include: *The Three of Us*; *The Coming of Mrs. Patrick*; *Myself Bettina*; *A Man's World*; *Young Wisdom*; *Ourselves*; *The Heart of Paddy Whack*; *Old Lady 31*; *Once Upon a Time*; *Mother Carey's Chickens*; *A Little Journey*; *39 East*; *He and She*; *Nice People*; *Everyday*; *Expressing Willie*.

CROWDER, ENOCH HERBERT (1859-). An American army officer. He was educated at the United States Military Academy, and at the University of Missouri Law School, and became major in the United States Judge Advocate's office in 1895. He was in the Philippines from 1898 to 1901, and with the Japanese army in Manchuria in 1904-05. In 1899-1902, he was Judge Advocate General of the Army of Cuban Occupation; he drafted the legal code for the

new republic and also helped to frame its constitution and to direct its financial policies and legislation. General Crowder is best known for his remarkable record as Provost Marshal General during the War in administering the selective service act which he himself had drafted. Under this law, about 24,000,000 men altogether had been registered and classified within 18 months after America had entered the war, two million of whom were in France, and almost as many more ready to go. In 1923, the rank of the United States' representative in Cuba was raised to that of ambassador, and General Crowder was the first to serve in that capacity. See CUBA.

CROWELL, BENEDICT (1869-). A mining engineer, born in Cleveland, Ohio, who entered War Service in 1916 and was a member of the Kernan board of the War Department to report on munitions of war and arsenals. In 1917 he was appointed Assistant Secretary of War and in the next year was made director of munitions. Among his recent books are *The Iron Ores of Lake Superior* and *How America Went to War*, in collaboration with Capt. Robert T. Wilson.

CROWTHER, SAMUEL (1880-). An American author, born at Philadelphia. He was educated at the University of Pennsylvania and subsequently engaged in newspaper work. He toured Europe in 1918-19 and collected his impressions in several volumes. His most important work was *Henry Ford* (with Henry Ford, 1922), an excellent analysis of the mental processes of a large industrialist.

CROZIER, WILLIAM (1855-). A United States artillery officer (see VOL. VI). He was chief of ordnance from the beginning of the War until December, 1917; member of the War Council, and commander of the Northeastern Department in 1918.

CRUISER. See VESSEL, NAVAL.

CRUISER, ARMORED. See VESSEL, NAVAL.

CRYSTAL STRUCTURE. See PHYSICS.

CUBA. An island republic of the West Indies with an area of 44,215 square miles and a population according to the census of November, 1919, of 2,889,004. This was a gain of 840,024 over the last census year, 1907, or an annual average increase of 3.4 per cent. The white population increased, with a proportion to the total population in 1907 and 1919 respectively of 69.7 and 74.3 per cent. Males continued in excess of females, the proportions for the two years were 52.5 and 53 per cent. Toward the end of the decade 1914-24, immigration, largely from Spain, but also from Haiti and Jamaica, increased enormously. In 1911, it amounted to 38,053; 1919, 80,485; 1920, 340,241; 1921-22, 128,177. Immigration was of a transitory character, a large proportion of the immigrants returning to their native countries at the end of the sugar crop season. Populations of the large towns in 1907 and 1919 were: Havana, the capital, 295,157 and 363,506; Cienfuegos, 30,100 and 95,865; Camagüey, 29,616 and 98,193; Santiago de Cuba, 45,470 and 70,232; Matanzas, 36,009 and 62,638. The official estimate of population for Dec. 31, 1922, was given as 3,123,040, of whom a little over 70 per cent were whites. The progress of education was slow during the period 1911-22, for though registration almost doubled over the 11 years, attendance remained about the same. In

1911, average attendance was 105,774; in 1921-22, 183,672. In the latter year there were 3337 school houses open, served by 6075 teachers.

Industry. Sugar cultivation continued the leading activity and the source of the country's well-being. The crop consistently increased after 1913. For that year the crop was 2,443,986 long tons. The crop reached the very large total of 4,104,205 long tons in 1919 but dropped to 3,758,347 long tons in 1920. 1921 again, showed an upward turn; 3,974,116 long tons were produced in that year. The 1922 crop reached almost 4,000,000 tons, while that of 1923, falling below previous estimates, showed a total production slightly in excess of 3,600,000 tons. Estimates for the 1924 crop made it at least equal to that of 1923. In 1912, 92 per cent of the whole crop went to the United States at a price between \$.02 and \$.03. The 1917-18 crop at \$.048 and the 1918-19 crop at \$.055 went mostly to the United States, but the failure of the Americans to buy the 1919-20 crop, together with the world shortage, sent the price crazily upward, so that by mid-year, 1920, it reached \$.235. The market then broke, and by the end of the year, sugar dropped below \$.04. During 1921 the fall was continuous; the price reached \$.02 or less, and Cuban growers carried over a heavy surplus into 1922. Conditions began to improve with that year as the price once more ascended. The purchase of sugar by the United States reflects the state of affairs. In 1913-14 the United States bought 4,926,606,000 pounds for \$98,394,782; in 1921, 5,180,145,000 pounds for \$194,156,615; in 1922, 9,054,289,838 pounds for \$227,257,500; and in 1923, 6,852,685,625 pounds for \$331,923,712. Tobacco was the crop of next greatest economic importance. In 1913 over 27,500,000 pounds (value \$16,164,795) were exported to the United States; in 1922, 22,600,000 pounds (value \$19,898,309). The 1923-24 tobacco crop was expected to be the largest in the history of Cuba. Other agricultural products were coffee, cacao, and tropical vegetables and fruits for the American winter markets; the economic value of these groups remained slight. Cattle raising was receiving increasing attention with the result that herds increased from 2,829,553 heads in 1912 to 4,771,394 in 1922. Horses similarly increased in number. Mineral areas were considerable; 1921, 407,000 acres of iron, 248,000 of copper, 102,300 of oil, and 42,000 of manganese. Exports to the United States dropped off, for interest in mining was not great. In 1913-14, 1,289,000 tons of iron ore were exported to the United States; in 1922, 381,746 tons.

Commerce. Imports in 1912 totaled \$120,229,317 and exports \$146,787,295; for 1918-19 they reached \$316,000,000 and \$477,000,000, and in 1919-20, the very high point of \$435,000,000 and \$862,000,000; for 1920-21 they dropped to \$356,435,000 and \$278,000,000, and for 1921-22 to \$180,259,000 and \$323,911,000. By 1923, imports once more ascended to \$226,118,000 for the fiscal year. The United States remained the most important factor in Cuba's foreign trade, the proportions for exports and imports ranging between 70 and 80 per cent of the whole. In 1913-14 the American imports from Cuba totaled \$132,303,795; for 1920, \$721,693,880; for 1922, \$267,840,867, and for 1923, \$376,442,581. American exports to Cuba amounted to \$68,884,428 in 1913-14; for 1920, \$515,208,-

731; for 1922, \$127,873,202; and for 1923, \$192,437,893. The importance of this trade may be gauged by the fact that in 1920, American imports and exports from and to Cuba almost equaled the whole United States trade with South America. For 1922-23 the American trade with Cuba was equal to 75 per cent of the whole South American trade. Other countries participating in Cuban trade during the period 1913-24 were Great Britain, Spain, and France. Imports, in order of importance, were foodstuffs, textiles, metals and metal goods, machinery, drugs, and wood. Cuba ranked fourth among countries exporting to the United States and seventh among importers of American goods.

Finance. For 1912-13 estimated revenues were \$37,940,000, and expenditures \$33,974,147; for 1922-23, \$55,638,800 and \$54,852,302; for 1923-24 (estimates), \$68,500,000 and \$67,779,438, and for 1924-25 (estimates), \$76,719,000 and \$66,400,282. The national debt in 1911 was \$62,083,100, with the debt service, in 1911, \$2,464,585. In July, 1922, the public debt was \$91,542,400 and in July, 1923, \$173,000,000, funded and floating. In January, 1923, a loan of \$50,000,000 was floated in the United States. The result was that the budget for 1923-24 carried the large figure of \$12,248,000 for the debt service. By the law of November, 1914, a Cuban coinage was established, with a gold peso equal to the American dollar. American coinage remained legal tender. Cuban currency in circulation in January, 1921, was \$23,787,250 gold, \$8,413,140 silver, and \$1,449,560 nickel. It was estimated that there was also in circulation in 1923 \$2,000,000 in United States gold coin and more than \$100,000,000 in United States paper notes. In an effort to hasten the stabilization of financial conditions, the United States Federal Reserve Board granted the applications of the Boston and Atlanta Federal Reserve Banks to establish agencies in Cuba in June, 1923. At the same time, as a result of the recommendations of the former governor of the Federal Reserve Board, W. P. G. Harding, who had served as financial adviser to Cuba in 1922, a Cuban national commission reported in favor of the creation of a Cuban Reserve Bank with powers to accept deposits, rediscount commercial paper, and issue paper currency.

Economic Conditions. In 1920 financial affairs reached so chaotic a condition that a national moratorium was declared on October 10 for 50 days and was then extended several times, until Jan. 31, 1921. This was precipitated by the break in the sugar market and the fact that banks had lent as much as \$.15 and \$.10 on sugar stored in warehouses by speculators who were waiting for a rise in price. Eighteen of the Cuban banks went into the hands of a liquidation commission. Rejected merchandise, amounting to an estimated invoice value of from \$60,000,000 to \$100,000,000, accumulated in bonded warehouses, with the result that American exporters were particularly hard hit. It was not until 1922 that conditions began to show improvement. By 1922 seven banks had already been liquidated; settlements made through the Havana Clearing House began to increase; and interest rates decreased. On Jan. 4, 1921, in the interest of the United States, General Crowder went to Cuba as adviser. The end of 1923 saw conditions in general in Cuba distinctly favorable. Sugar prices

were firm, and crop prospects were fairly good, with estimates ranging from 3,500,000 to 3,700,000 tons. It was expected that the 1923-24 tobacco crop would be the largest in the history of Cuba, with prices continuing at a high level. Government income exceeded expenses consistently during the early months of 1924, and imports and exports were much higher than in 1923. Sales in many lines were better than for the corresponding months in 1922, and business in general was in a satisfactory condition.

Communications. In 1922 there were 3020 miles of railway as compared with 2200 in 1913. The largest developments of the period 1913-23 centred in the construction of motor roads, so that by November, 1922, there were 1500 miles of these fit for travel. An air service was started in 1920 between Havana and Key West, Fla. In 1922 steam vessels with an aggregate of 5,498,850 net tons entered Cuban ports in the foreign trade. An enactment whose implications seriously affected the conduct of the sugar trade was the Tarafa bill, signed Oct. 9, 1923. It provided for the formation of a holding company under which all Cuban railways were to be consolidated. American sugar interests attacked it because it aimed at closing many of the small ports used in the sugar trade. The result was that on the request of the United States State Department certain monopolistic provisions were eliminated.

History. The country continued peaceful, and as a result of the large sugar crops, became increasingly prosperous. With the approach of the presidential elections, partisan feeling accounted for many disorders. The election of 1916 was closely contested, with the result that because of irregularities charged by the Liberals, a revolt broke out under ex-President Gomez on Feb. 9, 1917. By March the government had the uprising well in hand, being aided, materially, by the presence of American forces in the province of Oriente and, morally, by the condemnation of the rebels by Secretary of State Lansing. In May, 1917, the Cuban Congress announced the reelection of President Menocal over his Liberal opponent, Alfredo Zayas. On Apr. 7, 1917, both houses of Congress unanimously passed a measure declaring war on Germany, and financial measures to put the country on a war footing were drawn up. A war loan of \$13,000,000 was raised, and extraordinary taxes were placed on sugar and on the profits of mining and insurance companies. In 1918 a draft act was passed and the office of an alien property custodian created. In 1919, as a result of the aid of General Crowder, a new electoral law provided for obligatory voting and the public counting of ballots. In 1920, the year of the presidential election, sentiment was again at a high pitch. The office was contested by Dr. Alfredo Zayas, running on a coalition Conservative-Liberal ticket, and his old leader Gen. José Miguel Gomez. Zayas's supporters had united with the Conservatives because of their fear of Gomez's strength. Zayas was declared elected, but the unwillingness of the Gomez partisans to accept the result again threatened a national crisis. This, and the moratorium, led President Wilson to send General Crowder once more to Cuba. New elections were held in four provinces on Mar. 15, 1921, with the result that Zayas's election was confirmed and he was inaugurated on May 20. General Crowder's continued stay on

the island occasioned criticism, and so did the presence of American marines at Camagüey. General Crowder's presence stimulated the passage of a series of noteworthy administrative reforms which included a new civil service law, improvement of the accounts system, means for facilitating the removal of judges, and the contraction of a large foreign loan. General Crowder returned to the United States in October, 1922. In January of the same year, the American marines had been removed from the island. The loan of \$50,000,000 was approved by the United States, in accordance with the Platt Amendment, and was floated in January, 1923. This measure, together with the political reforms mentioned, aided materially in bringing the country back to its former commercial prosperity, so that by 1923 the financial depression of 1920-21 was being rapidly obviated. General Crowder was nominated as the first American Ambassador to Cuba on Feb. 9, 1923, and proceeded at once to his post. Dr. Cosme de la Torriente was appointed Cuban Ambassador to the United States on Sept. 1, 1923. Two days later he was elected President of League of Nations Assembly at Geneva. The continued participation by the United States in Cuban affairs was protested, and the Cuban Congress by a joint resolution in July, 1923, declared that "outside interference with their civil affairs" might prejudice Cuba against the United States. As a result Ambassador Crowder was summoned to Washington to confer with the State Department. A new force in Cuban domestic affairs emerged in August, 1923, with the formation of the Veterans' and Patriots' Association. It immediately began to conduct a campaign against public graft, the Tarafa bill (see above, *Communications*), the national lottery, the disabilities of women, and for the paying of soldiers' back pensions. It was so powerful that its programme was at once adopted by one of the candidates for presidential honors. In 1924, this propaganda almost succeeded in precipitating a national crisis. President Zayas moved against the Association with alacrity; its leader, General García-Vélez, was dismissed from the diplomatic service and compelled to quit the country; *El Sol*, the Association's organ, was suppressed on March 25. García-Vélez took refuge in New York and continued to direct activities, and sentiment in Cuba became feverish. An armed revolt broke out on April 29, in Central Cuba; to this the government replied by seizing the leaders of the Veterans' and Patriots' Association. Fighting went on for two weeks, principally in the provinces of Santa Clara and Oriente, but the back of the rebellion was broken when President Zayas succeeded in inducing the United States War Department to sell the Cuban government large stores of arms and ammunition. Materials to the value of \$208,000 were purchased in this way by May 10. A general amnesty was granted May 17. Hostile elements insisted that the incident had been enormously magnified, for the most part by Zayas himself who sought to strengthen his popularity in Cuba, and that the Veterans' and Patriots' Association, instead of being discredited, remained a great force in internal affairs. At any rate, in the summer of 1924, it was seen that Zayas's position was unstable.

CUBISM. See PAINTING.

CULBERTSON, WILLIAM SMITH (1884-).

An American lawyer and tariff expert, born at Greensburg, Pa. He graduated from the College of Emporia, Kan., in 1907, and from Yale University in 1908. After taking special courses in German universities, he became examiner of the United States Tariff Board in 1910, serving until 1912. From 1917, he was a member of the United States Tariff Commission. He was reappointed for a term of 12 years from 1921, by President Harding. From 1922, he was vice-chairman of the board of the commission. During the War he was engaged in Y. M. C. A. service in France, and in services for the government at the Peace Conference in Paris. He is the author of *Alexander Hamilton, an Essay* (1911) and *Commercial Policy in War Time and After* (1919).

CULLEN, THOMAS STEPHEN (1868-). An American gynecologist, born at Bridgewater, Ont. He was educated at the Toronto Collegiate Institute and the University of Toronto. He became associated with the Johns Hopkins Hospital College and was made a professor of clinical gynecology at the latter and visiting gynecologist to the hospital. He has written, alone, and in collaboration, four important monographs: *Cancer of the Uterus* (1900); *Adenomyoma of the Uterus* (1908); *Myomata of the Uterus* (1909); *Diseases of the Umbilicus* (1916).

CULTURE, HISTORY OF. See ETHNOLOGY.

CUMBERLAND, WILLIAM WILSON (1890-). An American economist, born at La Verne, Cal., and educated at Occidental College, Los Angeles, and at Columbia and Princeton universities. In 1916, he became a member of the faculty of the University of Minnesota. In 1918-19, he was economic or financial expert on several United States government boards and commissions in France and Armenia. In 1919-20, he was financial expert with the United States High Commission in Turkey, and the following year was attached to the Department of State as expert on foreign trade. In 1921, he was appointed Administrator of Customs of the Republic of Peru. He published *Coöperative Marketing* (1918).

CUMBERLAND PRESBYTERIAN CHURCH. This denomination originated in Tennessee in 1810 as an outgrowth of the revival of 1800 in Kentucky and Tennessee and in protest against some of the doctrines taught by Calvinists of that day. The membership in 1923, according to figures supplied by the organization, was 65,000, as compared with a membership of 72,052 by the Federal census of 1916, and the number of ministers in 1923 was about 800, as compared with 728 in 1916. In the latter year there were reported 12 synods and 70 presbyteries. As a result of the merger movement of 1906, when about half the denomination joined with the Presbyterian Church in the United States of America, the Cumberland branch in 1914 was practically without property and without any educational endowment; in 1924 it owned a good educational plant at McKenzie, Tenn., with buildings and equipment valued between \$150,000 and \$200,000; \$500,000 in endowment; a faculty of 20 persons, and a publishing plant having \$65,000 assets above liabilities.

CUMMINS, ALBERT BAIRD (1850-). An American senator (see VOL. VI). He was reelected United States senator for the terms 1915-21 and 1921-27. He was joint author

with Representative Esch of the act which returned the railroads to private ownership after the War.

CUMONT, FRANZ VALÉRY MARIE (1868-). A Belgian writer on Oriental Religions (see VOL. VI). Besides being a corresponding member of learned bodies in various countries, he is author of *Etudes syriennes* (1916), and *After-life in Roman Paganism* (1922).

CUNNINGHAM, LEON (?-). A playwright, whose best known recent play was *Hospitality*, produced at the Forty-eighth Street Theatre (New York) in 1922. He also wrote *The Draldo Bloom* (1919) and *The Wondership* (1919), one-act plays of considerable beauty.

CUNO, CARL JOSEPH WILHELM (1846-). A German chancellor, and director-general of the Hamburg-American Steamship Line. He was born at Suhl, Thuringia, Germany, in 1846, and educated at Berlin, Heidelberg, and Breslau. He became connected with the department of the treasury in 1906, and in 1912 was made privy counselor. During the War he was director of the grain and food organization, and upon the death of Albert Ballin became the head of the Hamburg-American Steamship Line. He represented Germany at Brussels and Versailles, and became chancellor in November, 1922. He was much criticized because of his policy of passive resistance to the French occupation of the Ruhr, and also for the fall of the mark. He resigned on Aug. 12, 1923, the immediate cause being the loss of Socialist backing in the Reichstag. Upon a number of occasions, Dr. Cuno was urged to accept the post of German Ambassador to the United States.

CUREL, FRANÇOIS, VICOMTE DE (1854-). A French dramatist (see VOL. VI). He recently wrote *L'Ame en Folie*, *La Comédie du Génie*, and *L'Ivresse du Sage*.

CURLEY, MICHAEL JOSEPH (1879-). An American bishop, born at Golden Island, Athlone, Ireland, and educated in the Royal University of Ireland and at the College of the Propaganda Fide in Rome. He was ordained to the Roman Catholic priesthood in 1904, and for the 10 ensuing years was a missionary in Florida. In 1914, he was made Bishop of Saint Augustine and in 1921 Archbishop of Baltimore.

CURRELLEY, CHARLES TRICK (1876-). A Canadian clergyman, director of the Royal Ontario Museum of Archaeology (see VOL. VI). In 1919, he returned from his eight-year collecting trip in Egypt and Europe.

CURTIS, CHARLES (1860-). An American senator (see VOL. VI). He was reelected to the United States Senate for the terms 1915-21 and 1921-27.

CURTISS, GLENN HAMMOND (1878-). An American aviator (see VOL. VI). In 1914, he designed and constructed for Rodman Wanamaker the *America*, which was the first heavier-than-air flying boat made for transatlantic passage. In 1917, in conjunction with J. N. Willys, he increased the output of his factories to meet the war demands of England, Russia and the United States. He developed all types of aircraft, especially the *Wasp*, the holder of world records for speed and altitude, and, with the United States navy, the Navy-Curtiss flying boats 1, 2, 3, and 4.

CURTISS, RALPH HAMILTON (1880-).

An American astronomer, born at Darby, Conn. He was graduated in 1901 at the University of California, where in 1904 he received his Ph.D. After serving as an assistant in astronomy at California during 1900-01 he was a fellow during 1901-05 at the Lick Observatory, and was a member of the Lick Eclipse Expedition (1901) to Sumatra. In 1905, he became assistant astronomer at Allegheny Observatory and two years later, assistant professor of astrophysics at Michigan, where in 1918 he became full professor, also serving as assistant director of the Detroit Observatory. His researches have had to do chiefly with the spectroscopy of the heavenly bodies, photography of comet forms, spectrography of variable stars, and of stars with peculiar spectra in Class B, on all of which he has published papers.

CURWOOD, JAMES OLIVER (1878-). An American author, born at Owosso, Mich. From 1900 to 1907, he was engaged in newspaper work, but in the latter year resigned from these activities to devote himself exclusively to novel-writing. His romances enjoyed a wide popularity and sold by the hundreds of thousands annually. They were usually vivid tales of the Canadian Northlands, depicting conventional emotions and conflicts, but written with an earnestness that often gave them the aspect of reality. The better known included: *Flower of the North* (1912); *God's Country and the Woman* (1915); *Nomads of the North* (1919); *The Valley of Silent Men* (1920); *The Country Beyond* (1922).

CURZON LINE. See VILNA.

CURZON OF KEDLESTON, GEORGE NATHANIEL CURZON, FIRST MARQUIS OF (1859-). An English statesman (see VOL. VI). In 1915, he became a member of the Asquith Coalition Cabinet and as such played a prominent rôle in the conduct of the War. Under the Lloyd George government of 1916, he advanced to even higher honors. He became government leader of the House of Lords, President of the Council, and one of the four members of the inner War Cabinet in whose charge rested the details of all military and civilian operations. With the passing of Arthur Balfour in 1919 he took control of the Foreign Office. He continued at the head of foreign affairs through the Lloyd George, Bonar Law, and Baldwin ministries, though in the first he was largely overshadowed by the operations of his superior. In the Bonar Law and Baldwin governments, he was given a free hand, and Europe and America again witnessed the characteristic and possibly unfortunate boldness that had distinguished his Indian career. For a time he almost seemed on the verge of succeeding with the eighteenth century diplomatic methods which he conspicuously adopted. It was declared of him that he treated Trotsky and Mastapha Kemal as though they were Tallyrands. Malicious critics said that the dukedom, which he so ardently desired, was within his grasp. But he really failed. France and England continued to draw farther and farther apart; British policy in Turkey, Mesopotamia, and Egypt, was characterized by a series of blunders; Russia continued estranged. When the Baldwin government went out in January, 1924, Curzon's name was not mentioned for a dukedom in the King's honor list. In 1924, Curzon practically put the capstone on his political career: he announced the preparation of his memoirs. In

1916 he married, as his second wife, Grace Elvina, daughter of J. Monroe Hinds, American minister to Brazil, and widow of Alfred Duggan, an Argentine millionaire. In 1923, he published *Tales of Travel*.

CUSHING, HARVEY (WILLIAMS) (1869-). An American surgeon (see VOL. VI). During the War, Dr. Cushing was director of United States Base Hospital No. 5. His monograph, *Tumors of the Nervus Acusticus*, was published in 1917.

CUTHELL, CHESTER WELDE (1884-). An American lawyer, born in New York City. After graduating from Columbia University Law School, he began the practice of law in New York City, and also in Washington. In 1918-19, he acted as general counsel of the United States Shipping Board Emergency Fleet Corporation, and effected collections of claims of the War Department against England, France and Italy. For his services, he was awarded the Distinguished Service Medal and decorations from the governments of France and Italy.

CYCLING. See SPORTS.

CYCLONES. See METEOROLOGY.

CYPRUS. An island of the Mediterranean and a British Crown colony; area, 3584 square miles; population in 1911, 274,108; in 1922, 317,000. The population was 80 per cent Greek and almost 20 per cent Turkish. The leading activity remained agriculture in the decade 1914-24. Chief exports in 1921 (1911 figure in parentheses) were animals, £89,000 (£94,932); carobs, £305,000 (£182,883); wine, £82,000 (£53,685); raisins, £42,000 (£29,636); fruits, £43,000 (£21,585); silk cocoons, £11,000 (£27,587). Imports were foodstuffs, coal, petroleum, cotton piece goods, manufactured articles, and machinery. The trade record over the period showed that the imports for 1913, 1920, and 1922, exclusive of bullion, were £619,337, £2,068,759, and £1,411,697; exports for the same years, £620,591, £1,200,449, and 871,211. The form of government showed no change. Revenues for 1913-14 were £341,816; for 1922, £668,294. Expenditures for 1913-14 were £296,165; for 1922, £719,752. The imperial annual grant was £60,000; the public debt, 1921-22, £215,000. British occupation of Cyprus, since 1878, became outright possession when the British government declared the island formally annexed on Nov. 5, 1914. The later discredited Treaty of Sèvres (1920) with Turkey confirmed the action, and so did the Franco-British agreement of Dec. 23, 1920. The status of the island was given international attention during 1919-23, when its disposition was ironically linked with that of Rhodes by the Italian government. A treaty between Greece and Italy in 1919 provided for the holding of a plebiscite in Rhodes on the question of cession to Greece, only and when Great Britain would hold a similar plebiscite in Cyprus. The stratagem succeeded in keeping the whole question of the Dodecanese (q.v.) and the other Mediterranean islands open until 1923, when the Treaty of Lausanne recognized Great Britain's right in Cyprus and Italy's in Rhodes.

CYRENAICA. See LIBYA.

CYTOLOGY. See ZOÖLOGY.

CZECHO-SLOVAKIA. One of the newly created states of Europe, formed out of all or parts of the old Austro-Hungarian governments of Bohemia, Moravia, Silesia, Slovakia, and

Ruthenia, on Oct. 28, 1918. The frontiers, delimited by the Treaties of Versailles, St. Germain, and the Trianon, and the Ambassadors' Conference of July 28, 1920, affecting the Teschen district, had an area of 54,877 square miles, and a population, by the census of Feb. 15, 1921, of 13,611,349. The provinces, with their areas and populations, are Bohemia, 20,106 square miles, population, 6,670,578; Moravia, 8615 square miles, population, 2,662,845; Silesia, 1767 square miles, population, 671,611; Slovakia, 18,933 square miles, population, 3,000,701; Ruthenia, 4903 square miles, population, 604,670. The principal towns, with their populations in 1921, are Prague, 676,476; Brunn, 221,422; Pilsen, 88,447; Pressburg, 93,329; Kosice, 52,699. Ethnologically, the great majority of the people are Czecho-Slovaks (8,760,957); the ratio between Czechs and Slovaks is about three to one. Of the other races, the Germans include 3,123,000, the Magyars, 747,000, the Ruthenians, 461,000, the Jews 180,000, the Poles, 75,000. From 1910 to 1921, the Czecho-Slovaks increased 9 per cent, and the Ruthenians 6, while the Germans declined 17 per cent and the Magyars 30. By religions, the population was divided into Roman Catholics, 10,384,860; Protestants, 992,083; Greek Catholics, 532,608, and Jews, 353,925. Compulsory education was provided for with particular care in Slovakia and Ruthenia, where the stern policy of Magyarization systematically carried out by the Hungarian government had kept the mass of the population ignorant of their native tongue. In 1921, there were 13,417 elementary schools, of which 64 per cent were Czecho-Slovak, 25 per cent German, 3 per cent Ruthenian, and 6 per cent Magyar. There were also 1411 advanced schools, 388 gymnasias and normal schools, 267 technical schools, 4 polytechnics, and 4 universities. These last were in Prague (one Czech and one German), Brunn (Czech), and Pressburg (Slovak), the last two founded in 1918. By the Treaties, racial minorities were guaranteed protection in their racial and religious rights. In districts where a minority constituted 20 per cent of the population, full rights were accorded for the use of the native tongue in schools and before judicial and administrative bodies. See SLAVONIC LITERATURE.

Agriculture. Because industry in the East was primarily agricultural, the largest single group of workers was busied on the land; this was about 40 per cent of the total population. Methods of production were intensive; aided by a strong government interest, they yielded good profit. The total area of agricultural land was 35,688,750 acres, of which the arable comprised 16,059,938 acres, meadows 6,423,975, and forests 11,778,288; only 1,427,550 were nonproductive. The following table indicates the area and yields of principal crops in 1921.

Crops	Area	Yield in metric tons
Wheat	1,557,306	1,152,756
Rye	2,103,642	1,361,939
Barley	1,615,441	1,033,574
Oats	1,965,769	1,075,387
Potatoes	1,575,791	4,329,166
Sugar Beets	546,200	4,071,655

Live stock (1920) included cattle, 4,351,794; horses, 587,639; pigs, 2,045,780; sheep, 982,258; goats, 1,213,833. These numbers were

considerably less than those antedating the War. The sugar beet industry, which ranked second in the world, engaged 172 factories and refineries in 1921, and these produced 722,955 metric tons of sugar. 457,039 tons were exported in 1921 and 318,179 tons in 1922. Similarly, the hop industry supported 700 breweries which turned out from 7,000,000 to 15,000,000 hectoliters annually. The centre of hop culture was in the Saaz, the breweries in Pilsen. The export of grain, flour, flour products, and malt, in 1921, was 36,103 tons; by 1922, it had increased to 227,157 tons. Land reform, always a crying need in the provinces because of the preponderance of great entailed estates usually owned by foreign families or by German or Magyar overlords, became at once the concern of the new government. By an act of 1919 the National Assembly ordered the expropriation of all estates of more than 475 acres if cultivated and of 350 acres if uncultivated. By January, 1922, 9,746,076 acres had been seized. In Bohemia, farms of $7\frac{1}{2}$ acres or less totaled only 23.5 per cent of the whole area; all the rest consisted of large estates. In Moravia, small farms had totaled 29.6 per cent, and in Silesia, 25.2 per cent. The progressive character of the agricultural class was indicated by the presence of some 10,000 agricultural coöperatives with a membership of 1,000,000.

Minerals and Industries. Coal and iron were the principal minerals. Coal production, including lignite, in 1921 totaled 32,699,112 metric tons; in 1922, 28,848,281 tons. While coal did not suffice for native wants, the yield of lignite was more than sufficient. In the Ostrava-Karvin basin, 70 per cent of the total coal production was mined; in the Most-Teplice basin, 77 per cent of the total lignite was extracted. Principally at Roudny, 983,960 tons of iron were mined. Other mines yielded gold, lead, copper, rock-salt, and graphite. The total number of workers in mining in 1919 reached 130,000. The petroleum region, extending along the Carpathians and marking the continuation of the Galician fields, produced about 7000 tons annually. With these resources, the metallurgical industry was able to support 27 furnaces, 10 of them in Bohemia, the most important at Witkowitz and Kladno, with an annual capacity of 1,500,000 tons. In 1920, 709,890 tons of pig iron were turned out; in 1921, 543,100 tons. Steel production reached 917,662 tons in 1921. There were well known mineral springs at Karlsbad, Marienbad, Franzensbad, Teplitz, and the Chalybeate springs of Giesshübel and Bilin. Other plants, numbering some 8830 and employing 848,600 workers in 1919, concerned themselves with the manufacture of textiles, glass and precious stones, food articles, furniture, machines, metals, paper, and chemicals. The important centres were, for textiles, Reichenberg, Trautenau, and Brünn; china, Karlsbad; glass, Gablonz and Haida; chemicals, Annaberg.

Commerce. Imports in 1921 reached a value of 22,435,000,000 crowns; in 1922, 12,695,000,000 crowns; and in 1923 they were 10,120,000,000 crowns. Exports for 1921 and 1922 were 27,312,000,000 crowns and 18,086,000,000, declining to 12,518,000,000 in 1923. The principal exports were glass, finished textiles, fuel, and sugar; the imports were raw textiles, food-stuffs, and iron. The greatest volume of im-

ports came from Germany, which, in 1922, sent 44 per cent of the total. Others participating were the United States, 7.1 per cent, and Austria, 6.8 per cent. Proportions of exports, in weight, by countries of destination in 1922 were Germany, 42 per cent; Austria, 31 per cent; Hungary, 9 per cent. Imports from the United States for 1922 (six months) were valued at 1,305,932,000 crowns, and exports at 609,025,000 crowns. Again, exports to the United States amounted to \$16,606,242 in 1922, compared with \$8,318,596 in 1921. Throughout 1922 and 1923, the export of manufactured goods showed marked decline; this was due largely to the appreciation of the crown and to labor troubles, and also to the number of commercial treaties effected by which England, France, and the United States received favored-nation treatment.

Communications. On Jan. 1, 1922, there were 8717 miles of railway in the state, of which 5305 miles were government owned. In July, 1923, the government acquired the Bustchrad railway, the last privately owned line of importance. From 1920 on, the government applied itself to the projection of a system of lines connecting east and west. The programme called for the construction of 15 new lines, 558 kilometers in length, of which 389 kilometers were to be in Slovakia, and the rest, of lines connecting Slovakia with the west. The plan included the building of a railway through the centre of Slovakia, leading from Veseli on the Moravia River to Marmarosska Sihot. There were 265 miles of navigable waterways on the Elbe and Danube Rivers. The former connected the country with Hamburg and the North Sea, and the latter with the Balkans. Pressburg was the chief port on the Danube and its terminal developments were being rapidly pushed. By the Treaties, Czecho-Slovakia was given the right to use certain wharfs in the ports of Hamburg and Stettin. The country had 73,600 miles of telegraph line and 138,482 of telephone line in 1921.

Finance. In 1922, the debts of the state were internal state loans, 6,807,550,300 crowns; from regulation of the currency, 8,262,702,035 crowns; foreign loans, 8,740,275,998 crowns; total, 23,870,528,333 crowns; debts imposed on the republic, 16,250,000,000 crowns, comprising 6,500,000,000 crowns of pre-war debt and 9,750,000,000 crowns for reparations; the grand total of debt was 40,120,528,333 crowns, or \$968,950,000 at average exchange for 1922 (\$0.24151). In the budget for 1923 receipts were estimated at 18,812,390,860 crowns (\$587,887,000, at \$0.3125) and expenditures at 19,377,880,639 crowns (\$605,559,000). Revenues came from direct taxation, indirect taxation, government monopolies, and state enterprises. On the service of the debt, the 1923 budget carried 2,790,225,194 crowns. In December, 1919, 6,621,000,000 crowns were in circulation, against a metallic reserve of 86,000,000 crowns; in December, 1922, notes in circulation were 10,664,000,000, against a reserve of 818,000,000, while in April, 1924, notes in circulation totaled 7,654,000,000 crowns, the lowest figure since 1919. The total reserves at the beginning of 1924 were 3,464,000,000 crowns.

Economic Conditions. The country was steadily marching to a greater stability, presenting the only pleasant relief in a Central Europe otherwise characterized by hopeless in-

flation, disorganized economic life, and widespread unemployment. Whereas the crown in 1918 was worth about \$.01, it had gone up to \$.015 in January, 1922, and by January, 1923, it had reached \$.03125. Retail prices fell, too. Based on the index number 100 for 1914, necessities, i.e. foodstuffs, fuel, and clothing, were at 2488 in January, 1921; at 1760 in January, 1922; at 1029 in December, 1922; and at 972 in May, 1923. On the other hand, wages ranged between 9 and 12½ times the pre-war rate. From 1919 to 1921 unemployment regularly dropped, falling from 260,000 to 100,000. However, the industrial crisis of the ensuing year raised the total of men out of work to 490,000, so that by February, 1923, 200,000 men were receiving unemployment doles. The reaction was due to the setback which industries supplying foreign markets received with the appreciation of the currency. A recovery was manifesting itself in 1923 as foreign buyers once more returned to Czecho-Slovakia because of the high cost of living in Austria and disturbed conditions in Germany. In the field of social legislation the government's attitude was enlightened. Within the years 1918-24, legislative provision was made for accident and sickness insurance codes, maternity insurance, a limited form of old age pensions, an eight hour day, prohibition of night work for women and children in industry, housing legislation, an equal legal status for women, and a limited form of workers' councils in mines and factories. Trade-union members numbered about 1,400,500 workmen in 1920; the largest groups were the Czecho-Slovak Federation of Trade Unions, with 822,520 members, and the Bohemian Labor Committee, with 352,608. Labor troubles were not wanting, with so large a proportion of the population organized. In 1918, 139 strikes involved 343,752 workers; in 1920, 1491 strikes brought out 1,675,321 workers. In December, 1921, occurred a general strike which lasted three days and involved 162,100 men.

History. That Czechs, whose dreams of national independences had been kept alive since their defeat at the battle of the White Mountain in 1620, should look on the outbreak of the War with misgivings and should render its prosecution only a lukewarm support was to be expected. Their leaders had openly identified themselves with Pan-Slavism; victory for the Central Powers would mean submergence of their racial aspirations. But that resentment should be so violent as to take the form of wholesale desertions had presumably never occurred to the Austrian bureaucracy. It is estimated that voluntary surrenders of Czechs to Serbs numbered 35,000 in 1914 alone; 300,000 surrendered to Russians and 30,000 to Italians during the war period. Retaliatory measures were therefore extreme. Czech civilians interned numbered 25,000; 5000 were sentenced to death by courts martial; attempts were made to force submission by the imprisonment of the womenfolk of absent Czech patriots; papers were suppressed, the Slav societies dissolved, and German installed as the official language in Bohemia. Magyar activities in Slovakia were even harsher. Driven underground, Slovak resistance took the form of a secret society, the Mafia, which kept up a steady stream of communications with leaders abroad, maintained a secret intelligence, and practiced successfully

an economic and military sabotage. The outside world was apprised of the struggles of the people for independence by the Czecho-Slovak National Committee at Paris, and the work of the outstanding national leaders, the Czecho Masaryk and Beneš, and the Slovak Stefanik. Firstfruits of their labors appeared when the liberation of the Czecho-Slovaks was included in the statement of the Allies' war-aims on Jan. 10, 1917; the next development was Czech spokesmen's audacious championing of their causes of historic rights and national self-determination in the first Austrian Parliament called since 1914, on May 30, 1917. On Jan. 6, 1918, at Prague, a convention of all the leaders of the Czecho-Slovak world met and openly made demands for a sovereign state and the liberation of Slovaks from Magyar exploitation. Other such congresses, at Prague, April 13; at Rome, April 8-10, and again at Prague, May 16, made it plain to the Allies that the subject races of the Dual Monarchy were one in demanding liberation. Other evidence of the wholeheartedness with which Czecho-Slovaks were ready to give proof of their support of the Allies' purposes was furnished by their equipping troops for the Allies' armies. The most important Czech unit was the corps formed of Czech prisoners in Russia after the revolution. This took part in the fighting on the eastern front in July, 1917, and then, after the collapse of the Russian army, undertook an astounding and almost mythical journey through the heart of Siberia in 1918 to join the troops on the western front. In the west, in December, 1917, a Czecho-Slovak unit was recognized; on the Italian front, the same steps were taken. Beginning with the summer of 1918 one after another of the Allies recognized Czecho-Slovakia as of their number and the National Committee as its *de facto* government; the United States did so on Sept. 3, 1918. On October 7, the Dual Monarchy formally accepted President Wilson's statements as a basis for negotiation; on October 14, Beneš announced the establishment of a Czecho-Slovak government, and its principles were promulgated on October 18; on the same day President Wilson declared to Austria-Hungary that no negotiations could be undertaken without the recognition of Czecho-Slovakia's and Jugo-Slavia's independence; on October 17, Andrassy accepted for the Dual Monarchy and in so doing dealt Austria-Hungary its deathblow. Czecho-Slovakia was now a European state. Its first national assembly met at Prague, Nov. 14, 1918, welcomed the Slovak delegates, elected Masaryk first president by acclamation, and set up a cabinet with Dr. Kramář as premier and Dr. Beneš as foreign minister. Also, Dr. Kramář and Dr. Beneš were delegated to represent the country at the Peace Conference. The conflicting claims of self-determination and historic rights have already been alluded to: in these centred the leading difficulty before the Peace Commissioners with respect to Czecho-Slovakia. The old Czech kingdom had included the whole of the provinces of Bohemia, Moravia, and Austrian Silesia; within these there were now 3,500,000 Germans, constituting 37 per cent of Bohemia's population, 28 per cent of Moravia's, and 44 per cent of Silesia's. It was therefore with some hesitation that the Supreme Council decided to yield to the demand for historic justice, instead of racial, and created a state em-

bracing so great a number of a minority and antagonistic people. Ample grounds were to be found for the decision; the Czechs had after all come to the country first, while the Germans had been colonized there; the boundaries had to be kept intact for strategic reasons; economic considerations, such as the convergence of the rivers toward the centre of the country, and German Bohemia's being an industrial centre and thus serving to complement the agricultural districts of the rest of the country, favored the move. In the case of Slovakia, historic rights were ignored in favor of Czechoslovak claims, and the Danube was accepted as the southern frontier in spite of large Magyar minorities on the left bank. In Ruthenia, of 572,028 inhabitants 319,361 were Ruthenes, 169,434 Magyars, 62,187 Germans, and only 4057 Slovaks, and the request of certain delegates of Ruthenians resident in the United States for union with Czechoslovakia was far from convincing; but as the Allies wished to establish direct territorial contact between Czechoslovakia and Rumania, and above all to prevent the future union of so strategically important a region as Carpathian Ruthenia with Russia or Ukrainia, ethnic ties were violated, and the area was assigned to Czechoslovakia, with treaty stipulations for autonomy, a separate diet, and the retention of the Ruthene language. Only in the Teschen (q.v.), Zips, and Orava areas, in the north, was the boundary left undetermined; the Treaty provided for plebiscites there. The Czechoslovak commissioners also effected the internationalization of the Elbe, the use of free zones in the ports of Hamburg and Stettin, and the reconstitution of the European Commission of the Danube.

The National Assembly continued to sit until the framing and adoption of the new constitution, Feb. 29, 1920. This document, which showed largely the American and French influence, provided for a president, a parliament of two houses, and a judiciary somewhat on the American plan. The president was to be elected for seven years by both houses in joint session, was to represent the republic in its international relations, to head the army, and to have the power to summon, prorogue, and dissolve Parliament. He did not have the right of veto. Both chambers were to be elected by universal manhood and womanhood suffrage, on the basis of proportional representation. The Chamber of Deputies was to have 300 members; the Senate, 150. Declarations of war and amendments to the constitution might be passed only by a three-fifths vote of all the members of both houses. Finance and army bills were to originate in the lower house. Cabinet ministers, 15 in number, were to be appointed by the president and to be responsible to the Parliament. During the intervals between sessions, a permanent parliamentary commission was to exercise the legislative power. A constitutional tribunal was to pass on the constitutionality of laws; there were to be special benches in the case of litigation in mining matters; and industrial courts were provided for labor disputes. In the elections of April, 1920, parties returned were as follows (first figure for Chamber, second for Senate): Social Democrats (Centre Socialists), 74 and 41, from whom 22 deputies and 5 senators broke away to form a Communist wing; Na-

tional Socialists (Right Socialists), 24 and 10; the Popular party (Catholics from Moravia and Slovakia), 33 and 18; Czechoslovak Agrarians, 28 and 14; Slovak Agrarians, 12 and 6; National Democrats (Liberals), 19 and 10; German Social Democrats, 31 and 16; German Electoral Union, 15 and 8; German Agrarians, 11 and 6; German Christian Socialists, 10 and 4; Magyar parties, 10. The vote, by nationalities, was 4,203,480 Czechoslovaks, 1,576,692 Germans, 274,630 Magyars. V. Tusar (Social Democrat) succeeded Kramář (National Democrat) and formed a ministry on July 8, 1919; on Sept. 15, 1920, Tusar was followed by Jan Černý (National Democrat) as a result of the split in the Socialist party; Beneš (Independent) succeeded on Sept. 26, 1921; on Oct. 8, 1922, he was followed by A. Švehla (Agrarian). In all these cabinets, the portfolio of foreign affairs was held by Dr. Beneš. The cabinets included representatives of all the Czechoslovak parties except the extreme left. The problems confronting the leaders of the young state were indeed grave. To begin with, food and clothing were scarce, the cost of living high, the coal shortage serious, the rate of exchange unfavorable, and the transportation system, because of the studied plan of Austria-Hungary, hopelessly inadequate. The first budget showed a marked deficit and conditions of life were far from normal. But the economic snare slowly disentangled itself so that from 1922 on Czechoslovakia presented the pleasant spectacle of a country at work, with high wages, and an appreciating currency. The well-being of the workers and Agrarian laborers was zealously provided for in elaborate codes of social legislation. Cultural problems were perhaps more complex and less easy of solution. The subject of the racial minorities cut deeply. In the first place, Czechs and Slovaks were not brothers, as their common name might imply, but rather distant cousins, and the superior attitude of the Czechs did not enhance Czechoslovak solidarity. During 1919-24, dissatisfaction was evident; Slovaks complained of espionage and censorship and of the de-industrializing of their country; even the Magyar overlordship was deemed more desirable by many. By 1924 it was plain that an autonomist movement had made considerable headway. Too, the Germans, the most cultivated and industrialized of the races residing in the country, were treated harshly; attempts were made to Slavonize them; their officials were removed; communes were split up to eliminate the preponderance of the minority race; Germans, and Magyars too, were hard hit by the land expropriation in favor of the Slavonic small farmer. As for Ruthenia, not until March, 1924, were elections held in the province for the selection of National Assembly representatives. Dissatisfaction was grounded on cultural neglect. Nothing revealed the complex character of the Ruthenian problem better than the fact that 13 parties contested for the eight seats. Another cause for internal dissension lay in the marked regional differences. In Bohemia and Moravia the standard of education was high and there were few illiterates; but in Slovakia, as a result of relentless Magyarization, literacy was low, primary schools were few, and up to 1918, there were no secondary schools; and in Ruthenia, as a result of the same policy, the illiterate population included

75 per cent of the total. In religious circles, another discordant element manifested itself. In 1920, as a result of the "Away from Rome" movement, which contended for such changes in Roman Catholic practice as abolition of celibacy, the use of the vernacular in church services, and a more democratic church administration, all of which the Pope naturally refused to countenance, dissatisfied bodies founded the Czecho-Slovak Church. By the 1921 census, 120 churches and 525,313 communicants were recorded. The political significance of the act lay in the fact that the Church was being supported by the Czechs, while the Slovaks, who were the most pious Catholic peasantry of Europe, regarded it with hostility.

The foreign policy of Czecho-Slovakia was perforce bold, in view of the new nation's situation as a landlocked state almost surrounded by a cordon of hostile neighbors. In its international relations it was guided by two principles, the maintenance of friendly relations with the Entente and with France first and then with Italy, and the creation of a group of conventions with the succession states of Austria-Hungary for the preservation of the status quo. With the aid of France the military establishment was perfected; in 1921 a military accord between the two powers was formed; on Jan. 25, 1924, after lengthy pourparlers between Poincaré and Masaryk and Beneš, a political alliance with important implications was signed. This included a pledge on the part of both nations to maintain the peace treaties and to prevent a Habsburg restoration; promises of mutual support, but without definite military commitments; the upholding of the League of Nations; arbitration in the case of disputes, and a new commercial convention. Though Beneš succeeded in convincing Great Britain that the intent of the treaty was pacific, by Germany and Italy the whole was regarded with suspicion, while Austrian and Hungarian comments were plainly querulous. Again, the creation of the Little Entente in Central Eu-

rope was largely the work of Beneš. By a series of bilateral conventions formed in 1920 and 1921, Czecho-Slovakia, Jugo-Slavia, and Rumania united to preserve the peace in Central Europe, to further the maintenance of normal economic relations, and to block consistently all attempts at reaction, in Hungary and Austria particularly. (For the character of the alliance and its achievements, see *LITTLE ENTENTE*.) A political convention of a similar nature was signed with Poland in 1921. Thus, Czecho-Slovakia regarded with suspicion all attempts at a Habsburg restoration in Hungary; it objected, too, to the proposed union of Austria and Germany, or a Danubian confederation. In the field of commercial relations, treaties and trade agreements were concluded with almost all the country's European neighbors and with the United States on the basis of the most-favored-nation clause. In Russian political affairs, Beneš steadfastly refused to intervene, but in 1921 unofficial missions were exchanged between Russia and Czecho-Slovakia, and on June 5, 1922, a commercial agreement similar to the Anglo-Russian arrangement was concluded, opening the vast but disorganized Russian market to Czech enterprise. In September, 1923, Czecho-Slovakia was elected as one of the smaller nations to be represented in the League of Nations Council. In May, 1924, another important link in Czecho-Slovak international relations was forged when a treaty of amity was signed between Beneš and Masaryk for Czecho-Slovakia and Mussolini for Italy. It pledged both countries to the observance of the Peace Treaties and both promised to employ their good offices in the event of a dispute between either signatory and a third power and even to consider acting in concert in the case of war with a third power. This action, like so many others, during 1923-24, seemed to mark a new orientation in Central European politics, with Italy as the centre of the system rather than France. See also *TESCHEN*, *ZIPS*, and *ORAVA QUESTIONS*; *SLAVONIC LITERATURE*.

D

D'ABERNON, EDGAR VINCENT. See ABERNON, EDGAR VINCENT D'.
DAEGER, ALBERT THOMAS (1872-). An American bishop, born at New Vernon, Ind., and educated at Saint Francis College, Cincinnati, and in several houses of the Friars Minor. He was ordained to the Roman Catholic priesthood in 1896, and from that time until 1919 was connected with various churches in Missouri, Nebraska and New Mexico. In 1919, he was consecrated Archbishop of Sainte Fé, N. M.
DAFOE, JOHN W. (1866-). A Canadian journalist (see VOL. VI). In 1919, he was the representative of the Canadian Department of Public Information at the Paris Peace Conference.

DAHLGREN, ULRIC (1870-). An American zoölogist born in Brooklyn, N. Y. He was educated at Princeton University, and was instructor in biology (1895-99), assistant professor (1899-1911), and professor of biology (1911-) at Princeton. In 1921 he was director of the Harpswell Marine Laboratory. Professor Dahlgren published (with Kepner) *Principles of Animal Histology* (1908), *Production of Light by Organisms* (1915), and various shorter papers mostly on electric and luminous organs of fishes.

DAHOMEY. A French colony on the west coast of Africa between Togoland and British Nigeria, forming part of the Government General of French West Africa. Its area is 42,460 square miles, and its population in 1921 was 842,243 of whom 538 were Europeans. The capital and chief business centre was Porto Novo, with an estimated population of 20,000. Other cities are Abomey, 12,372; Whydah, 13,000; and Kotonu, 2456. Palm kernels and palm oil remained the products of greatest economic value. Cotton cultivation was successfully introduced in the central provinces, 1914-24. Imports in 1921 were 39,255,747 francs and exports 36,637,787 francs. In comparing these with the 1911 imports of 19,524,531 francs and exports of 21,958,301 francs, account should be taken of the fall in value of the French franc during the period 1914-21. In 1921, 248 vessels of 680,740 tons entered the country's ports. Germany's share of the palm kernel trade was largely absorbed by Great Britain after the War. In 1922 the local budget balanced at 8,060,000 francs. The natives remained orderly during the War, and many served in the carrier contingents doing duty in Europe and the Cameroon.

DAIL EIREANN. See IRELAND.

DAINGERFIELD, ELLIOTT (1859-). An American painter (see VOL. VI), head of Permanent Art School, Blowing Rock, N. C. His work, as exemplified in "An Arcadian Huntress," is pervaded with poetic meaning. Among his later pictures, "The City That Never Was" and "Tower of Silence" were imaginative impressions of the Grand Canyon. In 1914, he published *Ralph Albert Blakelock*.

DAIRYING. The decade 1914-24 was marked by advancement in dairying. The public was better educated to a more complete realization of the food value of dairy products, and consumption was consequently stimulated. The producers and dealers came to exercise greater sanitary precautions in the production of milk and in the manufacture of its products. Pasteurization became almost universal in the milk supplies of the larger cities, the ordinances of many of the cities allowing no raw milk to be sold. This condition tended to reduce the spread of contagious diseases liable to be transmitted in milk. The manufactured dairy products became better known and more fully appreciated by increased advertising and by marketing products of more uniform quality and in a more attractive way. A wider use of brand names to denote slight differences in the products was also employed. Cheese and ice cream consumption was tremendously increased in this way. It has been suggested that prohibition also played a part in the increased use of ice cream and milk drinks. United States Department of Agriculture estimates of the per capita consumption of dairy products expressed in terms of whole milk were in 1919, 831 pounds, rising to 950 pounds in 1922, with estimates of a still greater consumption during 1923.

The development of coöperative and other organizations of milk producers during this period brought more independence in transactions with milk dealers and the receipt of better prices for milk. The first real stand of the dairymen against the dealers occurred in October, 1916, when the Dairymen's League of New York State declared a strike pending the adjustment of milk prices for the ensuing six months' period. The dairymen were essentially victorious after a spirited contest, and since that time many coöperative organizations have grown rapidly and now control large businesses, some of them going so far as to buy milk plants and to manufacture various types of dairy products. Along with the development of coöperative marketing associations, producers have also progressed profitably in the development of cow testing associations, bull associations, etc. Such progress made it possible to distinguish the profitable from the unprofitable cow and has served to demonstrate the importance of high producers. The bull associations have made it possible for owners of small herds to obtain the use of better bulls at a reasonable cost. Pure-bred sire campaigns and advanced registry testing in the different breeds of pure-bred dairy cattle also showed much progress. The increases in the cost of labor and feeds occurring during the War made it absolutely necessary to produce milk as efficiently as possible, and also furnished a legitimate excuse for increased milk prices. A decrease of from 30 to 50 per cent in feed prices during 1920, however, without any great reductions in milk prices, left the milk producer in a better posi-

tion than he had enjoyed for many years. Much interest was evidenced not only by the dairy industry but by the public in general in the World's Dairy Congress, which was held in the United States in October, 1923, and attended by 231 representatives from 43 foreign countries and 1590 delegates from 47 of the States. Two hundred and fifty-six papers were listed on the programme dealing with national health, regulation and control, research and education, and industry and economics. This congress, held in conjunction with the National Dairy Exposition, was a great success.

International Trade. A very significant change occurred in the world's market for dairy products. The Danes had before the war developed their system of butter production to supply the winter market of the United Kingdom, but a vast development of dairying in the Southern Hemisphere tended to furnish an ample or oversupply of butter to this market in the winter, and as a result of the War a shortage occurred in the summer, due to the cutting off of the supplies from Russia, the second largest exporter of butter before the War, and a great reduction in those from France and other European countries. Offsetting Russia in a sense, however, was Germany, which before the War imported over 100,000,000 pounds of butter annually and which since the War used butter substitutes extensively and imported only negligible quantities of butter. During the first nine months of 1923, 56 per cent of the butter and 59 per cent of the cheese imported by the United Kingdom, the largest importer of dairy products in the world, were from the Southern Hemisphere, as compared with 21 per cent of the butter and 40 per cent of the cheese in 1914. The greater part of the increased dairying in the Southern Hemisphere appeared in New Zealand, Australia, Argentina, and South Africa. The British butter market was promising for those countries of Northern Europe with dairy resources, such as Finland, Estonia, Latvia, and Lithuania. The British cheese market was not so much disturbed as the butter, since the cheese imports from New Zealand and Canada were complementary as to seasons of production and approximately equal in amount.

The foreign trade of the United States underwent very marked changes, due to an unusually large demand for dairy products by the belligerent countries of Europe, where many dairy cattle were slaughtered or not fed for maximum production. The summer butter shortage in the British markets also caused some flurry in American markets. It was problematical as to whether it would be more advantageous to ship fresh butter to the British market or hold it in storage for the home winter market despite the depreciation of quality from keeping. Very little American butter was shipped, however. The table below, giving the annual exports and imports of butter, cheese, and canned milk of the United States during 1913-23, shows how variable the international trade in these products was. A marked reduction in the foreign demand for canned milk due to the initial recovery in Europe in 1920 threatened a serious situation, but many of the condensing and evaporating plants turned to making butter and cheese when the first signs of flooding the markets were evident.

It is of interest to note the influence of the

amounts of dairy products exported from the United States to the United Kingdom on the total exports of the United States as given in

IMPORTS AND EXPORTS OF DAIRY PRODUCTS OF THE UNITED STATES

IMPORTS				
Year	Butter	Cheese	Condensed, evaporated, and powdered milk and cream	
	Lbs.	Lbs.	Lbs.	
1913	8,726,437	55,589,582	•	
1914	7,200,669	55,477,044	•	
1915	1,544,158	88,919,345	•	
1916	676,032	28,515,766	•	
1917	1,307,750	6,332,562	•	
1918	1,655,467	7,562,044	10,904,998	
1919	9,519,368	11,332,204	16,509,239	
1920	37,454,172	15,999,725	23,755,780	
1921	18,558,388	26,866,404	8,667,626	
1922	6,957,159	46,573,099	5,293,631	
1923	23,741,247	64,419,788	10,398,001	

EXPORTS			
1913	3,110,777	2,654,315	16,473,782
1914	3,687,657	3,797,450	22,831,904
1915	17,940,875	63,227,375	75,691,206
1916	26,561,302	54,092,585	219,686,127
1917	7,192,918	53,371,527	428,575,213
1918	26,194,415	48,404,672	551,139,754
1919	34,556,485	14,159,721	852,865,414
1920	17,487,735	16,291,529	414,250,021
1921	8,014,737	11,771,971	299,171,768
1922	10,937,519	5,006,574	193,686,904
1923	5,845,514	8,831,321	196,701,738

* Quantity not given in Commerce reports of the United States.

the table. The changes in the amounts of butter sent to the United Kingdom as compared with the preceding years were, in round numbers, for the years showing the greater fluctuations: in 1917, decrease of 17,000,000; 1918, increase of 20,000,000; 1920, decrease of 18,000,000; 1921, decrease of 3,750,000; 1922, increase of 3,500,000; and 1923, decrease of 3,250,000. The large reduction in the total exports of cheese of 34,000,000 pounds in 1919 was accompanied by a reduction of 38,000,000 pounds in the amount exported to the United Kingdom. Likewise the fluctuations in the exports to Great Britain played a large part in the total fluctuations in the exports of canned milk. In 1916 the United Kingdom took 106,000,000 pounds of condensed, evaporated, and powdered milk from the United States, but in 1919, the year of the largest exports of canned milk, the United Kingdom received 421,000,000 pounds, but in 1920 the exports to the United Kingdom dropped to 124,500,000 pounds and have not since reached 74,000,000 pounds in one year. Exports to Belgium and France also reached a high total in 1919 of 176,000,000 pounds, which dropped to 77,000,000 in 1920 and 28,000,000 in 1921. Exports of canned milk to Germany reached a high mark in 1921 of nearly 61,000,000 pounds, which dropped to about 31,500,000 in 1922 and 1923. Cuba's consumption of canned milk was relatively large, being over 30,000,000 pounds annually from 1916 to 1921 and 19,000,000 and 28,000,000 pounds, respectively, in 1922 and 1923.

The table shows that the War acted as a great stimulus to the production and export of all dairy products from the United States, more especially canned milk and cheese. Previous to the War the United States was importing over

55,000,000 pounds of cheese annually, whereas in 1917 only a little over 6,000,000 pounds were imported. American exports of cheese were likewise affected. Previous to the War less than 4,000,000 pounds was exported annually, but in 1915, 1916, and 1917 over 50,000,000 pounds were exported annually. The temporary character of this change in the exports, especially of cheese, is shown by the fact that the amount returned to 5,000,000 pounds in 1922 and a little over 8,000,000 in 1923, and at the same time the imports were 46,500,000 and 64,500,000 pounds respectively. The imports of cheese, which before the War came largely from Italy and Switzerland, were almost entirely cut off during the War. Argentina sent a large part of the cheese imported; from this source came nearly 10,000,000 pounds in 1920. The export of a little less than 200,000,000 pounds of canned milk during 1922 and 1923 indicated that this market also had again reached somewhat of a stable condition.

Research. The progress of research in dairying had gratifying results. As the importance of vitamins was better understood, the need of including them in the rations of dairy animals became apparent. The vitamins content of dairy products was forcibly brought out in 1918 by studies at Yale University and at the University of Wisconsin. Work on the importance of minerals in the rations of dairy cattle was intensively carried on by E. B. Forbes at the Ohio Experiment Station, E. B. Hart at the Wisconsin Experiment Station, and E. B. Meigs of the United States Department of Agriculture. These investigations tended to show the difficulties of keeping cows producing large amounts of milk in a positive calcium balance, even when plenty of calcium was supplied in the ration. The significance of the legumes, more especially alfalfa, as an aid to the maintenance of a positive calcium balance was first suggested from the Wisconsin Station and was later corroborated by other investigators. The proper curing of the alfalfa used is essential to prevent the partial or entire destruction of the substance which aids calcium assimilation. Investigations in the manufacture of dairy products progressed along bacteriological lines. The isolation in the United States Department of Agriculture of organisms necessary for the production of different types of fancy cheese which it was thought necessary to import previous to the War, and a study of the temperature and humidity requirements for ripening such cheeses, have made it possible to produce cheese in this country closely resembling many imported types. The influence of different strains of bacteria in butter making has been extensively studied at the Iowa Experiment Station, and some success has accompanied attempts to separate strains of organisms which are morphologically and characteristically very similar and which have been found to operate in the production of varied flavors.

The Illinois Experiment Station conducted a series of studies dealing with the thoroughness of different methods of sterilizing utensils and tests of the numbers of bacteria added to the milk through improperly cleaned utensils. Other investigations from the Illinois Station have tended to demonstrate the relative influence of different operations and methods of performing them on the bacteria added to the milk during milking and the handling of the product.

The New York State Experiment Station at Geneva has revealed interesting effects of milking machines on the bacterial count of milk, and has made an extensive study of different methods of sterilizing and cleaning parts of these machines.

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DALLAS. The leading wholesale market and manufacturing centre of Texas and the home of the Federal Reserve Bank of the eleventh district. Its population increased by 72.6 per cent in 10 years, from 92,104 in 1910 to 158,976 in 1920, and to 177,274 by estimate of the Bureau of the Census for 1923. The value of building permits issued increased from \$3,422,512 in 1915 to \$20,988,469 in 1923; bank resources from \$43,399,929 to \$152,914,761; deposits from \$30,187,466 to \$128,829,981; and bank clearings from \$256,200,598 to \$1,865,414,000. The factory output of Dallas increased from \$31,065,000 in 1914 to \$93,650,000 in 1919; in 1923 the wholesale business was estimated by the Chamber of Commerce at \$700,000,000 and the retail business at \$250,000,000. A \$6,600,000 Union Station and terminals and a \$1,000,000 interurban station were built during the decade. Engineers were at work in 1924 on plans for a new water supply project, to be built by a \$5,000,000 bond issue voted in 1922.

DALLIN, CYRUS EDWIN (1881-). An American sculptor (see Vol. VI). He has in recent years continued his impressive Indian subjects in such works as "The Hunter" (1915), Arlington, Mass.; "Massasoit" (1921), Plymouth, Mass., and "The Last Arrow" (1923). He has succeeded also in the domain of historical sculpture in works like "Anne Hutchinson," State House, Boston, and the impressive relief, "Signing the Compact," Provincetown, Mass.

DALMAN, GUSTAF HERMANN (1855-). A German Orientalist, professor of Old Testament Exegesis at the University of Greifswald (see Vol. VI). In 1917, he was appointed professor in the University of Greifswald, and in 1918 he became *Geheim-Konsistorial-Rat*. His works published since 1914 include: *Die Kapelle zum heiligen Kreuz und das heilige Grab in Gölitz und in Jerusalem* (1915); *Orte und Wege Jesu* (1921); *Das Grab Christi in Deutschland* (1922); and *Jesus-Jeschua. Die drei Sprachen Jesu. Jesus in der Synagoge, auf dem Berge, beim Passahmahl, am Kreuz* (1922).

DALMATIA. See FIUME-ADRIATIC CONTROVERSY.

DALRYMPLE, LEONA (MRS. C. ACTON WILSON) (?-). An American author. In 1914, she won a prize of \$10,000 for her novel, *Diane of the Green Van*. Among her other stories are: *Traumerei* (1912); *The Lovable Meddler* (1915); *Jimsy, the Christmas Kid* (1915); *When the Yule-Log Burns* (1916); *Kenny* (1917); "Paul" stories (1920). She also wrote short stories for magazines, and moving picture scenarios.

DALTON, ALBERT CLAYTON (1867-). An American army officer, born at Lafayette, Ind. He entered the United States Army as a private in the 25th Infantry in 1889 and was promoted second lieutenant two years later, and by successive advancements became brigadier-general in the Quartermaster's Department in 1922. His services included participation in the campaign against the Cheyenne Indians in 1890 and in that against the Sioux in 1891; and in the Santiago campaign in 1898 as well as those in the Philippines during 1899-1902, and that on the Mexican border in 1916-17. During the War he organized the Army Transport Service from New York (1917-18) and in 1919 he was in France commanding the 9th Division. He is a graduate of Infantry-Cavalry School (1895), the General Staff School (1920), and the Army War College (1921).

DALTON LABORATORY PLAN. See EDUCATION IN THE UNITED STATES.

D'ALVIELLA, COUNT GOBLET (1846-). A Belgian legislator, writer, and minister of state (see Vol. VI). During the War he was a member of the Belgian cabinet. He received many medals and other decorations, both Belgian and foreign, for his services. He published *The True and the False Pacifism* (1917).

DALY, THOMAS AUGUSTINE (1871-). An American writer born in Philadelphia, Pa. He was educated in the public schools and at Villanova College, Pa., and also was in Fordham University to the close of his sophomore year. He received honorary degrees from Fordham University, Notre Dame University and Boston College. He was associated with several newspapers, among them the *Catholic Standard and Times*, Philadelphia, and the *Evening Ledger and Philadelphia Record*. He is the author of the following books: *Canzoni* (1906); *Carmina* (1909); *Madrigali* (1912); *Little Polly's Pomes* (1913); *Songs of Wedlock* (1916); *McAroni Ballades* (1919).

DAMASCUS. See SYRIA.

DAMS. With greatly increased needs for large and constant water supplies for municipal purposes, for irrigation, and for power, as well as to provide adequate flood control and protection, the design and construction of dams received considerable attention among civil engineers between 1914 and 1924. With increased costs of fuel and greater demands for power, it was realized that more and more the natural power resources of the world must be utilized, and that mountain streams and other available sources must be conserved and transformed into reservoirs by suitable dams so that water at suitable head and in adequate amount could be obtained for power purposes. See WATER POWER.

There was an increased tendency in the United States, as well as in Europe, to secure and enforce state or national supervision for dam design and construction, as it was found almost always in the case of the failure of dams and

disastrous damage to life and property to the valleys below that faulty design or construction was responsible. After the War private capital was all the more anxious to develop power schemes under the terms of the Federal Water Power Act. In the case of streams either under United States control, or under various local statutes or regulations for streams not subject to Federal supervision, it was realized that sound design and construction were essential to maintain the integrity of the investment, as well as to conserve the safety of the valley below, and for this reason engineers were devoting more attention to design.

The height of dams gradually was being increased and for structures with record heights additional attention had to be paid to the foundations and footings as well as to the main construction. Particularly was this the case where a mountain gorge had to be closed by a masonry dam of unusual height and here important problems had to be solved. On the other hand where there were dams of considerable length, as for example, the Wilson Dam at Muscle Shoals, the undertaking was rather more simple though involving construction work of considerable volume. Where possible earth dams were being employed in greater amount and of greater size, and here the provision of suitable cores and other features was absolutely essential. These earth dams could be built rapidly by hydraulic fill, but they presented problems no less than other types of construction.

Arch Dam Investigation. In 1922 in the United States the Engineering Foundation put under way a practical study and investigation of arch dams in order to learn as much as possible about their characteristics and performances in different conditions and temperature of depth of water in the reservoirs. The arch dam was selected by the Engineering Foundation as a subject of special importance on account of its use in connection with water power development and irrigation and water supply projects, particularly in the western states of the United States and in similar regions in other countries. In this type it was possible to secure the necessary strength to resist the pressure of the water or of ice with less masonry than was required for the other common type of masonry dam known as a gravity dam which resisted the pressure of the water and other forces chiefly by its weight.

For the systematic investigation of arch dams, the committee appointed by the Engineering Foundation in 1924, proposed to build a test dam 60 to 100 feet high, which was to be tested repeatedly during construction and under different conditions, and finally to destruction. The site selected was in Stevenson Creek, a tributary of the San Joaquin River, about 60 miles east of Fresno, California. This site was in conjunction with a U-shaped section, typical of many dam sites, and a stream gradient of about 25 per cent. It afforded a suitable foundation without an undue amount of stripping and was convenient and accessible. There was adequate water available derived from a tunnel from Shaver Lake which passed near by so that the reservoir formed by the test dam could be filled at will. This reservoir was not so large as to imperil life or property in case of the actual failure of the structure.

Wilson Dam. The Muscle Shoals project to develop power by a dam across the Tennessee

River was an important war time undertaking put under way in 1918. The Wilson Dam—Dam No. 2 across the Tennessee—was a structure of the overflow type about 4600 feet in length from bank to bank, and about 96 feet high from bed rock to pool level. It not only would supply power but would render adequate depth of water for navigation of the Tennessee River. The dam was founded on solid rock with two tandem locks excavated in solid rock, 60 feet wide by 350 feet in length at the north end of the dam, each giving a lift of about 45½ feet and affording a minimum depth over mitre sills of 7½ feet. The spillway section of the dam shown to the right of the lower half of the accompanying plate is 2660 feet in length, and over its crest rise 8-foot piers which support a concrete arch bridge. In the 58 openings between the piers are vertical steel sliding crest gates 18 feet high and 38 feet wide, which are sufficient to pass a flood 75 per cent greater than the highest ever known on the river without any appreciable rise in the upper pool level. The heel trench is 35 feet wide and is carried down below the base of the dam so as to give a minimum breast wall of five feet without any seams.

The power house proper is located in a section of the dam about 1200 feet long, which is a continuation of the spillway section and includes a building for housing the generating machinery. Here were to be installed at the beginning four 30,000-h.p. turbines, although power was available to generate from 300,000 to 375,000 h.p., and provision was made for a corresponding installation of turbines. This dam contains nearly 1,000,000 cubic yards of masonry and is one of the largest dams ever

River, California, about 250 miles east of San Francisco, and at an elevation greater by 3600 feet, there was built a straight cyclopean masonry gravity section dam 600 feet in length with a siphon spillway. From the crest of the dam to the lowest excavation it was 311 feet in height, and the dam rises to a height above stream level of 212 feet, there being an average excavation of 72 feet. See AQUEDUCTS.

Don Pedro Dam. The highest arch gravity non-overflow type of dam in the world, and in fact one of the highest dams of any kind was completed in 1923, across the Tuolumne River in California. This dam, which was built on a simple curve with a radius of 675 feet and a height of 280 feet, is 1040 feet long on the crest and contains 282,000 cubic yards of concrete masonry. The spillway with a capacity of 100,000 second-feet was provided with 10 gates, each 58 feet long and weighing 22 tons. These gates sink into the lip when not in use and can be raised to increase the reservoir height by nine feet. There was also a power house built at the toe of the dam, which was equipped for an initial capacity of 150,000 horse power. The Don Pedro Dam forms a reservoir four miles above the La Grange Diversion Dam for the joint use of the Turlock and Modesto Irrigation districts in the San Joaquin Valley, California. Its estimated cost was about \$4,000,000. The reservoir when full covers an area of 3068 acres, having a capacity of about 280,000 acre feet. This dam itself was located about 60 miles below the Hetch Hetchy Dam of the San Francisco water supply project.

Dams of U. S. Bureau of Reclamation. Some of the most important dam construction in the United States has been carried on by the

RECENT HIGH MASONRY DAMS
(Approximate Dimensions)

Dam	Location	Date of Construction	Height above Bedrock	Width		Length on Crest	Plan
				Top	Base		
Arrowrock	United States	1912-1916	849	16.0	223.0	1,100	Curved
San Antonio	Spain	1914-1917	261.75	13.12	228.55	666	"
Elephant Butte	United States	1916	306	18.0	215.0	1,675	Straight
Kensico	Spain	1916	307.0	28.0	235.0	1,843	"
Yadkin	United States	1917	217	....	....	1,400	Curved
Camarasa	"	1918-1920	334.66	....	....	....	"
Hetch Hetchy	"	1921-	845-430 *	....	....	....	Straight
Don Pedro	"	1921	279.0	16.0	176.4	975	Curved
Gilboa	"	1921-1924	160.0	15.0	158.0	1,300	Straight
Wilson	"	1918-	95.0	46.5	156.0	4,111	"
Krishnaraja Sagara	India	1919-	80-120 *	....	....	....	"
Lake Arthur Hill	"	1916-	270.0	....	234.0	1,600	Curved
* Ultimate Height							

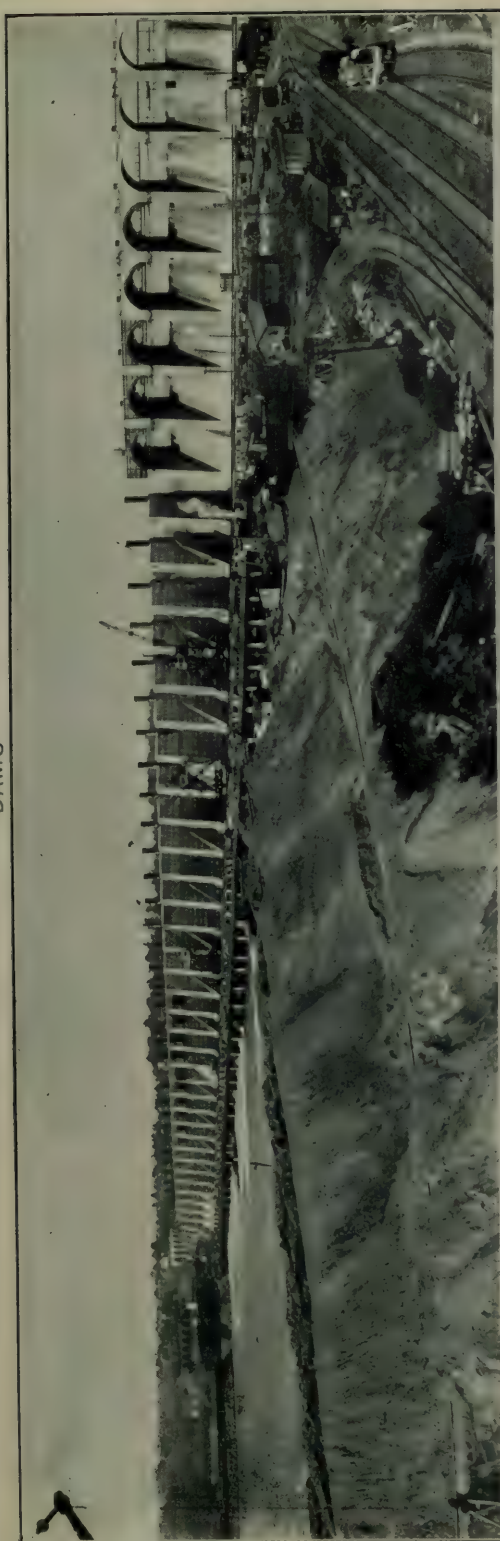
built as regards its volume. See MUSCLE SHOALS.

Gilboa Dam. The Gilboa Dam for the Schoharie development of the Catskill aqueduct of the New York City water supply system was a large gravity masonry structure for the overfall portion, 1300 feet in length with an earth portion with a masonry core 1000 feet in length. The masonry section has steps on the downstream side leading to a spillway channel along the toe of the dam for which earth portion there was a masonry core in the centre of heavy rock paving on the up-stream side. At the transition section the dam was flugged both up stream and down stream by a heavy masonry retaining wall to intersect the long slope of the earth section. This dam had a maximum height of 160 feet (see AQUEDUCTS).

Hetch Hetchy Dam. On the Tuolumne

United States Bureau of Reclamation, and its engineers have developed designs in which most of the leading types have been represented, as will appear from the accompanying table giving a summary of United States dams over 50 feet built by the Reclamation Bureau. Up to the end of 1923 the Bureau had built three dams over 300 feet high, two dams between 200 and 300 feet, four dams between 100 and 200 feet, and nearly 100 dams ranging from about 2½ to nearly 100 feet in height. In 1924 there were six dams under construction, the most important of which were the Tieton River Dam in the State of Washington, with an estimated volume of 185,000 cubic yards, and a height of 244 feet (maximum height to the bottom of the core wall is 321 feet); the McKay Dam in the State of Oregon with an estimated volume of 2,300,000 cubic yards and a height of 159 feet; and

DAMS



THE WILSON DAM AT MUSCLE SHOALS, ALABAMA

A panoramic photograph showing the construction of this dam across the Tennessee River at Florence, Alabama. 4000 feet in length. The upper half of the plate shows the lock under construction on the right bank of the river, the nonoverflow section of the dam, a portion of the spillway, and Jackson's Island separating the two channels of the river. The lower half of the plate shows the remainder of the spillway dam and the power house section extending to the left bank of the river

DAMS



THE GILBOA DAM IN COURSE OF CONSTRUCTION

Built across Schoharie Creek, New York, this dam forms a storage and diverting reservoir from which by the Shandaken Tunnel water will pass to the Ashokan Reservoir of the Catskill Water Supply of the City of New York

the Black Cannon Dam in Idaho with an estimated volume of 74,500 cubic yards and a height of 153 feet.

The Arrowrock Dam near Boise, Idaho, built by the United States Reclamation Service in the interval between 1910 and 1916, has a height of 349 feet, and is 1100 feet long on the crest. It is built of concrete with large stones imbedded in the concrete. The total volume, including the spillways, is 610,600 cubic yards. Another high masonry dam constructed by the United States Reclamation Service was the Elephant Butte Dam across the Rio Grande, 120 miles above El Paso, Texas. This dam, which was finished in 1916, has a height of 306 feet above bedrock, and contains 605,200 cubic feet of concrete.

brought to the dam site from borrow pits in cars was washed into position by hydraulic giants to a central pool divided by the core wall. Here a pump was installed to pump a large amount of the soft clay material from the lower side of the core wall to the upper side, leaving a fine graded sandy material against the down-stream side of the core wall and a clayey puddle against the up-stream side of the core wall.

The volume of the embankment is approximately 2,000,000 cubic yards. In the rock cliff on the west side a spillway was to be built with an overflow lip 420 feet long, equipped with six drum gates of the Arrowrock type, 65 feet long and 8 feet high. This spillway has a capacity under normal conditions of 30,-

DAMS CONSTRUCTED BY THE UNITED STATES BUREAU OF RECLAMATION WITH HEIGHT OF
50 FT. OR MORE

Name and state	Height	Type	Crest Length (feet)	Volume (cu. yds.)
Arrowrock, Idaho	349	Rubble concrete arch, gravity	1,100	585,130
Shoshone, Wyo.	328	Rubble concrete arch	200	78,576
Elephant Butte, N. Mex.	306	Rubble concrete, gravity	1,675	619,000
Roosevelt, Ariz.	280	Rubble masonry arch, gravity	1,125	342,325
Pathfinder, Wyo.	218	Broken range masonry arch	432	60,210
East Park, Colo.	139	Concrete arch, gravity	250	12,000
Sun River, Mont.	132	Concrete masonry arch	212	6,200
Lahontan, Nevada	124	Earth and gravel fill	1,400	770,000
Belle Fourche, S. Dak.	122	Earth fill	6,200	1,600,000
Cold Springs, Ore.	98	Earth and rock fill	3,800	789,500
Minidoka, Idaho	86	Rock fill, concrete core	937	242,500
Clear Creek, Wash.	84	Concrete arch	404	4,100
Sherburne Lakes, Mont.	83	Earth embankment	1,138	201,500
Willow Creek, Mont.	78	Earth fill	525	196,400
Strawberry, Utah	72	Earth fill, concrete core	438	108,415
Lake Keechelus, Wash.	70	Earth and gravel fill	6,500	639,000
Upper Deer Flat, Idaho	70	Earth fill	4,000	1,190,275
Willwood, Wyo.	70	Concrete ogee weir	820	22,119
Conconully, Wash.	67	Hydraulic earth fill	1,000	351,242
Jackson Lake, Wyo.	67	Concrete gate section and earth fill	4,450	345,400
Minatare, Neb.	65	Earth fill	5,700	570,000
Lake Kachess, Wash.	63	Earth and gravel fill	1,400	193,300
Lake McMillan, N. Mex.	55	Earth and rock fill	2,070	150,744
Avalon, N. Mex.	50	Earth and rock fill, concrete core	1,380	168,773
Ralston, Wyo.	50	Earth fill	150	24,740

Tieton Dam. In order to provide a reservoir with a capacity of 205,500 acre-feet as a part of the storage system for the Yakima project, Washington, the United States Reclamation Bureau constructed an earth dam on the Tulon River about 26 miles above Naches, Washington, in the Mt. Rainier National Forest. This was an earth dam heavily blanketed with rock, approximately 230 feet high and 900 feet long on the crest, with a concrete core wall of an approximate height of 330 feet extended over solid rock to the crest. During the construction of the dam a diversion tunnel 2200 feet long and of a diameter of approximately 21 feet was constructed to carry the waters of the Tieton River, and this work after the completion of the dam was to be used as a portion of the outlet control. The core wall consists of a concrete diaphragm completely across the core and tied into bedrock on the base and sides below the ground surface. It is five feet thick with no reinforcing. From the ground surface this core wall tapers to one foot thickness to the top of the dam, being heavily reinforced and without expansion joints.

The embankment forming the dam consists of hydraulic fill blanketed with rock, having a maximum height of approximately 230 feet, a crest 900 feet long with a 3 to 1 slope on the up-stream side, 25 foot top width and a 2 to 1 slope on the down-stream side. The material

000 second-feet and a capacity of 50,000 second-feet before the dam would be over-topped. It discharges through a concrete conduit down the slide of the cliff to a pool well below the toe of the dam. The outlet control works operate to control the water at three stages so that the gates will never have to operate under a greater head than 80 feet. These outlets each have a capacity of 25,000 second-feet which will be the maximum of any irrigation dam.

Boulder Dam. The United States Reclamation Service in 1924 proposed the improvement of the Colorado River Basin so as to provide adequate flood control, the impounding of water for irrigation, the storing of water for generating electric power, the provision of an all-American canal for supplying the Imperial Valley with irrigation water, and a possible future source of domestic water to supply California cities. An essential element of the project proposed was the construction of a dam across the Boulder Canyon, raising the water surface 605 feet, a height greater than that of the Washington Monument, and more than $2\frac{1}{4}$ times as much as the Don Pedro Dam in California.

The proposed dam would contain over three and three-fourths million cubic yards of concrete, or more than three times as much as the Assuan Dam in Egypt, which with 1,179,000 cubic yards had a record for the greatest amount of masonry of any dam yet constructed, though

it was exceeded by the Wilson Dam with 1,291,385 cubic yards. The Boulder Dam would cost about \$50,000,000 or 2½ times as much as the Assuan Dam. It would provide a reservoir 120 miles long with an area of 157,000 acres, or 50 per cent greater than that of Gatun Lake on the Panama Canal. This reservoir would have a capacity of 34,000,000 acre-feet, eight times as great as that of Gatun Lake and nearly 13 times as great as that of the Elephant Butte Reservoir in New Mexico, the largest in the United States.

The dam as recommended in the Fall-Davis report, submitted in 1922, would begin 150 feet below the bed of the river, and would rise to a height of 605 feet, being 1350 feet long and 650 feet thick at its base. The construction would have been carried on in a normal current, 20 to 30 feet deep ordinarily, with a flood crest in the canyon of 30 feet, having a velocity of 15 feet per second at the time. This probably would require the diversion of the river through tunnels around the construction, which was in every way feasible. This report and supplementary opinion received the careful consideration of Congress, but up to the middle of 1924 no positive action had been taken in this connection.

Roller Crest Dam. The Grand River Dam, completed in 1915 to form a diverting structure of the high line or main canal project, was the largest of the roller crest dams built in the United States; in fact there were but two others, one a short single roller controlling a logway in the Boise Dam of the Reclamation Service, and the other an installation of three rollers in the Washington Water Power Company's dam at Long Lake, near Spokane. The Grand River Dam is a steel roller crest surmounting an ogee concrete weir, with a sluiceway and a canal intake of a capacity of 1425 cubic feet per second at its west end. By means of this roller crest the entire upper 10 feet of the dam can be raised above high water so that the elevation of the back water surface in flood is no greater than during operation for maximum requirements in low water. The axis of the dam is normal to the direction of the river, and on the west end is a canal intake controlled by nine regulator gates each 7 feet square. In front of the intake head wall is the sluiceway, 60 feet wide and 255 feet long. The dam proper consists of six bases, each 70 feet wide, or a total of 420 feet.

The roller crests consist each of a hollow steel cylinder, each 74 feet, 9¼ inches long, and 7 feet, 1¼ inches in diameter, the ends projecting about 2½ feet into recesses in the piers and rolled on smooth tracks at an angle of 20 degrees with the vertical, while a toothed rim engages in a toothed rack. The hollow cylinder axle and the required height of the crest is obtained by fastening to the cylinder an extension shield which rests on the sill when the roller is down, thus forming the bottom seal. There is also a roller crest at the sluiceway of essentially the same design but of different dimensions.

The Camarasa Dam. In 1921 there was completed in the Pyrenees Mountains in northern Spain the Camarasa Dam to form a reservoir for the Rio Noguera Pallaresa at a point 80 miles northeast of Barcelona. At the time of its erection this was the highest dam in Europe, and one of the highest dams in the world, ris-

ing to a height of 333 feet from bed rock to crest, and containing 285,000 cubic yards of cyclopean concrete. It is 270 feet wide at the base and 13 feet wide at the crest which is widened to 21 feet to provide a roadway and foot walk along the top, whose length is 460 feet. This dam is of gravity section and is arched on a radius of 1000 feet. It forms a reservoir which supplies a head of water so that at the power house below some 88,000 h.p. is generated. The dam was built in a very narrow part of a deep gorge, so that it was necessary to place the spillway adjacent to the south abutments of the dam, and the headworks controlled the flow to the power house on the opposite side of the north abutment. At the power house the total head of 270 feet was developed.

Montejaque Dam. In 1924 there was completed a concrete dam of pure arch type in the Andalusian Mountains of Spain, which with a maximum height of 273 feet from the lowest portion of the foundation to the crest was the highest structure of the kind essayed up to that time. It was built across a gorge of the Gadares River where the cliffs rise almost vertically, and was of variable radius increasing from 72 feet at the base to 123 feet at the crest which, measured along the centre line, was 256 feet in length. Excavation was begun in July, 1923, and the crushed stone and sand were obtained from adjacent sources of supply. The completed structure contained 35,000 cubic yards of concrete and formed a reservoir containing 1,412,000,000 cubic feet of water. The design was the work of Swiss engineers who also supervised the construction.

Tirso Dam. Completed in 1923 in western Sardinia, Italy, this multiple-arch dam 200 feet high, was the highest dam of this type in the world, being almost 70 feet higher than the Lake Hodges Dam which had the record for height in the United States. The Tirso Dam had reinforced-concrete arches supported on cut-stone masonry buttresses and formed the main structure of a power plant generating some 30,000 horse power at maximum load and 10,000 horse power normally. The dam itself forms a reservoir with a surface area of 8.5 square miles which has a storage capacity of some 330,000 acre-feet, and will furnish irrigation water to about 75,000 acres.

The Tirso Dam in southern Italy, built in 1923, was exceeded in height by a new dam built in the following year for the Suviana Reservoir on the Limentra di Treppio Brook in the Province of Bologna, which has a height of 286 feet as compared with 213 feet for the Tirso Dam. This was a concrete multiple-arch dam built for the State railways of Italy, so as to afford a storage capacity of 35,000 acre-feet, of which 29,000 acre-feet was to be utilizable storage.

In the development of water power in Italy a number of concrete multiple-arch dams of large proportions had been constructed, though they did not have the height of the two dams mentioned. Thus the Pavana Reservoir across the Limentra di Sambuca Brook, also in Bologna, was formed by a concrete multiple arch dam 187 feet high, and had a storage capacity of 810 acre-feet.

Indian Dams. Some of the largest and most notable dams and reservoirs in the world have been constructed in India to provide irrigation

and power. The more important are the following: the Periyar in the Madras Presidency, the Marekanave in the Mysore State, Lake Whiting at Bhatghar which supplies the Nira Canal in the Bombay Presidency, and the Tansa Reservoir, the principal source of water supply for Bombay, and Lake Fife near Poona. These dams were designed for a maximum height as follows: Periyar Dam 173 feet; the Marekanave Dam 167 feet, and the Tansa Dam 118 feet. Greater, however, than any of these was the Krishnaraja Sagara Dam which was built across the Kaveri River in the state of Mysore. This dam is built of rubble masonry with cut stone faces, and at its first stage has a height of 80 feet, but is designed to rise ultimately to a height of 120 feet. It affords a storage reservoir of 41,500 million cubic feet capacity, carrying nearly 30,000 acres. From this reservoir water would be provided for both irrigation and power in an unfailing supply as the water impounded in the monsoon season would be available for the use of farmers and make cultivatable an increased acreage of land. At the same time there would be developed increased power needed for the large hydroelectric station at Sivasumudrum, lower down the river.

The actual foundation of this dam, which was built on solid rock where considerable excavation was required, was 5150 feet in length, and the complete dam was to contain nearly 30,000,000 cubic feet of masonry.

Sukkur-Barrage, Bhatghar. Construction began on one of the largest dams in the world in October, 1923, across the Indus River in the Province of Sind in India at Bhatghar, 35 miles from Poona. This dam would form a reservoir with a storage capacity of 551,000 acre-feet as compared with 1,070,000 acre-feet stored by the Assuan Dam in Egypt, and would provide water for the irrigation of 6,000,000 acres of land, the entire project including about 850 miles of main canals, and over 1200 miles with branch canals in addition to the dam, costing about \$50,000,000. The dam known as the Lloyd Dam, or Sukkur-Barrage, will be one mile in length and will be built of masonry using local limestone, with 66 arched openings of 60 feet each, provided with control gates. The height of the dam above the lowest foundation will be 185 feet and the height of the water above the sills of the lowest sluices will be 143 feet, a height which can be increased to 153 feet by means of gates in the waste weir. The masonry content of the dam will be approximately 800,000 cubic yards, and it will have two bridges on the top, the lower one directly over the water openings, carrying a roadway, while the other will be used for the machinery operating the gates. The Lloyd Dam takes the place of an older dam.

In connection with the Lloyd Dam attention might be directed to the elaborate system of canals by which the water is distributed. The eastern canal at Nara is to be carried through a deep cut nearly double the width of the Suez, while the northeastern canal will be nearly 100 miles long, and will have about 500 branches, being nearly as wide as the Suez Canal, and will irrigate more than 750,000 acres. The Central Rice Canal, which is the second largest, will be 87 miles in length, and will have 350 miles of branches. It will have a discharge equal to that of the River Thames.

Hartebeestpoort Dam. In September, 1923, the Hartebeestpoort Dam on the Crocodile River in South Africa was completed. This dam, situated about 23 miles from Pretoria, closes a gap in the Magaliesberg Range, and affords a reservoir with a surface area of about 6.7 square miles with a gross storage capacity of 136,241 acre-feet at spillway level, or 123,232 acre-feet above outlet level, having a drainage area of 1506 square miles, and an average annual rainfall of 26.34 inches. The dam is built of concrete in arch plan; 195 feet high, from the lowest foundation to the top of the solid parapet wall. It has a top radius of 240 feet on the up-stream face, and at the bottom the radius is 148 feet and 75 feet on the up-stream and down-stream faces respectively, affording a thickness of 73 feet. From the bottom, elevation 3795, to elevation 3960, both faces have a batter of 1 in 5.714, above which point they are vertical giving a roadway along the top.

The height of the dam from the river-bed level to the elevation of the crest of the waste weir is 140 feet, with an approximate height flood level of 158 feet to the top of practically 168 feet. At the west side of the gap there was a flat slope which required the construction of a long tangent abutment beyond which the spillway was cut in the rock and separated from the reservoir proper by a levee or weir 420 feet long. This spillway was 56 feet wide at this upper end and increased in width to 125 feet at the bottom where it is crossed by a concrete arched bridge. The channel so formed is lined with concrete and beyond its lower end below the dam the rock surface of the cliff is faced with gunite. On each side of the dam there is an outlet tower from which through pipes the water is passed into an open canal, whence it proceeds for irrigation purposes to the territory below the dam. As the main road from Pretoria to Rustenberg crosses the dam it has been made particularly ornamental as regards its finish and that of the bridge towers.

Gleno Dam Failure. Among the more serious of recent dam failures was that of a multiple-arch dam at Gleno, about 30 miles northeast of Bergamo in north central Italy, on Dec. 1, 1923, resulting in a loss of some 500 lives and property destruction estimated at 150,000,000 lire. This dam, which formed a reservoir of 190,000,000 cubic feet capacity, was a reinforced concrete structure of multiple-arch type 143 feet in height above the stream, 863 feet long on top, and of curved ground plan, with a central portion 250 feet in length flanked on either end by straight portion tangents to the central curve. The multiple-arch construction rested on a gravity base of stone masonry, being substituted without proper authority for the gravity dam for which official permission had been granted. The masonry basin was 5½ feet high and some 250 feet long and carried the curved part of the superstructure, while the straight portions at the sides were built directly on the rock of the side of the valley. In all there were 25 arches of semi-cylindrical form, 26 feet 3 inches between buttresses and inclined 53 degrees to the horizontal.

At the time of the failure eight of the arches of the curved portion of the dam, together with their buttresses, and the first arch of the tangent section on the left bank together with the heavy buttress at the point of tangency went

out. This released a vast volume of water which passed down the steep and narrow valley of the Dezzo River, for 12 miles to its junction with the Oglio River at Darfo, and then down the Oglio Valley 5 or 6 miles to Iseo Lake at Pisogne. Power stations at Vilminore, Dezzo, Mazzuno, Angola and Darfo, a number of factories, including the Valtre Steel Works at Darfo, and many houses and villages were destroyed by the flood. The failure of the dam was due to the faulty design and construction of the base. The execution of the work was badly performed and there was a failure to cut footings in the rock for the buttresses. Improper materials, badly mixed and poured, lax inspection and incompetent direction, all contributed to the disaster as was revealed in an official report published in 1924. It was believed that one outcome of the catastrophe would be the formation of a government department to pass on the design and construction of all dams as had been proposed previously by different Italian engineers.

Bibliography. Among the recent and more notable works on dams available are—Wegmann, *Design and Construction of Dams* (4th ed., revised and enlarged, New York, 1922), which has a full bibliography of the available literature; Creager, *Engineering for Masonry Dams*, (New York, also translated into French); Morrison and Brodie, *High Masonry Dams* (2d ed., New York, 1916); Davis, *United States Irrigation Works* (Washington, D. C., 1917). Most satisfactory, however, are the files of the *Engineering News-Record* (New York); *Reclamation Record* (Washington); *Engineering* (London); and *Engineer* (London), and *Transactions of the American Society of Civil Engineers* (New York, current), as well as *Reports Chief of Engineers U. S. Army* (Washington, annual); and *Reports Commissioner of the Reclamation Bureau* (Washington, annual).

DANA, PAUL (1852-). An American editor (see VOL. VI). He was stationed at Namur from May to June, 1915, as a member of the Committee for Relief in Belgium.

DANDURAND, RAOUL (1861-). A Canadian lawyer and statesman (see VOL. VI). In 1921, he became minister without portfolio in Canada. Mrs. Dandurand, his wife, was elected vice-president of the National Council of Women, and was decorated by the French government.

DANE, CLEMENCE (WINIFRED ASHTON) (?-). An English author, who wrote the following novels: *Regiment of Women*; *First the Blade*; *Legend*, a novel composed chiefly of conversation which gives a striking revelation of character, through its subtlety of method. She also wrote the following dramas: *A Bill of Divorcement*, played in New York in 1921; *Will Shakespeare*, played during the 1922-23 season, and *The Way Things Happen*.

DANIELS, JOSEPHUS (1862-). An American public official (see VOL. VI). He was Secretary of the Navy under President Wilson from 1913 to 1921, and from the beginning urged the establishment of a larger navy. That he had the real interests of the enlisted men of the navy at heart is shown by his order that no intoxicants should be allowed on shipboard, and by the fact that he caused opportunities to be given for the training of the men in various trades. He believed in government ownership of armorplate factories, and of tele-

phones and telegraphs. In 1921, he resumed the editorship of the *Raleigh News and Observer*. He wrote: *The Navy and the Nation* (1919).

DANISH LITERATURE. See SCANDINAVIAN LITERATURE.

D'ANNUNZIO. See ANNUNZIO; ITALIAN LITERATURE; ITALY, *History*.

DANUBE RIVER. See WAR IN EUROPE, *Balkan Front*.

DANZIG. Formerly belonging to Germany, but since 1920 a Free City established by the Treaty of Versailles and placed under the League of Nations' protection. The area of the district is about 745 miles, and the population, on Jan. 1, 1923, 365,000, largely German; in fact, only 6 per cent were Poles. The Free City area contains 325 localities, four of them cities with the following populations: Danzig proper, 194,953; Zoppot, 18,397; Neuteich, 2395; Tiegenhof, 2334. Of the Free City's total boundary line of 147 miles, 35 miles are on the sea. The production of the rural sections fell short of the requirements of the population with the result that foodstuffs had to be imported. The same was true of lumber, and stocks had to be imported from Poland. With Poland, Danzig was connected by three main lines, Danzig to Warsaw, 204 miles; Danzig to Lodz, 263 miles; Danzig to Posen, 192 miles. Inland waterways communication was of course maintained by the Vistula. Although by 1922 Danzig's trade had not reached pre-war proportions, it seemed in a fair way to recover its old stability. In 1913, 1921, and 1922, imports into Danzig by sea weighed, in metric tons, 1,233,630, 1,322,428, and 466,286; and exports by sea, 878,471, 383,448, and 504,876. A resumption of the importation of hides and skins, wool, wine, etc., all of which were destined for reshipment, appeared in 1922. Before the War, the principal exports from Danzig were grain, lumber, and sugar. Lumber, by 1922, had recovered pre-war proportions; sugar, too, was rapidly increasing, but grain had become an article of import. In 1913, 2854 vessels of 918,097 net tons entered and 2836 vessels of 931,509 net tons cleared Danzig; in 1922, 2712 vessels of 1,423,132 net tons entered and 2697 vessels of 1,428,820 net tons cleared. In 1923, 1,722,927 tons entered and 1,699,255 tons cleared. The disproportion between imports and exports for 1919-22 was largely due to the size of relief shipments originating in the United States. In 1920, 88 per cent of the total trade was made up of imports; in 1921, 78 per cent; but in 1922, 48 per cent, which approximated the pre-war status.

History. The problem posed in 1919 by the Polish claim to a sea outlet involved several important considerations. Danzig, the focal point of Polish aspirations, was overwhelmingly German in population, at least 90 per cent. The creation of a Polish "corridor" through Prussia to connect Poland with Danzig on the sea meant the separation from the Reich of some 2,000,000 Germans in East Prussia. On the other hand, Danzig was bound up with the life of the new state economically and geographically, for Danzig was the port of the Vistula, and the valley of the Vistula was really Poland; of the 46 cities of more than 20,000 population in Poland, 23 are in the valley of the Vistula system. If on the grounds of history, race, and economic necessity the Germans could ob-

ject to an outright cession of Danzig, the Poles could answer that Danzig had remained loyal to Poland as late as 1813, that under Prussian rule the city had dropped, as a commercial port, to a place of comparative insignificance, and that the well-being of 20,000,000 Poles was perhaps more important than the interests of the 170,000 inhabitants of the city or at most, 360,000 Germans in the city and the adjacent area. But to preserve the principle of self-determination of which so much had been made during the War, and to check the growth of a German irredentism, a compromise had to be effected. Articles 100-108 of the Treaty of Versailles, therefore, set up in Danzig and the German area about it a Free City under the League of Nations. Its governing head was to be a High Commissioner; foreign relations and customs tariff were to be controlled by Poland; while economic matters such as administration of railways, posts, telegraph lines, waterways, and port facilities, were to be largely in Polish hands. Under Article 103 of the Versailles Treaty, which provided for the drafting of a constitution by representatives of the city in agreement with the High Commissioner appointed by the League, a Constituent Assembly was elected in Danzig on May 16, 1920, by universal suffrage with proportional representation. This Assembly, in which the various German parties had an overwhelming majority, drew up a constitution which was approved by the High Commissioner and the League. The City's relations with Poland were defined by a treaty signed on Oct. 27, 1920, and ratified on November 9, and by a supplementary treaty of Oct. 24, 1921, regarding economic matters and naturalization. The formal proclamation of the new state, in accordance with these arrangements, occurred on Nov. 15, 1920. The essential points of the new system thus created were that the High Commissioner was to decide all points of dispute between Danzig and Poland, though a right of appeal to the League Council was assured; local autonomy was preserved through the creation of a bicameral diet, the president of whose upper house was to act as state head; a single customs area was to exist, and Poland was to be in charge of railway, postal, telegraph, telephone, diplomatic, and consular matters; Danzig port and terminal questions were to be in the hands of a joint board headed by a neutral. Any settlement so thoroughly permeated by the spirit of compromise was certain to be stigmatized as unfair by both sides, yet the Danzig experiment was more successful than some of the other decisions of the Peace Conference, albeit, as events of 1920-24 manifested, the causes of irritation were many. Sir Reginald Tower and the other Englishmen who succeeded him in the office of High Commissioner displayed admirable tact and impartiality in their difficult task; nevertheless in the first 18 months of the Free City's existence, appeals were made to the League Council against nine of his 12 decisions. The announcement of the League Council that the former German rifle factory at Danzig must be closed by July 30, 1921, was provocative of considerable resentment in Danzig. On the other hand, the refusal of the Danzig government, backed by High Commissioner Tower, to permit the passage of supplies to Poland during the Russo-Polish War, was censured by both Poland and France. Polish intentions to establish an

ammunition dépôt in the centre of Danzig harbor infuriated the Danzigers, while the steady infiltration of Polish business men, officials, and publicists threatened to contest the German supremacy. Nevertheless a more amicable attitude on the part of the Danzigers appeared as they began to realize that their economic interest would be best served by a prosperous Poland. Polish penetration of the region was tending to turn the city into a Polish port. See *POLAND, History*

DARDANELLES AND BOSPORUS STRAITS. Economically and strategically the excellent position of Constantinople at the crossroads of Europe and the Near East caused many of the Great Powers to regard this whole region with an acquisitive eye. To Russia its possession implied a "warm water" port fronting on the seas of the world, and long before the dawn of the 20th century Russian expansionists looked on the Golden Horn as their ultimate goal. When in 1913 Germany arranged to send a military mission to Turkey, with the aim of strengthening the Turco-Teutonic grip on the Straits, Russian resentment took the form of a secret crown council, which discussed plans for the seizure of the vital waterway in case of war. After the War began, in 1914, Russia held an expeditionary force ready for months to sail for the Bosphorus, but it was never sent. The Czar's government succeeded in vetoing a projected Greek attack on the Straits in 1915, and in exacting from France and England, in March of the same year, a pledge that the entire region of the Straits must be allotted to Russia in case of the Allies' victory. To Germany, on the other hand, the unhampered control of the waterway by a friendly Turkey meant the realization of the Berlin to Bagdad scheme and the checking of Russian aspirations. German domination of the Straits was destroyed by the Allies' military success in the War, while Russia's claims were cast aside after the Bolshevik revolution. At the close of the War there remained to be considered the claims of the Turks, reinforced by Moslem sentiment everywhere, most particularly in India; of the Greeks, whose pretensions far exceeded their power; of the Black Sea peoples of Bulgaria, Rumania, the Ukraine, and Transcaucasia, whose maritime intercourse with the West depended on freedom of the Straits; and, above all, of the British, whose historic policy of barring the Straits against Russia had been suddenly exchanged for the exact opposite, "freedom of the Straits." These warring purposes were reflected in the compromise which was struck in the Treaty of Sévres of 1920. Constantinople, with the region surrounding the Sea of Marmora, was restored to Turkey. The Straits themselves were placed under the control of an international commission while the whole region about was demilitarized and all fortifications were ordered destroyed. The sudden appearance and astounding success of the Turkish Nationalists indicated the ephemeral nature of the settlement, for one of the watchwords of the new leaders was the reestablishment of the security of the Straits and the Sea of Marmora. During 1921-23 the matter caused much anxiety to both the British and the French. Military men, Marshal Foch among them, pressed for an Allied or international domination of the gateway, for the disastrous Gallipoli campaign had indicated how

successfully a force on the banks could block the passage of ships. Something of these purposes was written into the first draft treaty at Lausanne, but that document's rejection by the Turkish National Assembly in February, 1923, left the matter still unsolved. Finally, to the completed Treaty of Lausanne of July, 1923, was appended an elaborate convention for the regulation of the Straits in peace and war. Once more a commission was set up under the protection of the League of Nations, this time presided over by a Turk with powers to execute the prescribed regulations for the passage of ships. A demilitarized zone was again mapped out, to include much smaller areas along the shores of the Dardanelles Strait and the Strait of Bosphorus. The Turks were permitted to maintain a garrison at Constantinople, and the free movement of their fleet in Turkish waters was not to be impaired. In time of peace the Straits were to be free for all merchant vessels and for warships; in time of war, Turkey, if a belligerent, was permitted to exclude enemy merchantmen and warships.

DARLING, SAMUEL TAYLOR (1872-). An American physician, parasitologist and authority on tropical medicine, born in Harrison, N. J. He obtained his medical degree at the College of Physicians and Surgeons at Baltimore in 1903 and he was in charge of the laboratory at the Panama Canal during the construction period (1906-14), later accompanying General Gorgas to South Africa. He became a member of the staff of the Rockefeller Foundation in 1915 and was chairman of the expedition to the Far East for the purpose of studying hookworm and malaria; later, he visited Brazil in a similar capacity. He has written many papers on tropical diseases and animal parasites and has published, in collaboration: *Hookworm and Malaria Research in Malaya, Java and the Fiji Islands* (Darling, Barber and Hacker, 1917), and *Studies in Hookworm Infection in Brazil* (Darling and Smillie, 1921).

DARLINGTON, JAMES HENRY (1856-). An American bishop (see VOL. VI). He declined an appointment on the United States Commission to Russia, but became head of the Serbian Relief Fund in the United States. In 1920, he was chairman of the commission to confer with the Eastern Orthodox Churches and the Old Catholics from the Episcopal Church of the United States, which visited Constantinople, Athens and other European capitals for the purpose of making a concordat.

DARLINGTON, URBAN VALENTINE W. (1870-). An American bishop, born in Shelby Co., Ky., and educated at the Kentucky Wesleyan College. In 1896, he was ordained to the ministry of the Methodist Episcopal Church, South, and from that time until 1917 was pastor in various churches in Kentucky and West Virginia. In 1917-18, he was president of the Morris Harvey College in Barboursville, W. Va. In 1918, he was made a bishop of the Methodist Episcopal Church, South.

DARMSTAEDTER, PAUL (1875-). A German historian, born in Berlin. He studied at the universities of Berlin, Munich, Freiburg and Strassburg, and became professor in Göttingen in 1907. His works include *Das Reichsgut in der Lombardei und in Piemont* (1896), *Die Befreiung der Leib eigenen in Savoyen, Schwyz und Lothringen* (1897), and a history

of the United States for Ullstein's *History of the World*. A recent publication was *Geschichte der Aufteilung und Kolonisation Afrikas* (1913-20).

D'ARSONVAL, ARSÈNE. See ARSONVAL, ARSÈNE D'.

DARTMOUTH COLLEGE. A nonsectarian institution at Hanover, N. H., for which an English royal charter was granted in 1769. With the exception of the war years 1917-19, when the number of students registered in the college fell off sharply, Dartmouth grew steadily during the decade from 1913 to 1923-24. During that time the enrollment increased from 1329 to 2065, and two new dormitories, Topliff Hall and Russell Sage Hall, the Steele Chemistry Building, Robinson Hall, headquarters of other than athletic student organizations, the new golf links at Hilton Field, the Spalding Swimming Pool, and the concrete football stand, a memorial to the Dartmouth men who died in the War, were built. From 1916 to 1923-24 the faculty was increased from 123 to 177 and the library from 130,000 to 175,000 volumes. In 1922 a new selective process for admission was adopted. Ernest Martin Hopkins, Litt.D., LL.D., succeeded Ernest Fox Nichols as president in 1916.

DARWINIAN THEORY. See HEREDITY; ZOÖLOGY.

DASKAM, JOSEPHINE DODGE (MRS. SELDEN BACON) (1876-). An American author (see VOL. VI). Her recent works include: *Today's Daughter* (1914); *Open Market* (1915); *When Binks Came; The Memoirs of a Baby* (1920); *Blind Cupid* (1923), and new editions of many of her earlier publications. She is also the compiler of *On Our Hill* (1918), and *Square Peggy* (1919).

DATO ÉIRADIER, EDUARDO (1856-1921). A Spanish jurisconsult and statesman (see VOL. VI). Upon the outbreak of the War, Dato was still in office and Spain's neutrality was a result of his efforts. He was prime minister during the crisis of 1917, and again in 1920-21. He was murdered at Madrid on Mar. 8, 1921.

DAUDET, ERNEST (1837-1921). A French novelist and historian (see VOL. VI). Following are his principal works published since (1914), *Devant la douleur* (1915), *L'entre-deux-guerra—Joseph* (1917); *La Mission du Duc de Saint-Vallier* (1918); *La Mission du Baron de Courcel* (1919); *Soixante années du règne des Romanoff* (1919); *Souvenirs de mon temps* (1st vol., 1921; others to be finished by his son). He died at Petites-Dalles (Seine-Inférieure) on Aug. 20, 1921.

DAUDET, LÉON (1867-). A French novelist and editor, member of the Académie Goncourt (see VOL. VI). Since 1913, he has published *Souvenirs des milieux littéraires, politiques, artistiques et médicaux de 1880 à 1905*, in four series, as follows: *Fantômes et vivants* (1914), *Devant la douleur* (1915), *L'entre-deux-guerra* (1915), *Salons et journaux* (1917). His other works during the decade include: *Hors du jong allemand* (1915); *La vermine du monde* (1916); *Le Bonheur d'être riche* (1917); *Le cœur et l'absence* (1917); *L'hérédité* (1917); *Le poignard dans le dos; notes sur l'affaire Malvy* (1918); *Dans la lumière* (1919); *Suzanne* (1921); and *Le stupide XIXe siècle* (1921); *Les Oeuvres devant les Hommes* (1922); *Sylla et son destin* (1923); *L'Héca-*

tombe (1923). During the War he was prominent in the campaign against defeatism and afterwards was especially conspicuous as head of the Action Française in monarchist agitation.

DAUGHERTY, HARRY MICAJAH (1860-). An American public official, born at Washington Court House, Ohio. He was educated in the public schools and studied law at the University of Michigan. He began practice at Washington Court House in 1881 and in 1893 removed to Columbus, Ohio, where he was in practice from 1902 to 1921. He was active in politics and was one of the leaders responsible for the nomination and election of President Harding, in whose cabinet he became Attorney General in 1921. Prior to that time he had served in the Ohio House of Representatives for two terms. Following the death of President Harding in August, 1923, Mr. Daugherty was retained in office by President Coolidge. Throughout his term of service he had been subject to severe criticism and this culminated in 1922 in an effort to bring impeachment proceedings in the House of Representatives. This failed on the ground that the evidence did not warrant the proceedings. In March, 1923, as a result of charges instigated chiefly by Senator Wheeler of Montana, a committee of the Senate began an investigation into Mr. Daugherty's administration of his office. In spite of great pressure brought to bear upon him, President Coolidge refused to ask for Mr. Daugherty's resignation until the charges had been heard. Following Mr. Daugherty's refusal to furnish certain information to the committee, President Coolidge asked for and received his resignation on Mar. 28, 1924.

DAVENPORT, EUGENE (1856-). An American agriculturist (see VOL. VI). From 1895 to 1922, he was dean of the College of Agriculture at the University of Illinois, and in the latter year was made professor emeritus. Until 1922, he was director of the Agricultural Experiment Station and professor of thrematology at the University of Illinois. He wrote many agricultural bulletins for the experiment stations of Michigan and Illinois.

DAVENPORT, GEORGE WILLIAM (1870-). An American Protestant Episcopal bishop, born at Brandon, Vt. He studied at Hobart College and was graduated from the General Theological Seminary in 1896, in which year he was also ordained to the priesthood. Subsequently he was rector of various churches in the East, until he was consecrated bishop on Sept. 15, 1920, when he went to live at Easton, Md. While in Burlington, he served as provincial secretary of the first province.

DAVIDSON, JO (1883-). An American sculptor born in New York City of Russian parents. He has won fame for his sculptures by the interpretation of the mental and physical in his subjects. His art is expressive of subdued emotion and characterized by massiveness of line. He is essentially sophisticated with a sophistication which does away with poses, attitudes and conventional mannerisms in his portraits. He struck out a line for himself and won recognition in Paris, America and London. Besides his many portraits, Mr. Davidson designed the United States War Industries Badge. He also designed a heroic group for the French government to commemorate the first victory of the Marne.

DAVIDSON COLLEGE. An institution at

Davidson, N. C., founded in 1837. During the years 1914-24 the student body increased from 335 to 575, the teaching staff from 15 to 31, and the productive endowment from \$284,745 to \$630,000. Because of a fire which destroyed 10,000 books, the number of volumes in the library decreased from 23,276 to 21,000. Income increased from \$48,557 to \$206,000. Three large fireproof dormitories housing 340 students were erected at a cost of \$225,000, and a central heating plant, a laundry, and homes for professors were built. Twenty-nine courses were added to the curriculum, and the entrance requirements were raised. President, William J. Martin.

DAVIES, ARTHUR B. (1862-). An American painter (see VOL. VI). In 1916, he was awarded the first W. A. Clark prize and Corcoran gold medal. His manner continued highly individualistic, his rebellion against the existing order still softened by the romantic, mystic atmosphere with which he surrounded his subjects. In his later works, among them "Sea, Wind and Sky," "Strewing Dust," and "Orchard of Pleasant Bounties," something of the mathematical or intellectual appeared to be displacing his earlier instinctive rhythm. By some, his feeling for abstract beauty was felt to be verging on preciosity.

DAVIES, SIR LOUIS HENRY (1845-1924). A Canadian jurist (see VOL. VI). From 1882, he was elected successively in the Dominion House of Commons, and continued a member until his appointment as chief justice of the Supreme Court of Canada in 1918. In the same year, Chief Justice Davies became Deputy Governor-General of Canada.

DAVIES, SIR (HENRY) WALFORD (1869-). A British organist and composer, born at Oswestry, England. He received his first musical education as a chorister in St. George's chapel, Windsor. From 1885 to 1890, he studied organ with Sir W. Parratt, acting frequently as his assistant. In 1890, he won a scholarship at the Royal College of Music, where for four years he studied composition, at the same time holding positions as organist. In 1895, he succeeded Rostro as professor of counterpoint at the Royal College of Music, remaining there till 1919, when he became professor of music at the University of Aberystwyth. He also was conductor of the London Church Choir Association (1901-13) and of the Bach Choir (1903-07). He was knighted in 1922. His works include an oratorio, *The Temple*; three symphonies; two overtures, *Dedication* and *Festal*; two suites for orchestra, *Parthenia* and *Wordsworth*; a *Short Requiem* a cappella; three piano quartets; two string quartets; three violin sonatas; a horn sonata; anthems, songs and part-songs. He also published *Music and Christian Worship* (1913).

DAVIES, WILLIAM HENRY (1870-). A Welsh poet and author, born at Newport. He began life as a picture-frame maker, but after completing his apprenticeship, he tramped through England and America, picking fruit, selling pins and needles, etc., and crossed the ocean several times on cattle boats. His poems include *The Soul's Destroyer* (1907), *Forty New Poems* (1918), *The Hour of Magic and Other Poems* (1922); and his prose works are *The Autobiography of a Super-Tramp* (1908), *Beggars, A Weak Woman, The True Traveler, Nature, and A Poet's Pilgrimage*.

DAVIS, CHARLES HAROLD (1856-). An American painter (see VOL. VI). The change from his earlier tendency to interpret nature in her more sombre moods is to be seen in such later paintings as "The Sunny Hillside," "In Golden Light," and "On the West Wind," where hill and tree, as well as cloud, are used expressively, and a spirit of light and joy predominates.

DAVIS, HARVEY NATHANIEL (1881-). An American physicist, born at Providence, R. I. He was graduated in 1901 at Brown University and received his Ph.D. at Harvard in 1906. He was instructor of physics at Harvard 1905-10, and in 1919, after successive promotions, he became professor of mechanical engineering. He also served with the General Electric Company during 1917-18, in charge of their turbine department; and in 1921 became consulting engineer to the United States Bureau of Mines. During the War, he was associated with the Air Service of the United States Army as a mechanical engineer. His various original investigations have had to do with the thermal properties of matter. He is the author (with L. S. Marks) of *Steam Tables and Diagrams* (1908), and (with N. H. Black) of *Practical Physics for High Schools* (1913).

DAVIS, HENRY WILLIAM CARLESS (1874-). An English historian (see VOL. VI). In 1915, he was a member of the War Trade Intelligence Department, and the following year of the War Trade Advisory Committee. He was made Commander in the Order of the British Empire in 1918. He became director of the *Dictionary of National Biography* (1920), and professor of modern history in the University of Manchester (1921). His works include: *Political Thought of Treitschke* (1914); *Why We Are at War* (in collaboration, 1914); contributions to the *History of the Peace Conference* (ed. Temperley, 1920, etc.) and to *The Encyclopædia Britannica* (12th ed., 1922). He edited *Oxford Pamphlets* (1914-15).

DAVIS, JAMES COX (1867-). An American lawyer, born at Keokuk, Iowa. After passing through the public schools of Keokuk and London, Ont., he was admitted to the bar in 1877 and began practice in Keokuk, where he remained until 1903. He acted as city solicitor of Keokuk, and as mayor. Under the Federal administration of railways, he was general solicitor for the Chicago and Northwestern, and in 1920-21 he was general counsel of the United States Railroad Administration. In the latter year, he was appointed Director-General and Agent of the President in settling controversies arising out of Federal control.

DAVIS, JAMES JOHN (1873-). An American cabinet member, born at Tredegar, South Wales, where he was educated at the public schools. He came to the United States in 1881 and worked in iron mills in Pittsburgh and in Elwood, Ind. From 1898 on, he was active in city and State politics in Indiana and in various fraternal organizations. He was named Secretary of Labor in 1921.

DAVIS, JOHN WILLIAM (1873-). An American lawyer and diplomatist, born at Clarksburg, W. Va., and educated at Washington and Lee University. He was admitted to the bar in 1895, and from 1896 to 1897 was assistant professor of law in Washington and Lee University. During the period 1897-1913, he practiced law at Clarksburg, took an active in-

terest in State and national politics, and was elected to Congress. From 1913 to 1918, he was solicitor-general of the United States, and from the latter year until 1921 he was ambassador to Great Britain. In 1924, he was Democratic nominee for the Presidency. See *UNITED STATES, History*.

DAVIS, KATHERINE BEMENT (1860-). An American sociologist (see VOL. VI). She was appointed, by Mayor Mitchel, Commissioner of Correction of New York City, for the term Jan. 1, 1914, to Dec. 28, 1915. From 1915 to 1917, she was chairman of the Parole Commission. In 1918, she was director of the women's work section of the Social Hygiene Division of the Commission on Training Camp Activities, and in the same year, was appointed general secretary of the Bureau of Social Hygiene.

DAVIS, NORMAN H. (1878-). An American statesman, born in Bedford Co., Tenn., and educated at Vanderbilt University and the University of California. In 1902, he interested himself in the sugar, banking, and other businesses in Cuba. During the War, he was active on various commissions and boards and as special delegate to foreign countries, particularly as regards financial problems. He was financial adviser to the American Peace Delegates in Paris and was a member of the Armistice Commission and of the Supreme Economic Council. In 1919-20, he was Assistant Secretary of the Treasury, and from 1920 to 1921, he was alternately Under Secretary of State and Acting Secretary of State.

DAVIS, OWEN (1874-). An American dramatist born in Portland, Me., who began writing plays in 1898 and has written more than 100 plays produced in New York. Of these about 50 were produced by A. H. Woods and were mostly melodramas. His most recent popular plays were: *The Family Cupboard*; *Sinners*; *Mile a Minute*; *Forever After*; *Opportunity*; *The Detour* (1921); *Icebound* (1922), which was awarded the Pulitzer Prize for the year.

DAVISON, HENRY POMEROY (1867-1922). An American banker born at Troy, Pa., June 13, 1867. After a school education at Greylock Institute, South Williamstown, Mass., he was errand boy in a bank conducted by his uncle at Troy, Pa. He later went to the Astor Place Bank, New York City, remaining there from 1891 to 1894. He became vice-president of the First National Bank in 1902 and afterwards a member of the firm of J. P. Morgan and Company. He was chairman of the executive commission and a director of the Bankers' Trust Company; director of the American Foreign Securities Company; and from 1917 to 1919, he was chairman of the War Council of the American Red Cross, during the time when \$300,000,000 was raised by popular subscription for war sufferers, and he was elected chairman of the governing board of the World League of Red Cross Societies in Paris, May, 1919. He died May 6, 1922.

DAWES, CHARLES GATES (1865-). An American public official (see VOL. VI). In 1917, he was in France on General Pershing's administrative staff. He was chairman of the general purchasing board, and also general purchasing agent for the United States Army in France. In 1919, he returned to the United States, and in 1921 was appointed by the President as director of the newly created Bureau

of the Budget, and organized the first budget of the United States government. On July 8, 1922, he retired from the Budget Bureau, and in November of the same year was elected director of the Chicago and Great Western Railway Company. At the beginning of 1924, General Dawes was appointed chairman of a group of experts to ascertain Germany's capacity to pay reparations for the losses caused by the War. This Reparations Commission arrived in Berlin on Jan. 30, 1924, and submitted a report on Apr. 9, 1924. The report was favorably received in practically all the Allied and neutral countries, and even Germany was not wholly hostile to its provisions. On June 12, 1924, General Dawes was nominated for vice-president of the United States by the Republican party in convention at Cleveland, Ohio.

DAWES REPORT. See REPARATIONS.

DAWSON, ALEC JOHN (1872-). An English novelist (see VOL. VI). He served throughout the War (1914-19), and was awarded the Croix de Guerre with Palm, and was made a member of the Order of the British Empire. He entered the service in 1914 as temporary lieutenant, was advanced to the rank of captain the following year, and thereafter was attached to other branches of the service, including the Military Intelligence Staff of the War Office, and the Air Intelligence Staff. In 1918, he joined the Royal Air Force, becoming major the same year. In 1919-21, he was director of information to the Government of Bombay. He is author of: *How to Help Lord Kitchener* (1914); *Somme Battle Stories* (1916); *Back to Blighty* (1917); *For France* (1917), and *Everybody's Dog Book* (1922).

DAWSON, CONINGSBY (WILLIAM) (1883-). An Anglo-American author (see VOL. VI). He joined the Canadian Army at the front in 1916, and continued in service until the end of the War. After having been wounded, he came twice to the United States (1917, 1918) on lecture tours. In 1918, he investigated, for the British Ministry of Information, American military preparedness in France. In 1919, he went to England to study European reconstruction problems, and subsequently lectured on the subject of the United States. He also visited and reported on the devastated regions of Central and Eastern Europe at the request of Herbert Hoover. His recent works include: *Florence on a Certain Night* (1914); *The Raft* (1914); *Slaves of Freedom* (1916); *The Seventh Christmas* (1917, 1921); *Carry On* (1917); *The Glory of the Trenches* (1918); *Out To Win* (1918); *Living Bayonets* (1919); *The Test of Scarlet* (1919); *The Little House* (1920); *It Might Have Happened to You* (1921); *The Kingdom Round the Corner* (1921, 1923), and *Christmas Outside Eden* (1922). He also edited, with W. J. Dawson (q.v.), *Best Short Stories* (1923).

DAWSON, MILES MENANDER (1863-). An American lawyer (see VOL. VI). He was adviser to the Governor of New York and the commission regarding workmen's compensation in 1914. He was special counsel for the United States in the tax litigation in 1915 and 1917. In 1917 and 1921 he was adviser to the War Risk Bureau, and in 1918-19, special attorney examiner for the United States Shipping Board Emergency Fleet Corporation. In the latter year, he was also counsel and actuary for the commission to investigate the New York State

Insurance Fund. He is the author of *The Ethics of Confucius* (1915), and the translator of *Brand*, a poetical tragedy, by Henrik Ibsen (1916).

DAWSON, WILLIAM JAMES (1854-). An English clergyman and author (see VOL. VI). He is the author of: *Robert Shenstone* (novel, 1917); *The Father of a Soldier* (1917); *The War Eagle* (1918); *Chalmers Comes Back* (1919), and *The Borrowdale Tragedy* (1920). He edited, with Coningsby Dawson (q.v.), *Best Short Stories* (1923).

DAY, CLIVE (1871-). An American university professor (see VOL. VI). He was chief of the Balkan Division of the American Commission to Negotiate Peace (Paris, 1918-19). He published a revised and enlarged edition of his *History of Commerce* (1922) and *The Question of the Balkans*, a brochure, (1920).

DAY, HOLMAN FRANCIS (1865-). An American author (see VOL. VI). Among his later works are: *The Landloper* (1915); *Along Came Ruth* (play produced in New York, 1914); *Blow the Man Down* (1916); *Where Your Treasure Is* (1917); *Kavanagh's Clare* (1917); *The Rider of the King Log* (1919); *When Egypt Went Broke* (1920); *All Wool Morrison* (1921).

DAY, JAMES ROSCOE (1845-1923). An American educator (see VOL. VI). In 1922, he became chancellor emeritus of Syracuse University. He was famous as a defender of "big business." During and after the War he criticized the Wilson administration and the League of Nations unsparingly. He published *My Neighbor the Workingman*, and at the time of his death was about to start on an autobiography. He died at Atlantic City on Jan. 13, 1923.

DAYTON. A city of Ohio. The population rose from 116,577 in 1910 to 152,559 in 1920, and to 165,530, by estimate of the Bureau of the Census, for 1923. A flood prevention works, which was considered one of the world's greatest engineering projects, was begun immediately after the flood of 1913 and completed in 1923, at a cost of \$35,000,000. Five aviation fields were established at and near Dayton, which came to the fore as a centre of aviation. The United States government aviation experiment laboratories were located at McCook Field, and a supply dépôt and airplane manufacturing plant at Wilbur Wright Field, which was expanded to 5000 acres by a gift of the people of Dayton to the government. Early in 1924 a city planning and zoning commission was appointed.

DEALEY, JAMES QUAYLE (1861-). An American university professor (see VOL. VI). He was president of the American Sociological Association in 1920, and in 1921 went to China as exchange professor and lecturer. He is author of *The Growth of State Constitutions* (1915); *Sociology—Its Development and Applications* (1920); and *State and Government* (1921).

DEAN, ARTHUR LYMAN (1878-). An American chemist, born at Southwick, Mass. He was graduated at Harvard in 1900 and received his Ph.D. from Yale in 1902. During 1902-07, he taught plant physiology at Sheffield Scientific School, Yale, and was also a Carnegie research assistant during 1904-05 as well as chief of the section of wood chemistry

in the United States Forest Service during 1905-07. He had charge of the chemical laboratory of A. D. Little in Boston during 1907-08, but at the close of the year returned to the Sheffield Scientific School, being assistant professor until 1914 when he was called to the presidency of the University of Hawaii in Honolulu. His original investigations have included studies on inulin, proteolytic enzymes, creosote oils, and chaulmoogra oil in treatment of leprosy, on all of which he has published valuable papers.

DEARBORN, GEORGE VAN NESS (1869-). An American psychologist and surgeon, born at Nashua, N. H. He was educated at Dartmouth College and received his medical degree from the College of Physicians and Surgeons, Columbia University, in 1893. He then devoted himself to graduate study in psychology at Harvard and Columbia Universities, and following his doctorate he became a professor of psychology and education. The greater part of his career was spent at the Sargent Normal School, Cambridge, Mass. Besides various contributions to professional journals, he is the author of a number of books on psychology and hygiene, the more important of which are the following: *The Emotion of Joy* (1899); *Textbook of Human Physiology* (1908); *Motor-Sensory Development* (1910), and *Physiology and Hygiene* (1921).

DEARBORN, WALTER FENNO (1878-). An American psychologist and educator born at Marblehead, Mass. He was educated at Wesleyan and Columbia Universities, receiving his degree of Ph.D. from the latter institution in 1905. He pursued medical studies in German at the University of Munich. He taught educational psychology at the University of Wisconsin, and in 1909 was called to the faculty of Harvard University. One of the leading authorities in educational psychology, Professor Dearborn has contributed numerous papers on the psychology of reading, the practice experiment in learning, intelligence tests, mental hygiene, and school training.

DEATH. See ZOOLOGY.

DEAVER, JOHN BLAIR (1855-). An American surgeon, who received his medical degree from the University of Pennsylvania in 1878, and after holding several other teaching and hospital positions was appointed Barton professor of surgery in his alma mater and chief surgeon to the University Hospital. His major publications include: *Treatise on Appendicitis* (1896), which was expanded in its fourth edition (1913); *Surgical Anatomy*, 3 vols. (1889-93); *Enlargement of the Prostate* (1905); *Surgery of the Upper Abdomen*, in collaboration with Ashhurst, 2 vols. (1909, 1913); *Surgical Anatomy of the Head and Neck* (1912); *The Breast*, in collaboration with McFarland (1917); *Excursions into Surgical Subjects*, with Reimann (1923).

DE BLOIS, AUSTEN KENNEDY (1866-). A Canadian clergyman, born at Wolfville, N. S., educated at Brown University, and at Berlin and Leipzig, Germany. He became president of Shurtleff College, Alton, Ill., in 1894. During 1900-01, he traveled in Europe and Africa, and on returning to the United States became pastor of several Baptist churches successively. He wrote: *Bible Study in American Colleges* (1899); *The Pioneer School* (1900); *Imperialism and Democracy* (1901); *History of the*

First Baptist Church in Boston, 1665-1915 (1916); *Life of John Mason Peck, Prophet of the Prairies* (1917); *The Message of Wisdom: Studies in the Book of Proverbs* (1920).

DEBS, EUGENE VICTOR (1855-). An American labor organizer (see VOL. VI). He was convicted of violation of the espionage act in September, 1918, and was sentenced to 10 years' imprisonment in the penitentiary. The decision was sustained by the Supreme Court of the United States on Mar. 10, 1919, and he went to prison on Apr. 13, 1919. He was pardoned by President Harding on Dec. 24, 1921, but his political rights were not restored.

DEBT, PUBLIC. See FINANCE AND BANKING.

DEFLECTION. See AGRICULTURE.

DE FOREST, LEE (1873-). An American inventor (see VOL. VI). In 1915, he was awarded a gold medal by the San Francisco Exposition for radio telephone. In 1919, he had taken out over 120 patents on radio devices, the most important being the "Audion," a detector, oscillator and amplifier which made possible telephone service both by wire and wireless across the continent.

DEISSMANN, GUSTAV ADOLF (1866-). A German New Testament scholar, professor at the University of Berlin, *Geheimkonsistorialrat* (1916-), member of the Brandenburg Provincial Synod and of the Prussian General Synod from 1914 on (see VOL. VI). He delivered a course of lectures for the clergymen in 1916-17 in Warsaw, Vilna, and Brussels. In 1918, he was for the second time Olaus-Petri Lecturer at the University of Upsala, and the following year became a member of the German Evangelical Synod in Dresden. His works published since 1913 include: *Der Lehrstoff für Religionsgeschichte* (1914); *Der Krieg und die Religion* (1914); *Deutscher Schwertsegen* (1915, 28th ed., 1916); *Inneres Aufgebot* (1st to 3d ed., 1915); *Evangelischer Wochenbrief* (1914-21).

DELACHENAL, JEAN PIERRE FRANÇOIS ROLAND (1854-1923). A French historian. He was born at Lyons, Apr. 5, 1854, and entered in 1879 the French palæographic institute, the Ecole des Chartes. In 1885, he published a learned *Histoire des Avocats du Parlement de Paris*. His monumental work on Charles V occupied 25 years of labor; three volumes were published from 1897 to 1916, and at his death two additional volumes remained unpublished. Delachenal was also the author of the *Grandes Chroniques de France* (1910-1916-1920). A member of the Academy of Inscriptions (1920), Delachenal was affiliated with a number of learned bodies, including the French historical society and the Royal Society of England, of which he was a foreign correspondent. He died in Paris on Jan. 31, 1923.

DELAGOA BAY. See PORTUGUESE EAST AFRICA.

DE LA GORCE, PIERRE-FRANÇOIS-GUSTAVE (1846-). A French historian, born at Vannes and educated at the Institution Saint Jean (Douai) and the University of Paris. He began his career in 1872, at Rocroi, as *juge suppléant*, and held positions subsequently at various places, but he resigned in 1880, finding that he could not follow his conscience in judging cases. He then practiced law for several years, but finally gave that up, too, and devoted himself thereafter to historical studies. In 1895, he was awarded the *prix Alfred Née* by

the French Academy, and in 1900 the *grand prix Gobert*. In 1907, he was admitted to the *Académie des Sciences Morales et Politiques*, and in 1914 was elected to the French Academy, being received in 1917. He belongs to the "classic" school of historians, that is, his writings, while based on solid study, are not annotated. They are literary, and he does not hesitate to express personal opinions. He writes from the point of view of a Roman Catholic and a conservative. His works include, besides contributions to periodicals: *Histoire de la seconde République française*, 2 vols. (1887); *Histoire du second Empire*, 7 vols. (1894-1905); *Histoire religieuse de la Révolution française*, vols. i and ii (1909-12).

DELAND, MARGARET WADE (1857-). An American author (see VOL. VI). She is the author of: *The Hands of Esau* (1914); *Around Old Chester* (1915); *The Rising Tide* (1916, 1918); *Old Chester Tales* (1919. Introduction by Vida D. Scudder); *Promises of Alice* (1919); *Small Things* (1919); *Old Chester Secret* (1920); *The Vehement Flame* (1922).

DELANO, EDITH BARNARD (?-). An American author, born at Washington. She wrote: *Zebedee V* (1912); *The Land of Content* (1913); *The Colonel's Experiment* (1913); *Rags* (1915); *The White Pearl* (1916); *June* (1916); *To-morrow Morning* (1917); *Two Alike* (1918). She also wrote feature photoplays, and contributed to many magazines.

DELANO, FREDERIC ADRIAN (1863-). An American railroad president (see VOL. VI). He was appointed by President Wilson to the Federal Reserve Board in 1914, but resigned in June, 1918, to join the army. He was commissioned major of the Engineering Corps and assigned to the staff of General Atterbury, director general of transportation at Tours, France. He was promoted to be colonel of the transportation corps in May, 1919, and discharged on Oct. 25, 1919. He was appointed receiver for the Supreme Court of the United States in the Red River Boundary Case.

DELANO, LYMAN (1883-). An American railway official, born in Newburgh, N. Y. He graduated from Harvard in 1906, and began his railway career in 1909 with the A. C. L. R.R., eventually becoming the executive vice-president. He was an official and director in many other railroads and terminal companies. During the period of the War, he was Federal manager for the A. C. L. and other railroads.

DELANO, WILLIAM ADAMS (1874-). An American architect, born in New York City and educated at Yale University and at the Ecole des Beaux Arts in Paris. He began practice in New York in 1903, and from that time until 1910 was professor of design in Columbia University. He collaborated on the plans for the Knickerbocker, Colony and India House club buildings in New York.

DELAWARE. Delaware is the forty-seventh of the United States in size, 2370 square miles, and the forty-sixth in population; capital, Dover. The total population increased from 202,322 in 1910 to 223,003 in 1920, a gain of 10.2 per cent. The white population rose from 171,102 to 192,615, while the number of negroes fell from 31,181 to 30,335. The native white population increased from 153,682 to 172,805; the foreign-born whites from 17,420 to 19,810. The urban population grew from 97,085 to 120,767, while the rural population decreased from 105,-

237 to 102,236. The only large city in the State is Wilmington (q.v.), with a population of 110,168 in 1920 as compared with 87,411 in 1910.

Agriculture. While the population of the State showed an increase of 10.2 per cent in the decade 1910-20, the number of farms decreased 6.4 per cent, from 10,836 to 10,140, and the acreage from 1,038,866 to 944,511. The total value of farm property showed an apparent increase from \$63,179,201 to \$80,137,614, and the average value per farm from \$5830 to \$7903. In interpreting statements of comparative values for the decade 1914-24, the inflation of currency in the latter part of the period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of land used for agricultural purposes in 1920 was 75.1, compared with 82.6 in 1910. The percentage of improved farm land increased from 68.7 to 69.1. Of the total of 10,140 farms in 1920, 6010 were worked by owners, compared with 6178 in 1910; 144 by managers, compared with 123; 3986 by tenants, compared with 4535. The white farmers in 1920 numbered 9268, compared with 9914 in 1910; native-born white, 8905, compared with 9504; foreign-born white, 363, compared with 410; Negro, 872, compared with 922. The total number of dairy cows in 1920 was 37,878; 35,708 in 1910. The number of sheep decreased from 4415 to 3220. The estimated production of the chief farm crops in 1923 was: corn, 6143 bushels; wheat, 1,908,000; oats, 176,000; potatoes, 724,000; sweet potatoes, 934,000; and hay, 82,000 tons. Comparative figures for 1913 are: corn, 6,206,000 bushels; wheat, 1,638,000; oats, 122,000; potatoes, 957,000; and hay, 94,000 tons. In 1923, the apple and peach crops were estimated at 859,000 and 203,000 bushels, respectively.

Mining. Delaware has no important mineral resources. Those produced include clay products, sand, gravel, and stone, to a total value between \$350,000 and \$400,000 per year. In 1921 the figure was \$379,785, compared with \$288,516 in 1914.

Manufactures. Delaware is not an important industrial State. The only city of more than 10,000 inhabitants is Wilmington, and the industries of the State are to a large extent concentrated here. This city had 73.3 per cent of the value of manufactured products in 1919. In 1909 there were 726 manufacturing establishments; in 1914, 808; and in 1919, 668. Persons engaged in manufacture in 1909 numbered 23,984; in 1914, 25,533, and in 1919, 32,972. The capital invested increased from \$60,905,671 in 1909 to \$69,323,927 in 1914, and \$148,207,598 in 1919. The total value of products apparently increased from \$52,839,619 in 1909 to \$56,034,966 in 1914, and \$165,073,009 in 1919; but this abnormal increase is due largely to the change in industrial conditions caused by the War, and these figures cannot be used to measure the growth of manufactures between the industrial census of 1914 and 1919. It will be noted that the number of establishments decreased to a large extent in 1919. The most important industries in point of value of products are those connected with the manufacture and tanning of leather. These were valued at \$12,079,000 in 1909; \$9,183,000 in 1914; and \$50,138,000 in 1919. Pulp goods rank second, with a product valued at \$1,032,000 in 1909;

1914, \$2,145,000; and 1919, \$9,385,000. Car construction and repair products in 1909 were valued at \$3,251,000; 1914, \$3,551,000, and 1919, \$7,687,000; and the products of iron and steel, steel work and rolling mills in 1909 at \$1,715,000; in 1914, \$1,669,000; in 1919, \$7,115,000. Wilmington had, in 1909, 261 establishments, with a product valued at \$38,069,000; 1914, 319, with a product of \$39,403,000; and in 1919, 262, with a product of \$121,040,000.

Education. The development of education in Delaware in the decade 1913-23 was slow but steady. As in other southern States the mixture of whites and Negroes in the population adds to the difficulty of educational advancement. In 1919 a new school code was put into effect. A school law, passed by the legislature in 1920 and modified by the Legislature of 1921, provided for a bi-partisan State Board of Education; for improved methods for raising funds for school purposes; consolidation of school districts by referendum vote of the districts involved; continuation of vocational training in agriculture and home economics, and State support of high schools. Sixty scholarships for the training of teachers in the University of Delaware were provided in 1919 by Pierre S. Du Pont and other members of the Du Pont family. The period showed great improvement in the supervision of rural schools and in the provision of industrial training in the colored schools. The enrollment in the public schools increased from 36,000 in 1913 to 39,000 in 1921-22. In the elementary white schools in the latter year 28,278 were enrolled, and in the white high schools 4479, a total of 32,757. In the colored elementary schools 6227 were enrolled; in the colored high schools, 158. The total expenditure for public schools for the year ending June 20, 1922, was \$2,189,032, of which \$1,338,149 was paid to special districts and the remainder expended by the State Board of Education. The percentage of illiteracy in Delaware decreased from 10 in 1910 to 7.4 in 1920; among the native whites, from 4.2 to 2.6; among the foreign-born whites, from 19.7 to 18.2; and among the Negroes, from 32.9 to 24.6.

Finance. For finance, see STATE FINANCES.

Political and Other Events. Political control in Delaware, in the decade 1914-24, fluctuated between the Republican and Democratic parties. In 1914 elections were held for a representative in Congress and for State Treasurer and Auditor. A Republican candidate for the House of Representatives, Thomas W. Miller, was elected. Great industrial prosperity was brought about by the War. Some of the largest ammunition factories in America are located in the State; they received large orders from the warring countries. Several serious explosions occurred in ammunition factories during 1915. In 1916 Josiah Wolcott, Democratic candidate, was elected to the United States Senate, defeating Senator Du Pont, while John G. Townsend, Republican candidate for governor, was elected. In the presidential election of this year Charles E. Hughes received 26,011 votes; Woodrow Wilson, 24,753. In 1918 no elections for State officers were held; L. Heisler Ball, Republican, was elected Senator. Elections were held in 1920 for governor and other State officers. William D. Denny, Republican, won the governorship. In the presidential election of this year Warren G. Harding received 52,858 votes and James M. Cox, 39,897. In 1922,

Thomas F. Bayard, Democrat, was elected to the United States Senate, defeating Henry A. Du Pont.

Legislation. The most important activities of the State Legislature, which meets biennially, were as follows during the decade 1914-1924. In 1915 an agricultural commission was created. In 1917 the laws relating to the administration of the State government were amended, and so were the child labor laws. A workmen's compensation act was passed, and measures were enacted looking toward the prevention of monopolies and unfair discrimination in the buying and selling of commodities. A commission was appointed to study the educational system of the State and make recommendations for necessary changes. The Legislature of 1919 created a banking department, passed several new school laws, and amended the criminal law of the State. In 1921 the Legislature imposed an income tax for school purposes, amended the law in respect to alien land ownership, provided a tax on shares of banking corporations, established a child welfare commission, amended the laws relating to compulsory school attendance, and adopted legislation for carrying out the educational programme of 1920. This work for education by the Legislature was greatly augmented by gifts worth millions of dollars from Pierre S. Du Pont in university, high school, and graded school buildings and equipment.

DELBET, PIERRE LOUIS ERNEST (1861-). One of the leading surgeons of France. His chief hospital connection was with the Hotel-Dieu, and his principal works are: *Du traitement des aneurysmes externes* (1889); *Des supurations pelviennes chez la femme* (1891); *Leçons de clinique chirurgicale faites à l'Hotel-Dieu* (1899); *Grands procès morbides* (1907); *Méthode de traitement des fractures* (1916). In collaboration, he published: *Affections chirurgicales des artères* (1911, with Moquot); *Maladies de l'anus et du rectum* (1916, with Brechet); *Biologie de la plaie de guerre* (1918, with Fieissinger); *Nouveau traité de chirurgie*, with Le Dentu, which came out serially, the first volume in 1907.

DELBRÜCK, HANS D. L. (1848-). Professor of history at the University of Berlin, *Geheimregierungsrat* (see Vol. VI). In 1920, he became a member of the Historical Committee for the Imperial Archives. His works published since 1913 include: *Regierung und Volkswille* (1914, 1920); *Bismarcks Erbe* (1915); *Krieg und Politik*, 3 vols. (1919); *Geschichte der Kriegskunst*, 4th vol. (1920); *Kautsky und Harden* (1920); *Ludendorff, Tirpitz, Falckenhagen* (1920); *Ludendorffs Selbstporträt* (1922).

DELCASSÉ, THÉOPHILE (1852-1923). A French statesman. In 1913-14 he served as Ambassador at Petrograd, and from 1914 to 1915 was Minister of Foreign Affairs. He had previously served in this capacity in 1912. He was recognized as one of the most eminent of French statesmen, and was best known as the founder of the Entente.

DELITZSCH, FRIEDRICH (1850-). A German Assyriologist (see Vol. VI) professor at the University of Berlin, member of the Akademie der Wissenschaften. His works published since 1913 include: *Sumerische Grammatik* (1914); *Sumerisches Glossar* (1914); *Die Grosse Täuschung* (1920; Part 2, 1921,

1922); *Les-und Schreibfehler im Alten Testament* (1920).

DELL, FLOYD (1887-). An American novelist and critic, born at Barry, Ill. He entered the field of journalism at the age of 18 and in six years was the literary editor of the *Chicago Evening Post*. In 1914, he went to New York to associate himself with Max Eastman in the publication of *The Masses*, a periodical with a radical economic policy and an excellent literary department. Early attempts at writing did not reveal his true métier, but the publication of his novel *Mooncalf* (1920) proved him a fictionist of the highest rank. He followed the success of this work with *The Briary-Bush* (1921). These together made a full-length portrait of the American youth of the period: ambitious, curious, aesthetically-minded, but thwarted by the hostility of his environment and his own sentimental heritage. *Janet March* (1923) was a less successful attempt to do the same thing for the young American woman. Other books included: *Were You Ever a Child?* (1919); *Looking at Life* (1924).

DELORME, EDMOND (1847-). A French surgeon, surgeon-general of France before and during the recent War. Many years before the outbreak of hostilities he published his great work *Traité de chirurgie de guerre* in two volumes (1888-1893). When war was declared in 1914, he promptly issued his manual, *Précis de chirurgie de guerre*, which was translated into English for the British Army in 1915. In the midst of the War, he published *Chirurgie de guerre—fractures* (1917); and at the close of the War, *Les enseignements chirurgicaux de la grand guerre* (1919).

DEMILLE, CECIL B(LOUNT) (1881-). An American actor and motion-picture producer, educated at the Pennsylvania Military College and the American Academy of Dramatic Arts. After being successively playwright, actor and theatrical producer, after 1914 he devoted himself entirely to production for the moving pictures. His best work includes: *Girl of the Golden West*; *The Warrens of Virginia*; *Carmen*; *Joan of Arc*; *The Dream Girl*; *The Woman God Forgot*; *The Devil Stone*; *The Whispering Chorus*; *Don't Change Your Husband*; *For Better, For Worse*; *Male and Female*; *Why Change Your Wife*; *Something to Think About*; *The Affairs of Anatol*; *Fool's Paradise*; *Manslaughter*; *The Ten Commandments*, and *Triumph*.

DE MORGAN, WILLIAM FRENCH (1839-1917). An English novelist (see Vol. VI). *The Old Madhouse* was published posthumously in 1919, and *The Old Man's Youth*, De Morgan's incomplete novel, was published, with additions by his widow, in 1921.

DEMPSEY, JACK (1896-). World's heavyweight boxing champion, born as William Harrison at Manassa, Colo. He began his pugilistic career in 1915 and four years later defeated Jess Willard for the world's title at Toledo, Ohio. He has since successfully defended his laurels against many aspirers to the pugilistic throne, including Georges Carpentier, Tom Gibbons and Luis Firpo. He knocked out Carpentier in the fourth round of a scheduled 15-round bout at Boyle's Thirty Acres, New Jersey, in 1921 and won on a decision from Gibbons at Shelby, Montana, in 1923. His most spectacular battle was with Firpo at the Polo Grounds, New York City, which also oc-

curred in 1923, Dempsey winning by a knockout in the second round after having been knocked from the ring himself by his opponent in the first round.

DE MUYSER, ERNEST (?-). A Belgian airman, contestant for the Gordon Bennett International Balloon Cup for several years. He won the Balloon race and the Cup in 1922 and again in 1923.

DENBY, EDWIN (1870-). An American lawyer, born at Evansville, Ind. As a boy he went to Pekin with his father, then minister to China, and served in the Maritime Customs Service during 1887-94. He then returned to the United States, was graduated in law at the University of Michigan in 1896, and was admitted to practice in the same year. In 1903, he was a member of the Michigan House of Representatives, then was elected from the First Michigan District to Congress, serving during 1905-11. During the war with Spain, he was a gunner's mate on the *Yosemite*, and when the United States entered the recent war, he enlisted as a private in the United States Marine Corps, becoming a major on the Reserves' list in that corps. By appointment of President Harding, he became Secretary of the Navy in March, 1921, but in response to a request from Congress to President Coolidge, he resigned from his office in March, 1924, and returned to Detroit, where he resumed the practice of his profession.

DENGEL, PHILIPP IGNAZ (1874-). German philosopher and professor of general history at the University of Innsbruck. He was born at Elbigenalp in the Tirol, and studied at the universities of Innsbruck and Berlin. He was elected member of the Austrian Historical Institute of Rome and specialized on Italian history and politics. His principal works are: *Geschichte des Palazzo di San Marco in Rom bekannt als Palazzo di Venezia* (1909); *Die verschollene Mappa mundi im Palazzo di Venezia* (1912); *Der italienische Irredentismus* (1912); *Palast und Basilica di San Marco* (1913); *Die Südgrenze Deutsch-Tirols* (1919); *Italien auf falschem Wege* (1919); *Südtirol im Lichte des italienischen Irredentismus, Nationalismus und Imperialismus* (1919).

DENIKIN, ANTON (1872-). A Russian soldier. After years of service in the Russian armies, he was Chief of the General Staff under Generals Alexeiev and Brussilov during the War. Following the Russian revolution, he was placed in command of the western front, succeeding General Gourko in June, 1917. He was commander of the southwestern front during the advance of General Kornilov against Kerensky, in September, 1917, and following the death of the latter took command of the volunteer force, which in Mar. 26, 1918, captured Kuban. He assembled an army against the Soviet government, which included about 100,000 men. In February, 1919, he took the offensive, and by November had established a fighting front from which he advanced a considerable distance in the interior of Russia. In February, 1920, he was completely defeated by the Soviet army and his forces were dispersed.

DENIS, MAURICE (1870-). A French painter born at Granville, Manche, who was to become one of the so-called Symbolists. He studied at the Ecole des Beaux Arts and was strongly influenced by Paul Serusier, who favored synthesis and the use of form and color

to express subjective states of mind. He was also one with the Rose Croix group who favored idealist decorative art rather than realism. In 1894, a visit to Italy impressed him with the value of Italian quattrocento art and influenced his work to a large extent. He found the subjects for most of his important murals in religious pieces and classical mythology. Besides murals, he has executed many easel pictures and has illustrated books and contributed to art reviews. In 1902, he was made a full member of the Société Nationale and in 1910 he became Chevalier de la Légion d'Honneur. His most important pieces have been exhibited at the Salon des Indépendents and the Salon d'Automne, and he is also represented in the Luxembourg, Paris.

DENISON UNIVERSITY. A coeducational Baptist institution founded in 1830 at Granville, Ohio. The student enrollment increased from 575 in 1914 to 978 in 1924, and the number of members in the faculty from 43 to 69. The productive endowment in 1924 amounted to \$2,250,000. Marsh Hall, which was partially destroyed by fire in 1918, was fully reconstructed; Swasey Chapel, seating 1300, was partly built in 1924, and funds were in hand for the construction of the Helen Arnett Whistler Memorial Hospital. Col. Edward A. Deeds gave a large tract of land to enlarge the campus and built the Deeds athletic field with its concrete stadium seating 6000 persons and field house equipped with dressing rooms, showers, etc. President, Clark W. Chamberlain, Ph.D., LL.D.

DENMARK. The smallest of the Scandinavian countries, whose area, by the accession of North Schleswig (q.v.) in 1920, was increased to 16,604 square miles, and whose population, by the census of Feb. 1, 1921, was 3,267,831. The increase in population over the last census period was distributed evenly between the rural and urban centres. The population of the capital, Copenhagen, was 561,344, in 1921. Other large towns are Aarhus, 74,256; Odense, 49,469; Aalborg, 71,613; Horsens, 27,588; and Randers, 26,495. The population growth was

dependent on its export trade in dairy products and pork particularly. After the War recovery was rapid, though no advance was discernible up to 1924 over the pre-war years. In 1922 there were 575,773 horses, 2,525,348 cattle, 441,875 sheep, 1,899,019 swine, and 19,100,000 hens; in 1910, 535,018 horses, 2,253,982 cattle, 726,829 sheep, 1,467,822 swine, and about 15,000,000 hens. In 1922, 237,180 acres were under wheat, 546,660 rye, 666,217 barley, 1,117,902 oats, and 204,206 potatoes. Though harvests were large, the drop in prices following the depression of 1921 reacted unfavorably on every branch of industry. Grains were selling in December, 1922, for 50 per cent less than the December, 1920, figures. The same drop was to be traced all along the line.

Industry. Small plants were the rule. In 1914 factories numbered 82,442; in 1906, 85,242. Here were employed in 1912 346,000 hands; in 1906, 317,086. Because of the demands of belligerents during the War, manufacturing activity increased considerably, but the world-wide depression of 1921 brought the country back to its pre-war status. The production of margarine, one of the most important industries, increased somewhat; in 1921 the output was 55,740 tons, compared with a 1911 output of 35,400 tons.

Commerce. The trade record for typical years follows, in millions of kroner; value, \$268:

Year	Imports	Exports	Average exchange rate
1914	795	867	\$0.2625
1917	1,082	1,065	.2959
1920	3,142	1,814	.1577
1921	1,697	1,564	.1779
1922	1,448	1,173	.2095

In 1922, animals to the value of 47,270,000 kroner were exported; provisions to the value of 917,439,000 kroner; and cereals to the value of 370,000 kroner. Exports and imports by countries for typical years, in thousands of kroner, were:

IMPORTS				EXPORTS			
Country	1912	1920	1921	Country	1912	1920	1921
United Kingdom	135,887	887,549	305,360	United Kingdom	37,312	671,981	825,552
Germany	314,246	532,219	461,748	Germany	181,646	326,471	211,187
Sweden	69,060	189,904	97,989	Sweden	38,352	858,270	139,351
Russia	56,175			Russia	16,347		
United States	58,838	753,666	342,597	United States	10,568	90,719	42,761

about 1 per cent annually. Emigration was chiefly to the United States, 6300, in 1920; in 1921, 5309; in 1922, 4300. The pre-war yearly average was 9000. North Schleswig has an area of 1538 square miles and a population of 164,500. The Faeroe Islands count 21,364 inhabitants and an area of 540 square miles.

Agriculture. A movement from the land to the cities was shown in Denmark, the tillers of the soil dropping from 40 per cent of the total population in 1900 to less than 35 per cent in 1921. The movement toward the creation of small holdings continued; the law of 1919, in particular, aimed at the parcelling up of large estates held in entail. Intensive cultivation and dairy farming made continued headway through the initiative of the cooperative societies. The War of course dealt Denmark's agriculture a severe blow, for its prosperity was

In March, 1923, 2082 vessels of 1,070,218 tons were flying the Danish flag; 628 of these were steamers. During the War official figures put the shipping losses due to submarine attacks and mines at almost 150 ships, of 230,000 tons. In 1920, 23,038 vessels of 3,269,268 tons entered Danish ports and 23,944 vessels of 1,030,954 tons cleared. A sign of renewed activity was the fact that in 1922, 13,700 vessels of 3,850,000 tons entered Copenhagen alone. Important maritime activities included the opening of the Odense Canal in 1921 and the commencement in 1922 of the Drogden, a channel for larger ships between the North Sea and the Baltic.

Communications. At the end of 1920 the country had 4713 miles of road, with 23,654 miles of by-ways. Railways totaled 2662 miles. The length of state telegraph lines was 9531 miles. By means of radio-telegraph stations at

Lyngby, Blaavand, Copenhagen, and Amager, Denmark is in touch with ships at sea and with the United States.

Finance. The 1923-24 budget carried 399,900,680 kroner for revenue and 362,147,031 kroner for expenditure. Of the latter, 53,397,554 kroner went toward meeting the interest and expenses on the state debt. In 1922 the total debt stood at 1,235,317,000 kroner; the 1913 figure was 348,040,923 kroner.

History. The cost of living as measured by retail prices gradually rose so that in 1921 it more than doubled that of the last pre-war year. Based on prices for 1913 considered as 100, the index number for October, 1920, reached 403, but by October of the next year it had fallen back to 202. Wages, too, kept pace with prices up to 1921. The high degree of organization of both employers and employees in industry, about 280,000 workers belonging to the Combined Trade Unions made up of factory and agricultural workers, accounted for the marked stability. In the years following the War considerable unrest appeared among the transport workers, but this abated after 1921. Denmark followed in the wake of other countries of northern Europe in establishing elaborate agencies for social insurance in industry. Illness and unemployment pensions and old-age pensions were either in whole or in part state aided. The budget of 1923 carried 15,346,000 kroner for pension charges alone. A comprehensive compensation act was passed in 1916. The state contributed to the unemployment fund of the trade unions.

During the War, because of her proximity to the belligerents, Denmark's position was precarious. Early in August, 1914, it was found necessary to fix prices and regulate exports to prove the country's desire for a real neutrality. In the War atmosphere parties quickly came to terms, and the revision to the constitution which had long been agitated was agreed on. On June 5, 1915, the new constitution was signed by the King, and amendments were promulgated on Sept. 10, 1920. Voting is universal; proportional representation is employed; and the King may not declare war without the consent of Parliament. The sovereign power is vested in the King through his ministers.

The tightening of the submarine campaign in 1917 brought renewed hardships to the Danish population. Rationing was resorted to, and state and local agencies contributed extensively to poor and unemployment relief. Large sums had to be spent on military defense as well. The result was that the government was compelled to resort to loans to make up deficits appearing annually in the budget. The Danish period of reconstruction did not escape the difficulties which other countries experienced. The demobilization of the troops and the break in the foreign market augmented unrest. German competition, made possible by the low value of the mark, naturally added to the uncertain economic conditions. The country's foreign trade received a severe blow in 1922 when the United States emergency tariff imposed prohibitive rates on Danish goods. By 1922, agriculture had almost reached the normal; eggs, butter, and bacon showed a remarkable recovery. Late in August, 1922, the figure of unemployed had fallen to 30,000. But that the country was not to weather the depression of 1921-22 easily was shown when the Danish Landmandsbank, the

most important Danish banking institution, suddenly collapsed in September, 1922. Its interest in business built on the high price levels of the preceding years worked its undoing, with the result that it became incumbent on the government to effect a reorganization. Ninety million kroner of the outstanding capital had to be written off, while the Danish National Bank was called on to contribute 30,000,000 kroner toward the bank's new surplus. The result was that public confidence was diverted more and more from private banking and centered in the Danish National Bank. Of a piece with the economic distress was the renewed interest in emigration schemes. Plans were launched in 1922 for the settlement of Danish colonies in Madagascar, Lithuania, and Central and South America.

After a bitter political contest, a plebiscite in December, 1916, approved the sale of the Danish West Indies or Virgin Islands to the United States for \$25,000,000. A further diminution of the Danish Empire took place in 1918 when Iceland (q.v.) was granted its independence; thenceforth Iceland and Denmark were connected only by a personal union under the Danish King. Greenland (q.v.) alone remained a colonial possession. In 1920 Denmark regained part of the province of Schleswig which had been wrested from her by Prussia in 1864. The Peace Treaty provided for two plebiscites in North and Central Schleswig respectively, and under an international administration they were held in February and March, 1920. The result was favorable for Denmark in North Schleswig, the vote being 75,000 for union, and 25,000 against; while in the Central district the natives decided by a vote of 51,000 to 12,000 to remain a part of Germany. On Sept. 21, 1920, citizens of Schleswig took part in the Danish general elections for the first time. The parties returned to the lower house numbered 52 Liberals, representing the farmers; 18 Radicals, representing the small landholders; 48 Socialists, representing the city workers; 27 Conservatives, sitting for the middle class; 3 Trade party; 1 Schleswig (German party). The ministry therefore was formed by the Liberals. The Liberal Premier Neergaard, supported by a parliamentary bloc, remained in power during the troublesome reconstruction years, and was not overthrown until 1924, when parliamentary elections gave victory to the Labor party despite the inclusion of a capital levy plank in its platform. After the Labor victory at the polls, a Labor Cabinet was formed under the premiership of Theodore Stauning. See SCANDINAVIAN LITERATURE; EXPLORATION; NAVIES OF THE WORLD.

DENNERT, EBERHARD (1861-). A German writer on nature and popular philosophy, who was born at Putzerlin near Staargard, Pomerania. He studied at the universities of Marburg and Bonn, and was successively assistant at the Botanical Institute of Marburg, director of the Keplerbund, and editor of the nature department of the *Deutsche Encyclopädie*. Among his numerous works are: *Moses oder Darwin* (1907); *Haeckels Weltanschauung naturwissenschaftlich beleuchtet* (1908); *Die Zelle ein Wunderwerk* (1909); *Die geschichtliche Entwicklung der Descendenztheorie* (1910); *Die Welt für sich und die Welt mit Gott* (1913); *Mehr Naturfreude für die Jugend* (1914); *Gibt es ein Leben nach dem Tode?*

(1915); *Gott, Seele, Geist, Jenseits* (1916); *Not und Mangel im Lichte der Entwicklung* (1916); *Der Staat als lebendiger Organismus* (1920).

DENNETT, TYLER (1883-). An American author, born at Spencer, Wis., and educated at Bates College and at Williams College. From 1914 to 1916, he was associate editor of *The World Outlook*. He directed the publicity of the Methodist centenary (1916-18), and in 1919-20 held the same position in the Inter-Church world movement. He is also known as a lecturer on Asia, having traveled widely in the Orient and in Africa. He is author of *The Democratic Movement in Asia* (1918) and of *A Better World* (1920).

DENNIS, ALFRED P. (1869-). An American diplomat, born in Worcester Co., Md., and educated at Princeton University. During the period 1894-1907, he was professor of history at Wesleyan University (Conn.) and at Smith College. In the latter year, he resigned because of ill health, and became engaged in the mercantile business. In 1918, he was commercial attaché at the American Embassy at Rome, and in 1921 held the same post in London. As a representative of the Department of Commerce, he made investigations for Herbert Hoover in Central and Eastern Europe (1922). A student of political history and economics, he has made frequent contributions on those subjects to the *Atlantic Monthly*, the *Yale Review*, *International Journal*, *Saturday Evening Post*, etc.

DE NOAILLES, COUNTESS ANNA (1876-). A French poet and novelist. She was born Princess de Brancovan, and married Count Matthieu de Noailles. Her poetry is characterized by romantic naturalism, and she earned the title "Muse of the Gardens." As a novelist also she is the apostle of sentiment and sensation. Her poetic works include *Le Cœur Innombrable*, *L'Ombre des Jours*, *Les Vivants et les Morts*, *Les Eblouissements*, and *Les Forces Eternelles*; her works of prose include three novels, *La Nouvelle Espérance*, *La Domination*, and *Le Visage Eternel*.

DENTISTRY, MODERN. See **RHEUMATISM, CHRONIC.**

DENVER. The capital of Colorado and the largest city between the Missouri River and the Pacific Ocean. The population rose from 213,381 in 1910 to 256,491 in 1920 and to 272,031 by estimate of the Bureau of the Census for 1923. In 1916, after three years' trial of the commission form of government, Denver went back to the mayor and council form. The new charter provided for a small council of nine men, and assigned wide powers of appointment and removal to the mayor. The library system was extended during the decade by the addition of branch libraries. After years of struggle between the city and the Denver Union Water Company and its predecessors over franchises, rates and valuation, and projects for building municipally owned works, an agreement for purchase was made between the company and the city in 1918, and ratified by popular vote. Zoning and city planning provisions were being put through in 1924, and a programme of paving carried on within the city and connecting Denver with all of the principal towns in a radius of several miles. The value of manufacturing increased from about \$70,500,000 in 1913 to \$125,411,000 in 1924, and

the number of establishments from 738 to 1147. According to the census figures of 1920 there were on an average 16,635 wage earners, an increase of 50 per cent over the figures for five years earlier. The value of the packing business increased during the 10 years by 234 per cent.

DENVER, UNIVERSITY OF. An institution at Denver, Colo., under the auspices of the Methodist Episcopal Church, founded in 1864. The enrollment of the university practically doubled between 1913, when it was 1159, and the year 1923-24, when it was 2188. The faculty increased from 132 in 1918 to 150 in 1923-24, and the library from 38,000 to 50,000 volumes. Henry A. Buchtel, D.D., LL.D., was chancellor until 1921, and Heber Reece Harper became chancellor in 1922. During the interim Wilber D. Engle was acting chancellor.

DEPAUW UNIVERSITY. A coeducational institution at Greencastle, Ind., under the auspices of the Methodist Episcopal Church, founded in 1837. DePauw grew steadily during the decade 1913-1923, increasing its student body from 1000 in 1913 to 1485 in the year 1923-24, with 196 in the summer school of 1923; it added 10,880 volumes to its library and thereby brought the total number of volumes in 1923 up to 58,880. The faculty was enlarged from 50 to 68. The equipment of the university was augmented by the erection of Rector Hall, a dormitory for women, and the Clem Studebaker Memorial Administration Building. The productive funds were increased from \$1,300,000 to \$3,930,000, and a campaign to add \$1,000,000 more for endowment and \$500,000 for increased equipment was nearing completion in 1924. President, George Richmond Grose, D.D., LL.D.

DEPENDENTS, DEFECTIVES, DELINQUENTS. See **CHILD WELFARE; MOTHERS' PENSIONS; and JUVENILE COURTS.**

DEPEW, CHAUNCEY MITCHELL (1834-). An American politician (see **VOL. VI**). In 1914, he was in favor of the repeal of the Panama Canal tolls bill. He was violently opposed to pacifism from the outbreak of the War, and in 1915, on the occasion of the sinking of the *Lusitania*, urged drastic measures against Germany. After 1913 he published *Some Views on the Threshold of Fourscore* (1914), and *Speeches and Literary Contributions at Fourscore and Four* (1918).

DEPTH BOMB. See **BOMB, DEPTH.**

DERBY, EDWARD GEORGE VILLIERS STANLEY, SEVENTEENTH EARL OF (1865-). An English statesman born in London. He was educated at Wellington College, and later received valuable experience as lieutenant grenadier of the Guards during the period 1865-95, and as aide de camp to the Governor-General of Canada. He was a Lord of the Treasury (1895-1900), chief press censor in South Africa (1900), Financial Secretary to the War Office (1900-03), Postmaster-General (1903-05), member of Parliament from West Houghton Division of Lancashire (1892-1906), and Director-General of Recruiting (1915-16). During the War he had an admirable scheme for recruiting on the basis of voluntary service, but as the number of volunteers did not equal expectations, the plan was abandoned. In February, 1916, he became chairman of the military air service joint committee, from which office he resigned two months later, and in July of the

same year, upon the formation of Lloyd George's government, he accepted the secretaryship of War. In 1918, he was appointed ambassador to France, from which post he resigned in 1920.

DERCUM, FRANCIS XAVIER (1856-). An American neurologist (see VOL. VI). He published *Hysteria and Accident Compensation* (1916); *An Essay on the Biology of Mind* (1922); *The Biology of Internal Secretions* (1924).

DESCAMPS, BARON EDOUARD (1847-). A Belgian jurist (see VOL. VI). After 1913, he published, with others: *Recueil international des traités du 19e siècle*, vol. i, 1801-25 (1914); *Recueil international des traités du 20e siècle*, vol. vi, 1906 (1914).

DESCAVES, LUCIEN (1861-). A French man of letters (see VOL. VI). His recent works include: *Biribi* (1911); *Ateliers d'aveugles* (1912); *Philémon* (1914); *La Maison anxieuse* (1916); *Dans Paris bombardé* (1919); *La Saignée*.

DESCHAMPS, ALBERT. See **PSYCHOLOGY, ABNORMAL**.

DESCHANEL, PAUL (EUGÈNE LOUIS) (1856-1922). A French statesman and author (see VOL. VI). In January, 1920, he was elected President of France, but his health soon began to fail, and in May a singular accident happened when he was on a train near Montargis. He fell from the window, and though his physical injuries were not serious, he never recovered from the nervous shock, and finally was obliged to resign the Presidency. Though he afterwards appeared in the Senate for a short time, his career was practically over.

DES MOINES. The capital of Iowa. The population increased approximately 46 per cent, from 86,368 in 1910 to 126,468 in 1920, and to 140,923, by estimate of the Bureau of the Census, for 1923. Between 1914 and 1924, the State Capitol park was increased from 18 to 83 acres by the razing of several city blocks, and a new municipal court and public safety building was erected on the river front civic centre. A diagonal boulevard, Keosauqua Way, was constructed, connecting the business district with the northwest residential section, and Fifth Avenue was widened and graded, at a cost for the two projects of more than \$1,000,000. Locations for new units of the public school system were purchased and a building programme was partially completed, involving a final cost of approximately \$7,000,000. The city bought the water plant in 1919. Twenty-six banks reported clearings of \$568,487,000 for 1923; 400 factories, capitalized at \$50,000,000, employed 10,000 persons and turned out \$80,000,000 worth of merchandise.

D'ESPEREY, LOUIS FRANCHET (1856-). A French marshal, born in Motaganem. He saw service in North Africa and elsewhere, and in 1914 was given command of the 1st Corps in the 5th French Army. Here he did distinguished service in attempting to hold back the German advance in the retreat from Mons, in September, 1914, and succeeded General Lanza in command of the 5th Army before the first battle of the Marne. In this battle, he performed brilliant services. In 1916 he was given command of the group of Eastern armies in France. In 1917 he commanded the group of Northern armies, and in 1918 was made

commander-in-chief of the Allied Forces in Salonica. He organized, with great skill, a general attack of the armies, and on December 15 carried this out with success. This was followed by the surrender of Bulgaria. He was in charge of the Allied Forces in Eastern Turkey and the Balkans in 1919, and in 1921 was created marshal.

DESSOIR, MAX (1867-). A German psychologist, born at Berlin. He was educated in the German universities and passed through the academic *cursus honorum*, becoming professor at the University of Berlin in 1920. As editor of the *Zeitschrift für Ästhetik und allgemeine Kunstwissenschaft*, he was one of the leaders in the empirical study of the principles of taste. He was also interested in the various phases of abnormal psychology and psychological research, and published his findings in a volume on *Jenseits der Seele* (On the Other Side of the Soul, 1920). His *Geschichte der Psychologie* (1911) was translated into English under the title of *History of Modern Psychology*. Among his other works are *Eine Bibliographie des modernen Hypnotismus* (1890), *Das Doppel-Ich* (1896), *Geschichte der neueren deutschen Psychologie* (1903), *Ästhetik und allgemeine Kunstwissenschaft* (1906), and *Philosophisches Lesebuch* (1911).

DESTROYER. See **VESSEL, NAVAL**.

DETLEFSEN, JOHN A. (1883-). An American zoölogist born at Norwich, Conn. He was educated at Dartmouth and at Harvard. He was Austin teaching fellow of Harvard (1908-12) and was at the University of Illinois as assistant professor of genetics (1912-18), associate professor (1918-19) and professor (1919-). Professor Detlefsen wrote on genetics, especially in domesticated animals.

DETONATORS. See **EXPLOSIVES**.

DETROIT. The 1914 area of the incorporated city of Detroit in Michigan was 41.76 miles. In 1924 it was 92.66 miles; 10 extra square miles of area were in process of annexation. Within the city and entirely inclosed by the corporate limits are two independently incorporated cities, Highland Park with a population of 56,000 and Hamtramck with a population of 75,000. The Federal census of 1910 gave Detroit a population of 465,766 Highland Park, 46,499, and Hamtramck, 3559. The Federal census of 1920 gave Detroit 993,729; Highland Park, 46,499, and Hamtramck, 48,615. Growth during the four years since the Federal census was taken has been fully as rapid. The figures for 1924 are based on estimates made by the Water Board, the gas company, and the R. L. Polk Directory Company, which makes a thorough canvass of the cities each year. The estimated population of Detroit in 1924 was 1,250,000. The village of Oakwood had been annexed. Adjoining the corporate limits of the city were the following independent municipalities, all within 12 miles of the city hall: Grosse Pointe Park, 3000 population; Ecorse, 5500; River Rouge, 14,500; Ferndale, 12,000; Springwells, 8000; Lincoln Park, 7000; Pleasant Ridge, 1500; Redford, 5500; Royal Oak, 12,500; Dearborn, 4500; and Brightmoor, 4000.

Among many public works constructed since 1914 are the new Belle Isle Bridge, costing \$3,000,000; the new public library, \$3,000,000; and the Detroit Institute of Arts, now under construction, to cost about \$3,000,000. From

1914 to 1924 the pumping capacity of the city water works was practically doubled, and a general installation of meters led to a more considerate and economical use of water. In 1914 there were 917 miles of water mains; the 1924 mileage is 1943 miles. During 1923 a new filtration plant was put in operation, with a capacity of 180,000,000 gallons daily, at a cost of \$4,500,000. The per capita water consumption in 1923 was 141 gallons per day. On July 1, 1923, the Water Board estimated that it was supplying 1,248,900 persons with water. In 1914 the public works department reported 227 miles of public sewers and 565 miles of lateral sewers. On Aug. 1, 1924, there were 1169 miles of public sewers and 1924 miles of laterals. The police department was provided with a new headquarters building at a cost of \$1,700,000. In 1914 the department had 1125 uniformed men and 112 others in service. In 1924 the uniformed force numbered 2387 and the office staff 138. The fire department in 1914 employed 729 men; in 1924 the fire-fighting force numbered 1261; the total force, 1467. Detroit had 51 public parks containing 1990 acres; 59 playgrounds containing 219 acres; 66 street playgrounds; 16 swimming centres; 46 public tennis courts; 31 baseball diamonds; 15 football fields, and other recreation facilities. The River Rouge improvements, including dredging and new bridges, cost about \$10,000,000. The first big freighter, with a cargo of iron, passed up to the Ford plant on July 2, 1923.

The total value of Detroit's manufactured products in 1914 was \$400,348,000. In 1919 the total value of the manufactures of Detroit proper was \$1,234,519,842. The total value of manufactures in the metropolitan district was \$1,803,728,219. The total value of Detroit products in 1923 was a little over \$2,000,000,000. The metropolitan district includes the two cities of Hamtramck and Highland Park. In 1919 there were 2176 manufacturing plants in the city proper, with a capital investment of \$788,329,200; 167,016 wage earners; 29,639 salaried officials, receiving salaries and wages aggregating \$297,884,461. In the metropolitan district there were 2256 establishments with capital of \$1,230,470,739; salaried officials, 34,928; employees 231,045, receiving \$419,774,189 in salaries and wages.

The banks of Detroit in 1914 had aggregated capital and surplus to the amount of \$30,030,000 and savings deposits of \$88,704,876. On June 30, 1924, the combined capital of State and National banks of the City was \$33,950,000; surplus, \$32,042,000; savings deposits, \$308,568,738; total deposits, \$586,473,338; total resources, \$713,766,686; total clearances of banks associated in clearing house in 1923, \$6,091,595,579.

In April, 1922, the city of Detroit voted an authorization of the purchase of the street railway lines of the Detroit United Railway Company for \$19,850,000, with the full understanding that the price was excessive, but that the termination of 30 years' dissatisfaction would be worth it. The city began operation of the lines on May 1. The trackage purchased was 311 miles, and considerable valuable real estate and plant went with the purchase. The city added 72 miles of new line to the system, and service in 1924 was furnished by 1594 cars and 6,463 employees. Paying \$500,000,000 of the purchase price every six months, the city had

paid \$4,700,000 of this debt up to the middle of 1924.

The assessed valuation of property in the city of Detroit in 1914 was \$525,856,000; tax levy of 1914, \$10,267,999; tax rate, \$19.69 per \$1000. Assessed valuation in 1924, \$2,455,327,680; tax levy, \$51,476,676; tax rate, \$20.96 per \$1000. Bonded debt of 1914, \$16,656,000; bonded debt of 1924, \$157,428,430.

In 1914, 7884 buildings were erected, valued at \$28,427,140; 1915, 9006 buildings, \$32,235,550; 1916, 16,490 buildings, \$51,067,110; 1917, 12,108 buildings, \$39,676,690; 1918, 7010 buildings, \$18,201,707; 1919, 21,473 buildings, \$82,995,071; 1920, 19,412 buildings, \$77,737,365; 1921, 17,615 buildings, \$58,087,081; 1922, 25,460 buildings, value, \$94,615,093; 1923, 35,234 buildings, \$129,719,731. For the first six months of 1924, building permits for 25,620 buildings aggregating \$99,299,884. Summary for 10 years: 197,312 buildings; aggregate cost, \$712,062,422.

The census of persons of school age from 5 to 20 years, inclusive, in the city of Detroit proper in 1914 was 133,339; the registration in the public schools was 69,086. In 1924 the school census gave 284,693 persons of school age, and the registration in the public schools was 162,807. From 1914 to 1924 the Board of Education erected 36 elementary schools, 8 intermediate schools, and 5 high schools. The total increase of public schools since 1914 is 67 elementary schools, 5 intermediate schools, and 4 High schools. The total cost of new school buildings and additions, 1914-24, was \$30,454,903. The public expenditures for school purposes in 1914 amounted to \$4,186,864; in 1924, \$20,290,999. The value of the public school plant in 1914 was \$9,325,673; in 1924, \$54,729,427.

DETROIT, UNIVERSITY OF. An institution under the auspices of the Roman Catholic Church, founded in 1875 at Detroit, Mich. The enrollment of the university increased rapidly, from 792 in 1918 to 1500 in the college and technical schools and 500 in the high school in the year 1923-24. The faculty was correspondingly increased from 69 to 165 members and the library from 18,000 to 38,000 volumes. A day school of commerce and finance, as well as night courses in journalism, short story writing and social service work, were added in 1922. The institution is conducted by the Fathers of the Society of Jesus, whose services, as well as those of several lay professors, are given gratis. About \$350,000 toward a building fund had been gathered by the trustees at the end of 1923. John P. McNichols, S.J., Ph.D., succeeded the Rev. William T. Doran, S.J., as president in 1921.

DEUSSEN, PAUL (1845-1919). A German philosopher and Orientalist (see Vol. VI). He completed his *Allgemeine Geschichte der Philosophie* in 1917. His autobiography was published posthumously in 1922 by his widow, Erika Rosenthal-Deussen.

DE VALERA, EDWARD (EAMONN) (1882-). An Irish Republican leader born in Charleville, County Cork, Ireland, and educated at the Christian Brothers' School (Charleville), Blackrock College, and the Royal University of Ireland. He taught mathematics and languages at several of the Catholic Colleges of Ireland, and was generally well liked. In 1916, three years after the founding of the Irish

Volunteers, De Valera, always deeply interested in the cause of Irish freedom, threw himself wholeheartedly into the movement, and in the rebellion of that year commanded the insurgents at Boland's bakery, Dublin. Orders compelled him to surrender on April 30, and he was sentenced to death, but the sentence was later commuted to life imprisonment. He was released, however, in the general amnesty of June 16, 1917. What importance he had achieved as the surviving leader of the Easter Rebellion, as it was called, became recognizable in the large majority he received in his election for East Clare. Henceforth De Valera devoted his entire time to the Sinn Feiners and at the convention of October, 1917, was elected President of the Irish Republic. In the following spring he was rearrested for the part taken in the agitation against "conscription" and in a plot for another rebellion coupled with a German invasion. In February of 1919, he escaped from the prison at Lincoln, England, and finally made his way to the United States, where he enlisted much sympathy from many of the Roman Catholic Irish and in German-American centres. He returned to Ireland in 1921, and negotiations for an Irish settlement were begun with the British government. In the same year, he became chancellor of the National University of Ireland. See IRELAND, *History*.

DEVINE, EDWARD THOMAS (1867-). An American leader in social work (see VOL. VI). In 1916, he was special agent at the American Embassy in Petrograd. Recent books published by him include: *The Normal Life* (1915), *Disabled Soldiers and Sailors* (1919), and *Social Work* (1921).

DEVONPORT, HUDSON EWBANKE KEARLEY, first Viscount (1856-). An English politician and business man, born at Uxbridge, and educated at Cranleigh School. He entered the firm of Kearley and Tonge, subsequently becoming a senior partner. In 1892, he entered Parliament as Liberal member for Devonport (1892-1910). He was parliamentary secretary to the Board of Trade (1905-09), was chairman of the Port of London Authority (1909), first Food Controller (1916), and Secretary to the Sugar Commission (1917). He was created a baronet in 1908, was raised to the peerage in 1910, and in 1917 was created a viscount.

DEVONSHIRE, VICTOR CHRISTIAN WILLIAM CAVENDISH, ninth Duke of (1868-). A British statesman educated at Cambridge. He entered Parliament in 1891. He was civil lord of the Admiralty in 1915-16, and Governor-General of Canada 1916-21, and in 1922, he became Secretary of State for the Colonies.

DEVORE, DANIEL BRADFORD (1860-). An American soldier, born in Monroe Co., Ohio. He graduated from the United States Military Academy in 1885, and was commissioned 2d lieutenant in the same year. He served during the Spanish-American War as captain of volunteers and was commissioned captain of the Regular Army in 1899. He rose to the rank of colonel in 1916 and in the following year was appointed brigadier-general. He had charge of the training of troops in Illinois and commanded the 167th Brigade in France, in 1918. In the following year he was commander of Camp Logan, Houston, Texas, and in 1920-21 commanded the 10th Infantry at Camp Sherman. From the latter date he was adjutant-general at Governor's Island, at New York Har-

bor. His career included service in the Philippines, Panama Canal Zone, and as a member of the faculty of the United States Military Academy.

DEWAR, SIR JAMES (1842-1923). A British chemist (see VOL. VI). In 1915, he published (with G. D. Liveing) *Collected Papers on Spectroscopy*. The Copley medal of the Royal Society of London was awarded to him in 1916, and the Franklin medal of the Franklin Institute of Philadelphia in 1919.

DE WET, CHRISTIAN RUDOLPH (1854-). A South African military leader and statesman (see VOL. VI). He was one of the leaders in the rebellion in the South African Union which broke out in 1914. He was defeated at Mushroom Valley by General Botha on Nov. 12, 1914, taken prisoner by Colonel Brits on December 1, and sentenced to a term of six years and to pay a fine of £2000. He was released after one year's imprisonment, however, giving a written promise to take no further part in politics.

DEWEY, EVELYN (1889-). An American educational psychologist, and daughter of John Dewey. She was educated at Barnard College. She is the author of *Schools of Tomorrow* (1915), *New Schools for Old* (1919), and *Methods and Results of Testing School Children* (1920). In 1920, she became the director of the Psychological Survey of New York City.

DEWEY, HARRY PINNEO (1861-). An American clergyman, born at Toulon, Ill., and educated at Williams College and Andover Theological Seminary. He was ordained in the Congregational ministry in 1887, and from that year until 1907 served as pastor in various churches. In 1907, he became pastor of Plymouth Church, Minneapolis. He was trustee of a number of colleges and universities, among them Williams College, Andover Theological Seminary, and Straight University. From 1904 to 1907, he was director of the Brooklyn Heights Seminary, the Long Island Historical Society and the Eye and Ear Hospital. He held at various times offices in a number of religious bodies; for example, he became vice-president of the Congregational Education Society in 1907, and of the American Missionary Association in 1914. He was a member of the National Service Committee of Congregational Churches 1917-19, and in 1921 became a member of the National Council Commission on Missions. In 1914, he was made director of the Northeast Neighborhood Settlement House in Minneapolis, and in 1918 of the Pillsbury Settlement House in the same city.

DEWEY, JOHN (1859-). An American philosopher and educator (see VOL. VI). With the death of William James in 1910, Professor Dewey became the leader of the pragmatic school in the United States, and under his direction the emphasis of pragmatism was changed from that of religion and the will to believe to the practical problems of social reconstruction. After the War he went on an educational mission to China and Japan. While in Tokio he delivered a series of lectures subsequently published under the title of *Reconstruction in Philosophy* (1920). In 1924 Professor Dewey went on an educational visit to Constantinople. A frequent contributor to the *New Republic*, Professor Dewey did not attempt to draw much of a distinction between

the immediate exigencies of social action and the more cultural aspects of philosophic inquiry. Both in his *Reconstruction* and in his *Human Nature and Conduct* (1922) we meet with the notion that contemplative ideas (including the mystical belief in a transcendent Deity) are luxuries too great to be indulged in by the modern man because they tend to inhibit his impulses for action. The latter work, moreover, contains a remarkable discussion of the problems of social psychology, with particular emphasis on the much abused topic of instincts. For reasons of social optimism, Professor Dewey rejects the realistic conception of preëxistent determinisms fatally controlling the course of human action; instead he regards both instincts and habits as existing only from the moment they come into play but with a retroactive power of explanation. Such a solution opens up vistas of critical idealism, perhaps beyond the intentions of the pragmatic philosophy. Professor Dewey's other works after 1914 include: *German Philosophy and Politics* (1915); *Essays in Experimental Logic* (1916); *Democracy and Education* (1916); and *Creative Intelligence* (with others, 1917).

DEWING, THOMAS WILMER (1851-). An American figure and portrait painter (see Vol. VI). At the death of Charles L. Freer, in 1919, the Freer collection of Dewing's paintings passed to the National Gallery at Washington, where a room in the Freer Gallery was given over to these works—oil paintings, pastels, silver points and screens. A lyric vision, and the exquisite texture of his painting, evoke about his figures an air of charm and tenderness and mystery.

DEXTRIN. See CHEMISTRY, ORGANIC.

DIABETES. The decade 1914-24 witnessed the introduction of two radical departures in the treatment of diabetes, so that it is hardly too much to state that the disease as a social malady has been conquered. The innovations are respectively the Allen fasting treatment and the discovery at the University of Toronto of the organic preparation insulin, manufactured from the animal pancreas. In contrasting these new resources it may be stated that the Allen fasting treatment is both curative and able to arrest the progress of the disease when the pancreas remains able to function. Under favorable circumstances it is computed that all but about 8 per cent of the patients treated are benefited. The treatment itself is naturally a hardship, as the patient must remain in bed for some weeks, and it cannot be well carried out save in special institutions and under expert care. The field of the insulin treatment is somewhat different. The patient is in an advanced stage of the malady and menaced with death by diabetic acidosis. The injected pancreatic substance makes up for the deficiency of pancreatic substance in the body, and so the patient may be kept alive indefinitely as long as he can receive these injections; he may even resume some of his former usefulness. He is not so restricted in his diet as the ordinary diabetic. As in the case of the fasting treatment, the insulin treatment is to be given only by those who are specially instructed, as there is no little danger to the patient from the unskilled use of the remedy. See FOOD AND NUTRITION.

DIAGHILEV, SERGEI. See BALLET.

DIAMONDS. The diamond trade of the world by 1924 had come largely into the hands of a single large syndicate, including the De Beers Company and other mines, which was able to control the prices and production of the entire world. In 1922 in the course of its 33 years the De Beers Company reported that it had paid out in dividends $11\frac{1}{2}$ times the par value of its capital stock, or \$254,320,163 on a capital stock of \$21,899,260. In this period the total weight of the diamonds produced would have amounted to 27,816 pounds or nearly 14 tons. As in other industries the mining and cutting of diamonds was seriously interfered with during the period of hostilities and during the post-War period there resulted a number of interesting developments. Stones from Russia came upon the market at forced sale, but the London Diamond Syndicate traders made no effort to compete with such supplies. There was established, however, a Berlin jewel exchange where the jewels of Europe were traded in quite largely, and effort was made to control and stabilize the traffic in this way.

The diamond industry in France had declined during and after the War, and while in a large measure controlled in London, nevertheless Amsterdam and Antwerp continued as the leading markets for the cutting of gems. This was demonstrated by the fact that in 1923 diamonds cut but not set aggregating 539,972 karats, valued at \$52,020,098, were imported into the United States, of which amount 313,895 karats, valued at \$29,017,358 came from Belgium; 202,101 karats, valued at \$20,518,443 from the Netherlands; 10,000 karats, valued at \$976,543 from the United Kingdom and 9242 karats, valued at \$1,100,225 from France.

The greater part of the diamonds imported into the United States are cut, principally in Antwerp and Amsterdam. The rough uncut diamonds in 1923 imported into the United States aggregated 200,222 karats with a value of \$7,401,698, coming principally from Brazil and British Guiana. Brazil supplies the United States with the diamonds required for industrial uses.

The Diamond Syndicate in 1923 had control of the principal diamond producing regions of the world, not only the South African product, but also having a working agreement to handle those produced in the Congo and Angola.

The diamond mines of Angola, Portuguese West Africa, showed a remarkable development in 1916 over the time when prospecting began. These mines are in the Lunda district in the northeast corner of the Colony, just south of the Kasai diamond fields of the Belgian Congo. Prospecting began in 1916 in which year 809.30 karats of diamonds were found, and by 1921 the output had reached 106,719.46 karats. The production of diamonds in South Africa held its own during the 10 years from 1914 to 1924, and the production as given in the *Mineral Industry* is indicated on next page.

The Belgian Congo in 1915 produced 48,995 karats which amount by 1919 had increased to 275,000 karats, and in 1922 amounted to approximately 250,000 karats. Here the chief source of diamonds is the Kasai Basin which is operated by the Société Internationale Forestière et Minière du Congo (or Forminière) and its associated companies. As there was an improved market for diamonds in 1923 this organization was able to produce about 250,000 kar-

PRODUCTION OF DIAMONDS IN SOUTH AFRICA

Year	Production from mines		Alluvial diamonds	
	Karats	Value per karat	Karats	Value per karat
1913	4,944,946	41s 6d	206,049	108s 9d
1914	2,653,089	37 0	143,924	80 2
1915	2,131	36 6	97,678	80 4
1916	2,170,348	43 11	167,620	113 2
1917	2,710,041	49 2	182,992	113 10
1918	2,385,361	51 5	143,348	134 6
1919	2,366,744	75 9	209,589	261 6
1920	2,312,436	106 3	221,460	220 6
1921	671,483	63 16	151,552	118 1
1922	465,634	89 0	203,925	133 4

ats, compared with 190,000 karats in 1922, in addition to Beeka Company producing between 100,000 and 150,000 karats, the Kasai Mining Company about 30,000 and the Luebo about 13,000 karats. The Diamang Company produced over 100,000 karats. This made the 1923 production of the Kasai Basin about 525,000 karats, compared with 348,000 karats in 1922.

While there were several diamond mines in Arkansas, working in connection with the peridotite, there had been no substantial developments in the industry, although a number of stones had been found ranging from almost microscopic size up to 20¼ karats.

DIAMONDS, ARTIFICIAL. See MINERALOGY.

DIAZ, ARMANDO, BARON (1861-). An Italian soldier. He was educated at the military college of Turin and served in the Libyan War. He commanded a division on the Carso front after the entrance of Italy in the War, and was promoted commander of the 23d Army Corps which penetrated the Selo line on the Middle Carso in August, 1917. After the disaster of the Caporetto, when the German and Austrian troops penetrated the Italian line and forced it to retreat from the Isonzo to the Piave rivers, Diaz was appointed commander-in-chief to succeed General Cadorna. He made a brilliant defense and established his reputation as one of the greatest generals of the War. By the end of June, 1918, he had forced back the enemy east of the Piave, and on October 27, he attacked across the Piave, and was successful all along the line. A week later Austria surrendered. He was made minister of war in the Mussolini Cabinet, in 1922.

DIBELIUS, MARTIN (1883-). A German theologian and historian born at Dresden. He specialized on the literature and history of primitive Christianity and other religions. He studied at the universities of Neuchatel, Leipzig, Tübingen and Berlin and was professor of theology in Berlin from 1910 to 1915, later becoming professor of New Testament theology at Heidelberg. His principal works are: *Die Lade Jahwes* (1906); *Die Geisterwelt im Glauben des Paulus* (1909); *Urchristliche Ueberlieferung von Johannes dem Täufer* (1911); *Isaiweihe bei Apulejus* (1917); *Formgeschichte der Evangelien* (1919); *Kommentar zum Jakobusbriefe* (1921).

DIBELIUS, WILHELM (1876-). A German philologist who specializes on English language and literature, born in Berlin. He successively held professorships in Posen, Hamburg, and other cities before retiring to Godesberg on the Rhine. His principal works are *John Copgrave und die englische Schiftsprache* (1899), *Englische Romankunst* (1910), and an exhaustive study of *Charles Dickens* (1916).

DICKINSON, ASA DON (1876-). An American librarian and editor, born at Detroit, Mich. He studied at the Columbia University Law School and the State Library School at Albany, N. Y. In the period 1903-12, he was successively connected with the Brooklyn Public Library, Union College Library (Schenectady, N. Y.), Washington State College Library, and others. In 1912-15 and 1916-18, he was on the editorial staff of Doubleday, Page and Company, and later in the war service department of the American Library Association at Hoboken, N. J., and Paris, France (1918-19). His work organizing the Punjab libraries for the Indian government was followed up by the publication of *Punjab Library Primer*, in 1917. Mr. Dickinson also published *Europe at War* (1914), *The Kaiser* (1914), and several children's publications along a patriotic vein.

DICKINSON, HOBART CUTLER (1875-). An American physicist, born at Bangor, Me. He was educated at Williams College and later gained the Ph.D. degree at Clark University. During 1900-01 he was an assistant at Williams, but in 1903, entered the service of the United States Bureau of Standards, where in 1916 he became chief of the division of heat and power. His original studies have included papers on thermometry, calorimetry, specific heats of liquids, heats of combustion and fusion, thermal properties of refrigerants, thermal conductivities, and internal combustion engines.

DICKINSON, THOMAS HERBERT (1877-). An American writer, born at Randolph, Charlotte County, Va. He studied at Ohio State University, Columbia University, and the University of Wisconsin. During the War he was a member of the United States Food Administration (1917-18), and the American Relief Administration, Paris and New York (1919-22). He edited *The Play-Book* (1913-15), and several books on the drama. In addition to articles in magazines, he has published *The Case of American Drama* (1915), *Contemporary Drama of England* (1917), and *The Insurgent Theatre* (1917).

DICKINSON COLLEGE. An institution at Carlisle, Pa., founded in 1783. The number of students enrolled in the college increased from 292 in 1914 to 523 in 1924, the number of teaching members of the faculty from 16 to 27, and the number of volumes in the library from 30,000 to 33,000. The productive funds increased from \$245,000 to \$550,000 and the total income from \$43,050 to \$147,500. There was also a law school connected with the college which increased in membership from 119 to 218 and in the size of its faculty from 7 to 10 members. President, J. H. Morgan.

DICKSON, LEONARD EUGENE (1874-). An American mathematician (see VOL. VI). Among his later writings are: *Algebraic Invariants* (1915); *Finite Groups* (1916); *History of the Theory of Numbers* (1919; vol. ii, 1920); *Trigonometry with Practical Applications* (1921); *First Course in the Theory of Equations* (1921).

DIESCH-KAULFUSS, CARL H. (1880-). A German librarian, born in Sorau. He studied at the universities of Tübingen and Leipzig and was especially interested in modern literature, the history of the stage and the Reformation. He is librarian of the state library of Berlin. Among his principal works are: *Buch*

der Reformation (1917), and *Deutsche Dichtung im Strome des Lebens* (1921).

DIESEL ENGINE. See INTERNAL-COMBUSTION ENGINES; SHIPBUILDING, *Propelling Machinery*.

DIET. Within the decade 1914-24 the discovery of the vitamins and other advances added greatly to knowledge of dietetics. Some enthusiasts stated that nearly all ills of the body might be produced and cured by diet. If we include in the term everything introduced into the stomach, the statement is approximately correct. It is no longer possible to distinguish between food and drugs, for the end products of protein digestion are closely related chemically to certain active drugs. Some of the amino-acids are known to be stimulants of growth; they agree to this extent with growth-vitamines. The hormones at times present in the diet are of the same nature as those manufactured in the body itself and have the status of drugs. Some of the amino-acids formed in protein digestion are of no nutritive value when given alone. Gelatine has no food value as a substitute for the albumins, but it may be utilized in certain combinations.

While autointoxication is still imperfectly understood, we know that the action of intestinal bacteria on food can give rise to certain poisonous products, and we can surmise that the behavior known as conjugation, in which the split products of digestion may lose their poisonous properties by uniting with one another, may sometimes fail to take place. Surgeons attribute many ills to intestinal stagnation from purely mechanical causes, and it is true that a short fast is of material benefit in many illnesses; the improvement which follows the use of a light or monotonous diet is still more apparent. If it is kept up too long, a diet poor in calories, vitamins, protein, mineral matter, etc., will lead to the development of numerous diseases. A disease may sometimes be controlled by diametrically opposite plans of diet; everything depends on the individual case. Typhoid fever, often the result of impure and germ-infested drinking water, has often been beneficially treated by semistarvation; at the other extreme, supposing of course that the digestive processes have not been greatly impaired, equally good results have resulted from stuffing the patient with highly concentrated food. The latter course counteracts the great tendency to lose weight. The dietetic treatment of diabetes (q.v.) was revolutionized, and the application of the Allen fasting treatment has justly been regarded as a great triumph in therapeutics. In this resource the short fast has been followed by the use of a very light diet slowly increased in nutritive value. The introduction of insulin into the therapeutics of diabetes made possible the use of a more liberal diet.

Acidosis, a form of autointoxication which is not to be confused with intestinal self-poisoning, was shown to play an extraordinary part in the causation of disease. The readiness with which it can now be controlled by diet is one of the greatest recent advances in medicine. The condition develops in actual starvation and in diabetes, in which the carbon of the diet is imperfectly utilized; it may also follow dietetic errors of excess. Acidosis, with its lowering of the normal alkaline reserves of the body, follows on a diet consisting largely of so-called

acid forming foods, some of which have always been regarded as staples. The use of a diet in which alkali formers predominate and even the addition of alkalis to ordinary diet often leads to great improvement.

The beneficial results of the so-called basic diet, from which acid formers are largely omitted, are seen especially in the middle-aged and elderly, and such chronic conditions as high blood pressure and affections usually ascribed to excess of uric acid or slowing up of nutrition with accumulation of waste products in the body, respond remarkably well. In any case of chronic disease or ill health of obscure origin in which there is reason to suspect the presence of diminished alkaline reserves, the basic diet, which entails no trouble or discomfort, may forestall expensive cures at distant resorts and surgical intervention for the supposed results of focal infection. See FOOD AND NUTRITION; VITAMINE OR VITAMINES.

DIETRICH, JOHN HASSLER (1878-). An American clergyman, born at Chambersburg, Pa., and educated at Franklin and Marshall College and at the Reformed Theological Seminary at Lancaster, Pa. He was ordained in the ministry of the Reformed Church in 1905, but before this he held various positions such as private secretary and manager of *Life's Fresh Air Fund*. From 1905 to 1916, he held various pastorates, becoming in the latter year pastor of the First Unitarian Society in Minneapolis. He is the author of: *The Gain for Religion in Modern Thought* (1908); *The Religion of a Sceptic* (1911); *Substitutes for the Old Beliefs* (1914); *From Stardust to Soul* (1916); *The Religion of Evolution* (1917); *The Religion of Humanity* (1919).

DIFFENDORFER, RALPH EUGENE (1879-). An American clergyman, born at Hayesville, Ohio, and educated at Ohio Wesleyan University, Drew Theological Seminary and Union Theological Seminary. He was assistant secretary of the Epworth League from 1902 to 1904, and from 1904 to 1916 was secretary of the Missionary Education Movement in the United States and Canada. The following year (1916-17), he was educational secretary of the Board of Home Missions and Church Extension and of the Board of Foreign Missions of the Methodist Episcopal Church. He was associate secretary of the Centenary Commission of the Board of Home Missions and Church Extension in 1918, and in 1919-20 served as director of the Home Missions Survey of the Inter-church world movement. In 1920, he was appointed secretary of the department of education of the Committee on Conservation and Advance of the Methodist Episcopal Church in Chicago. He is the author of: *Child Life in Mission Lands* (1904); *Junior Studies in the Life of Christ* (1904); *A Modern Disciple of Jesus Christ—David Livingstone* (1913); *Thy Kingdom Come* (1914); *Missionary Education in Home and School* (1917); *The Church and the Community* (1920).

DIFFUSION OF GASES. See CHEMISTRY.

DILLON, JOHN (1851-). An Irish politician and agitator (see VOL. VII). In 1918, he succeeded Mr. Redmond as head of the Irish Nationalist party and was very bitter in denouncing England's methods in coercing the Irish. During the War he was among those who favored Ireland's share in the conflict, although he was opposed to compulsory service

and the Munitions Department, and was not kindly disposed toward Lloyd George's suggestions for settling the Irish question.

DILNOT, FRANK (1875-). An English author and journalist, born in Hampshire. He was educated privately and began as a newspaper reporter in 1900 on the staff of the *Central News*, London, which he left two years later for the *Daily Mail* (1902-10). He was editor of the *Daily Citizen*, a British labor organ (1912-15), and thereafter was a correspondent for the *Chronicle* to investigate social and economic conditions in England. In 1916-19, he was president of the Association of Foreign Correspondents in America, and in the latter year, editor of the *Globe*. His publications, the majority of which give evidence of thorough insight into social and economic conditions in England, include: *The Old Order Changeth: the Passing of Power from the House of Lords* (1911), *Lloyd George the Man* (1917), *The New America* (1919), and *England after the War* (1920). His *Lloyd George the Man* had a second edition with three supplementary chapters in 1923 under the title *Lloyd George*. The indiscriminating admiration of the first edition has distinctly ebbed in the supplementary chapters.

DINGLER, HUGO ALBERT EMMANUEL HERMANN (1881-). A German mathematician and physicist, born in Munich and educated at the high school of Aschaffenburg and at the universities of Erlangen, Göttingen and Munich. He became a member of the faculty of the University of Munich in 1912. His works include: *The Foundations for a Critique of the Exact Sciences* (1907); *The Boundaries and Aims of Science* (1910); *The Bases of Natural Philosophy* (1913); *The Elements of Physics* (1920); *Remarks on the Theory of Relativity* (1921).

DINSMORE, CHARLES ALLEN (1860-). An American clergyman and Dante scholar (see VOL. VII). In 1920, Dr. Dinsmore gave up his pastorate at Waterbury, Conn., and became professor of spiritual interpretation of literature at the Yale Divinity School. In 1920, he was Carew lecturer at the Harvard Theological Seminary. His *Life of Dante* was published in 1919.

DINWIDDIE, ALBERT BLEDSOE (1871-). An American university president, born at Lexington, Ky., and educated at the University of Virginia and the University of Göttingen, Germany. He began his career with a teaching licentiate in the University of Virginia, in 1888, and held various teaching positions, principally in secondary schools, until 1896, when he was appointed professor of mathematics in Southwestern Presbyterian University. In 1906, he was called to Tulane University as assistant professor of applied mathematics and astronomy. He was made associate professor in 1908 and full professor in 1910. He was dean of the College of Arts and Sciences, director of the summer school from 1910 to 1918, and in 1918 became president. He was also elected president of the American Association of University Professors, the Louisiana Council of Education, and other educational associations.

DINWIDDIE, EDWIN COURTLAND (1867-). An American temperance advocate (see VOL. VII). He directed the national campaign for the Constitutional Amendment for the prohibition of the liquor traffic in 1917,

and was president of the International Congress against Alcoholism in 1920-21.

DIPHTHERIA. The greatest advance since 1914 in knowledge of this plague is contained in the application of the Schick test to school children, to determine the relative susceptibility or immunity to infection. Many facts have come to light which contradict popular belief. Diphtheria has commonly been regarded as a disease of the tenement population, while scarlet fever was believed to attack both social extremes indifferently. The Schick test shows plainly that the prosperous enjoy no immunity from diphtheria and that the susceptibility to the infection among the well-to-do is about three times as great as among the indigent. This is offset by the recognition among the prosperous of the importance of segregation. The Schick test has also shown that heredity is a factor.

In any case susceptibility and immunity are not lasting, and tests have to be repeated at comparatively short intervals. Susceptibility is apt to disappear after the age of two or three years. The Negro child is much more susceptible to the disease than some of the whites, e.g. the Italians. Immunization tests are successful in a proportion varying from 70 to 93 per cent. Reports of results of the application of the Schick test vary much with the locality. Diphtheria was responsible for 20,000 deaths annually in the United States. Susceptibility exists in 85 per cent of all children tested.

DIPLOMACY OF THE WAR. See WAR, DIPLOMACY OF THE.

DIRIGIBLES. See AERONAUTICS.

DIRIGIBLES, IN WARFARE. See STRATEGY AND TACTICS.

DISARMAMENT. See WASHINGTON CONFERENCE, and PAN-AMERICAN CONFERENCES.

DISARMAMENT CONFERENCE. See WASHINGTON CONFERENCE.

DISCIPLES OF CHRIST. The fifth largest Protestant communion in the United States, congregational in organization. It was first in percentage of growth in 1923, reporting 4.2 per cent. It seeks to restore the union of the churches through a return to the plan outlined in the New Testament without human addition of creeds and formulas. The number of communicants increased from 1,362,711 in 1914 to 1,383,247 in 1923; the number of churches from 9076 to 9533; the number of ministers from 5592 to 6150; and the number of pupils enrolled in the Sunday schools from 900,000 to 1,170,148. In addition to varied types of home mission work among Negroes, Indians, Orientals, Mexican-Americans, and immigrants, foreign missions were maintained throughout the decade in Africa, China, India, Jamaica, Japan, Mexico, the Philippines, Porto Rico, South America (Argentina and Paraguay), and Tibet. The communion maintained 25 colleges in the United States, coöperating through a board of education. The Men and Millions Movement was started in 1913 to secure \$6,300,000 to equip mission stations and increase the endowment of the educational and benevolent institutions of the communion, to enlist 1000 workers for the mission field, and to start "every member" canvasses as the best plan for securing regular offerings for missions. The Movement was completed in 1918. In 1920 the six missionary boards of the communion united under the title of the United Christian Missionary

Society, with headquarters at St. Louis, Mo.

DISEASES OF PLANTS. See PLANTS, DISEASES OF.

DITRICHSTEIN, LEO (1867-). An actor-playwright, born in Temesvar, Austria-Hungary. He was educated in Vienna and was naturalized as an American citizen in 1897. He made his New York debut in *Die Ehre*, 1890. This was followed by: *Mr. Wilkinson's Widows*, *Trilby*, *Are You a Mason?* and other plays. He is the author of numerous plays, among which are: *Gossip* (with Clyde Fitch, 1895); *A Southern Romance* (1897); *The Last Appeal* (1901); *What's the Matter with Susan?* (1904); *The Ambitious Mrs. Susan* (1907); *The Million* (from the French, 1911); *The Concert* (1911); *Temperamental Journey* (1912); *The Great Lover* (1915).

DIVING SHELL. See PROJECTILE.

DIVISION. See ARMIES AND ARMY ORGANIZATION.

DIVORCE. Whether because of some general demoralization or because of an awakening sense of what marriage ought to be, the striking increase in divorcement during these years was not peculiar to any one country. In England, notwithstanding the narrow restriction of grounds and the prohibitive cost, the number of absolute divorces rose from 546 in 1906 to 972 in 1916, and to 1629 in 1919, while the number of petitions for divorce, even more significant of the general trend, rose from 767 to 1163 and to 5085. In Germany the increase in the number of divorces from 1918 to 1920 was from 13,344 to 36,542; in Switzerland, from 1699 to 2241. In Sweden the number rose from 1098 in 1918 to 1455 in 1922. Norway seemed to be the one exception to the rule, the number of divorces in 1922 falling slightly below the figure for 1918, 594. In France the ratio of divorces to marriages had become about 1 to 5: 7851 divorces in 1918-19, 11,514 in 1919-20. Japan was still conceded first place among the nations with a high divorce rate. As for the United States, the number of decrees rose from 72,062 for 1906 to 112,036 for 1916, from a ratio of 84 per 100,000 population to 112. This ratio rose by 1922, according to the Department of Commerce, to 130; while the number of marriages per 100,000 population fell from 1055 in 1916 to 1033 in 1922. In 1916, desertion and cruelty accounted for 65.1 per cent of all divorces granted. In 1922 there was one divorce to every 7.6 marriages.

United States. That phase of the divorce problem which received particular attention in the United States during the decade 1914-24 was the need for uniformity of legislation. The various States, left to their own resources, had developed a confusing diversity of divorce legislation. In South Carolina, divorce was not allowed; in New Hampshire there were 14 recognized grounds for a decree. Counting certain duplications, there were in the United States 363 causes for divorce: in one State, New York, unfaithfulness alone; in others, for varied reasons down to mere bad temper. And the legal complications ensuing on the remarriage of divorced persons were correspondingly abundant and confusing: a marriage legal in one State was bigamy in others, and a child legitimate in one State was illegitimate in another. Recognition of the need for some measure of uniformity in the divorce laws of the United States grew steadily. In 1913 at a con-

ference of governors the movement to secure uniform divorce legislation was endorsed; and throughout the decade by many organizations in convention. But the question of State's rights impeded action. In 1924, however, there was introduced in the Senate, a Federal bill calling for uniform regulation of marriage and divorce. In this, five causes for absolute divorce were fixed: Adultery, cruel and inhuman treatment, abandonment or failure to provide, incurable insanity, and conviction for infamous crime. The measure was referred to committee to await action at the next session of Congress.

Other Countries. The tendency abroad during the period was markedly toward liberalization of divorce provisions. Spain and Italy (both predominantly Catholic countries), where divorce was not allowed, were in striking contrast. In England, the report of the Royal Divorce Commission, presented in 1912, had recommended an increase of both the causes of divorce and facilities for divorcement. Although this was steadily opposed by the Church of England, and several bills on the subject were defeated during the period, in 1923 a measure was got through by which the terms for a decree, infidelity, were at least made identical for men and women (previously, for women, cruelty or desertion as well as infidelity had been necessary). The prohibitive cost of divorce in England had been somewhat eased by a Poor Persons' Act, under which, if an individual did not object to be so classed, a decree might be obtained at a cheaper rate; but up to 1924 only one divorce court (in London) had been established and this condition added greatly to the expense of securing a decree. On the continent there was an unmistakable drift toward the adoption of mutual desire as a reason for the dissolution of marriage. In Austria and Russia this had been legal for Jews; in Holland, the principle was evident in a provision for divorce after five years of judicial separation; Belgium recognized as grounds "mutual and unwavering consent"; and in Portugal and Rumania mutual consent was accepted, subject to provisions. The new German, Austrian, and Russian legislation on the subject, in adopting mutual consent as a cause, endeavored specifically to provide against an irresponsible attitude toward children or wife. The Scandinavian experiment was most noteworthy. As a result of a comprehensive study of Scandinavian social legislation, 1910-18, divorce legislation was adopted in Sweden in 1915, in Norway in 1918, and in Denmark in 1922, which definitely recognized mutual consent as the fundamental reason for the dissolution of marriage. Separation for a year, however, was required before the granting of the decree. Both parents were required to contribute to the support of children. The question of custody was left to be settled by the parents where possible and where there was involved no danger to the welfare of the child. For cases where divorce was desired by only one party, the grounds were liberal, including such as flagrant neglect, misuse of intoxicants, etc. The statistics previously given show that there was no increase from 1918 to 1922 in Norway under the new legislation, and in Sweden no greater than in other countries. The expedient adopted in Latvia, Lithuania, Czecho-Slovakia, and Jugo-Slavia, to stem the

increase in divorce, was to make it more difficult to marry and to grant dissolution of marriage for the asking; but that this was no solution seemed evident from the marked increase in the number of divorces in France under similar laws.

DIX, KURT WALTER (1878-). A German pedagogue and writer on subjects of education, born in Greiz. He studied at the universities of Dresden and Jena and has devoted himself to teaching and studying child psychology, child hygiene, etc. Among his works are: *Erziehung und Nervosität im Kindesalter* (1909); *Körperliche und geistige Entwicklung eines Kindes* (1911-12); *Kindeskunde* (1911); *Entwicklung der Denkkakte* (1921).

DIXON, AMZI CLARENCE (1854-). An American clergyman and author (see VOL. VII). His later works include: *Reconstruction* (1919); *The Birth of Christ, the Incarnation of God* (1919); *Why I Am a Christian* (1921); *Higher Critic Myths and Moths* (1921).

DIXON, JAMES MAIN (1856-). An American teacher and author (see VOL. VII). In 1920, he wrote, *The Spiritual Meaning of Tennyson's "In Memoriam,"* and *Manual of Modern Scots*.

DIXON, ROLAND BURRAGE (1875-). An American anthropologist (see VOL. VII). He was professor at Harvard after 1916 and member of the American Commission to Negotiate Peace (1916-18) in Paris. He is a contributor to anthropological and ethnological journals and his most recent works include *Oceanic Mythology* (Myths of the Indonesian, Oceanian, Australian region, published in 1915), and *The Racial History of Man* (1923).

DIXON, ROYAL (1885-). An American author, born at Huntsville, Tex., and educated at the Sam Houston Normal Institute and as a special student at the University of Chicago. After spending five years with the department of botany at the Field Museum of Chicago, he entered the literary field as a member of the *Houston Chronicle* staff. He has been a special contributor to the leading newspapers of New York, where he has lectured for the Board of Education. His interest and attention have been directed to immigration, as a director of publicity of the Commission of Immigrants in America, and as managing editor of *The Immigrants in America Review*. His works include: *The Human Side of Plants* (1914); *Americanization* (1916); *The Human Side of Animals* (1918); *Hidden Children* (1922).

DIXON, THOMAS (1864-). An American novelist and playwright (see VOL. VII). His photoplay, *The Birth of a Nation*, appeared in 1915, and he published *Fall of a Nation* (1916), *The Way of a Man* (1918), *A Man of the People* (1920), and *The Man in Gray* (1921).

DJEMAL PASHA (AHMAD DJEMAL) (1875-). A Turkish soldier and politician, born at Bagdad. After an excellent French education, he entered the Turkish army, and soon became lieutenant-colonel. He acquainted himself with the Young Turkish Movement and was criticized for his obvious support. In 1911, after serving at Adana in Cilicia, he was made governor of his native town of Bagdad, and shortly after became Vali of Constantinople. About this time he resigned as commander of the 1st Corps at Constantinople, and devoted himself to politics, becoming Minister of Public

Works and shortly afterwards Minister of Marine. These political activities brought upon him the personal antagonism of Enver Pasha. Djemal was opposed to any combination that included both Turkey and Germany; he became distinctly pro-French at the outbreak of the War. Thus it was because of his political beliefs and influence that Enver Pasha sent him to Syria as commander-in-chief of the 4th Army. Upon being recalled in 1917, he was made commander-in-chief of all the troops except those at the Sinai front, an exception which immediately led to friction; as a result, Djemal, losing interest, abandoned military operations. In 1917, he returned to Constantinople and resumed his duties as Minister of Marine, but opportunities for military and political power did not come his way, and on the downfall of Turkey in 1918, he fled to Germany and thence to Switzerland. Three years later he became military adviser to the amir of Afghanistan.

DOBRUDJA. See BULGARIA; RUMANIA.

DOCKS. The construction of large merchant steamers and vessels of war in the period between 1914 and 1924 developed the need for drydocks or, as they are sometimes called, graving docks, of increased size and capacity. Under normal circumstances there would have been no such need but with the outbreak of the War in 1914 the necessity for such facilities was appreciated, particularly in the United States. Before the United States entered the War there was naturally an increase in its commerce, and at the same time the officers of the United States Navy appreciated that the construction of suitable drydocks was an essential element in any scheme of naval preparedness. Accordingly as early as 1914 plans were discussed for additional drydocks located at various naval stations, while at the Panama Canal, and at certain leading ports, docks were constructed intended primarily for merchant shipping. When the United States actively joined the Allies in the War and took over for its transport service the former German liner, the *Vaterland*, renamed *Leviathan*, it was apparent that no drydock in the United States was large enough for that vessel.

Pearl Harbor Drydock. As early as 1908 the United States Navy began the construction of a drydock at Pearl Harbor, Hawaiian Islands, which was completed and flooded on Aug. 21, 1919. The plans for developing a small naval station located at this point involved the construction of a graving dock 589 feet long, but with the completion of the Panama Canal and the increased size of ships navigating the Pacific Ocean it was determined to increase its dimensions. Accordingly the dock was built 1022 feet long, 138 feet wide at the coping and 39½ feet in effective depth, there being 43½ feet depth from top of coping to floor. This gave a clear water basin 1010 feet long and 1010 feet wide at the bottom clearance. In 1913 a seismic disturbance caused the collapse of the work under way, and after a technical investigation a modified plan of construction was adopted in 1915, and finished in 1919. A full report of this drydock, the history of its early construction, as well as the adoption of the new design is contained in the *Transaction of the American Society of Civil Engineers*, vol. lxx, page 223, 1916.

Norfolk Navy Yard Drydock. The United States Navy Yard at Portsmouth, Virginia, had its facilities increased by the construction of a drydock 1011 feet long, 144 feet wide at the coping and 40 feet deep, which was opened in April, 1919, after having been under construction since February, 1917. This work involved the excavation of 625,000 cubic yards and the placing of a total yardage of concrete of 185,000. The Norfolk Navy Yard also contained two drydocks, built through the coöperation and financial assistance of the United States Shipping Board during the War, which were completed in 1919, and formally inaugurated on October 31, of that year, by the Queen of the Belgians.

Commonwealth Drydock. In 1915 active work was begun on a large drydock at South Boston built by the Commonwealth of Massachusetts which was an important element in the port and harbor development of Boston. This dock at the time of its completion was the largest in the United States, being 1176 feet long and 149 feet, 9 inches wide. It could take care of a ship of 1150 feet in length with a beam of 115 feet and 45 feet draft. It had a capacity of 55,000,000 gallons, and was unwatered by three electric pumps, requiring about two hours for the operation. This dock cost the Commonwealth of Massachusetts over \$3,000,000, and was purchased by the United States government under authority from Congress for \$4,100,000, being formally taken over by the United States Navy and put in commission on Dec. 22, 1919, the battleship *Virginia* being the first vessel to use the dock.

Balboa Drydock. In 1916 the new drydock at Balboa, at the Pacific terminal of the Panama Canal zone, was completed with a length of 1000 feet, a width of 110 feet and a depth of 35 feet over the blocks at mean tide. This structure was one of the important works connected with the shipping facilities of the Panama Canal, and made possible the docking and repair of steamers of considerable size.

St. John, N. B., Drydock. The St. John Drydock and Shipbuilding Company in November, 1923, opened its new drydock at St. John, N. B. This new dock was the largest of its kind in the world, having an extreme length of 1225 feet and length over the blocks of 1150 feet. It was so arranged that it could be used in two independent sections, one 650 feet long and the other 500 feet long. There was a patent slipway 720 feet in length and a cradle 240 feet long. The depth over the sill at high tide was 42 feet. The dock was provided with a 70-ton fixed crane and a 20-ton traveling crane.

Drydock at Quebec. The Champlain drydock at Quebec, which had been under construction since 1914, was completed in August, 1918. Situated on the south side of the St. Lawrence, and with a length of 1150 feet, a width of 120 feet and depth over the sill of 34 feet at neap tide, and 40 feet at high water at spring tide, it was at the time of its completion one of the largest drydocks in the world, being able to accommodate the largest ships for which the port of Quebec had adequate deep water berths. This dock was divided into two compartments with an inner chamber 650 feet in length and an outer one 500 feet in length, the latter being closed by a rolling caisson, while the middle entrance was formed by a floating caisson. For emptying the dock three main pumps of the horizontal centrifugal type, designed to deliver

63,000 gallons a minute against the total head of 25 feet, were provided. These were operated by electric power and could empty the dock in about two and a half hours.

Floating Docks. In the period between 1914 and 1924 there was also an increase in the size and capacity of floating docks which, it will be recalled, could be used at any convenient location, and could be moved from place to place if so desired. At the close of the War two large floating docks owned by Germany, and at the time the largest structures of the kind, passed into the possession of the British. Each of these had an overall length of about 700 feet and a lift of some 40,000 tons. The British Admiralty, however, decided that there was need of a still larger floating dock, and in November, 1922, one was put under construction with a length of 960 feet, and a lifting capacity of 60,000 tons. This was built at the Walker Shipyard of Sir W. G. Armstrong, Whitworth and Company, and was designed for the port of Southampton. This dock which, at the time of its completion, in 1924, was the world's largest floating dock, was of the double sided, self-docking sectional box type, and consisted of pontoon and two parallel walls divided transversely by seven sections. When in position at Southampton it was moored by four steel booms 110 feet long, hinged at one end to the dock and at the other extremity to four dolphins of reinforced concrete. When submerged the dock contains some 80,000 tons of water to pump out which 14 motor driven centrifugal pumps were provided and with all in operation some four hours were required to remove the water. The British Government accordingly had with the Southampton and the two German docks three floating docks, each of which was capable of taking a large battleship, such as the *Hood*, and a distinct strategic and maintenance advantage was gained by the fact that all of these docks could be passed through the Suez Canal. It was rumored in 1924 that one of these floating docks was to be sent to Singapore, another to Malta, but no confirmation was available of such disposition.

American Built Docks in France. At the mouth of the Loire River in France, during the War, engineers of the American Army constructed a notable timber dock system which provided new berths for 10 vessels in addition to an existing series of docks adjoining, previously constructed by the French. These docks were built of timber supported by wooden piles and were located on mud flats. On their shore side were built long low classification sheds, and further inland a receiving yard, a departure yard for the handling of freight cars. There was provided specially designed timber rigging for the handling of ships' cargoes, and heavy steel gantry cranes were erected also.

DODD, LEE WILSON (1879-). An American author and playwright, born at Franklin, Pa., and educated at Yale. He studied law at the New York Law School and was admitted to the bar in 1902, but gave up law five years later for literature, in which he made distinct accomplishment, but has been criticized as being over novelistic. He is author of *A Modern Alchemist* (1906); *The Return of Eve* (1909); *Speed* (1911); *The Middle Miles* (1915); *His Majesty Bunker Bean* (1915); *Pals First*; *The Book of Susan* (1920) and *Lilia Chenoworth* (1922).

DODD, WILLIAM EDWARD (1869-). An American historian, born at Clayton, N. C., and educated at Virginia Polytechnical Institute and the University of Leipzig. While successively holding the chairs of history at Randolph-Macon College (1900-08) and at the University of Chicago (1908-), he wrote: *Jeffersons Rückkehr zur Politik, 1796* (1900); *Life of Nathaniel Macon* (1903); *Life of Jefferson Davis* (1907); *Statesmen of the Old South* (1911); and *Woodrow Wilson and His Work* (1920). In addition, he was editor and joint author of the *Riverside History of the United States* (1915) and of *The Cotton Kingdom* (in *Chronicles of America* series), and co-translator of Lamprecht's *What Is History?* (1905).

DODECANESE. A group of 12 small islands, the Sporades, off the southwest coast of Asia Minor, among which, politically, Rhodes was included. Most of them, barren rocks, are uninhabited. Of their total population, 100,198 in 1917, the greater part were Greek sponge fishermen inhabiting Rhodes and Cos. During the Libyan War between Italy and Turkey, the Italians occupied the islands, and by the Treaty of Lausanne of 1912, Italy was permitted to continue occupation only as a guarantee toward Turkish evacuation of Tripoli. The Turks claimed to have fulfilled their obligations, but the Italians stayed on. After the War the question of the Dodecanese became a test of the sincerity of the Allies' idealistic pretensions. On the one hand was the plain fact of the Greek nationality of the population; on the other, the Italian claim, frankly imperialistic, based on actual possession and on the recognition of this possession in the secret Treaty of London in 1915, by which the Italian government had been induced to enter the War. In 1919 the Greek Premier, Venizelos, effected a bargain with Tittoni, Italian foreign minister, by which the Dodecanese were to be turned over to Greece and Rhodes to Italy. The disposition of the latter the Italians promised to submit to a plebiscite when Great Britain should promise to do similarly in the case of Cyprus. The Peace Treaty of Sèvres in 1920 transferred the islands from Turkish to Italian sovereignty, while a separate Greco-Italian treaty signed on the same day in accordance with the Venizelos-Tittoni agreement promised all except Rhodes, where a plebiscite was to be held, to Greece. Despite this pledge, Italy continued in occupation of the disputed territory, and shortly afterward repudiated the agreement, on the ground that the Sèvres Treaty had not been ratified. Events of the succeeding years once more brought the Dodecanese question before the attention of the world. The overthrow of Venizelos, the defeat of Greece in its Asia Minor adventure, and the rise of Italian chauvinism under Mussolini, gave substance to the belief that Venizelos' settlement was only too ephemeral and that Italy rather than Greece was to control the eastern Mediterranean. The soundness of these conjectures was confirmed when, regardless of self-determination and the principle of nationalism, and in a spirit typical of the old diplomacy, the Great Powers in 1923 confirmed Italy's hold on the islands. By article 15 of the Treaty of Lausanne, Turkey renounced all rights over the Dodecanese, Rhodes, and the island of Castellorizo in favor of Italy. No mention was made of a plebiscite. See GREECE; ITALY.

DODGE, RAYMOND (1871-). An American experimental psychologist. He was educated at Williams College and the University of Halle (Germany). In 1896, he was appointed professor of philosophy at Ursinus College, and the following year became associated with Wesleyan University, and was made full professor in 1902. He was selected to conduct experiments on the psychology of nutrition at the Carnegie Institute laboratory (1913-14), and became the editor of the *Journal of Experimental Psychology* (1916) and of the *Journal of Comparative Psychology* (1921). He is the author of numerous scientific monographs and papers on the psychology of language, vision, eye movement, and dynamic psychology in general.

DODGE, WILLIAM DE LEFTWICH (1867-). An American artist born at Liberty, Va., who studied in Paris and Munich and entered first place in the examination for the Ecole des Beaux Arts. Mr. Dodge's work as a mural painter is represented in New York by his decorations of the Empire Theatre, of the Waldorf-Astoria Hotel, and of other theatres and hotels. Among his principal works were the decorations of the Café de l'Opéra, Paris, The Folies Bergères Theatre, murals for the Panama-Pacific International Exposition, and for the Flag Room at the capitol at Albany, mosaics for the Hall of Records, New York, "Signing of the Peace," at Versailles, and "Taking of the Fort de Vaux."

DOFLEIN, FRANZ J. T. (1873-). A German zoölogist born in Paris. He traveled extensively in the United States, West Indies and Mexico. He succeeded Weismann as professor of zoölogy at the University of Munich, in 1912, and became professor at Breslau in 1918. Professor Doflein's published works were on the protozoa, animal biology, and psychology.

DOHENY, EDWARD LAURENCE (1856-). An American capitalist and oil producer, born at Fond du Lac, Wis., who spent his early years prospecting for gold with varying success. Stranded in Los Angeles in 1892, he noticed a wagonload of pitch passing along the street and investigated the hole from which it was taken. He obtained a lease of a lot near-by, and at 225 feet struck a gusher which started the Los Angeles oil field. After finding several other fields, and gaining several fortunes, he went to Mexico in 1900 and organized the Mexican Petroleum Company with \$10,000,000 capital, and obtained leases on about 1,000,000 acres of barren land near Tampico. In four or five years, Tampico was a world oil centre. The control of such vast enterprises inevitably led Doheny into political activity. In Mexico, he was charged with being responsible for several revolutions, and he was a large factor in California politics. He was prominent in the transactions in regard to the United States naval oil reserves, and was called to Washington to testify before the investigating committee early in 1924. His testimony revealed that he had lent to former Secretary of the Interior Albert B. Fall \$100,000, and that a number of ex-cabinet members and other government officials had been employed by him in connection with the oil leases.

DOHERTY, PHILIP JOSEPH (1856-). An American lawyer, born at Charlestown, Mass., and educated at the School of Law, Boston University. He practiced in Boston from

1877 to 1908; in the latter year, he became attorney to the division of safety of the Interstate Commerce Commission; and in 1913, chief attorney. Beginning in 1884, he held various political offices, including member of the Massachusetts House of Representatives, delegate to the Democratic National Convention, and chairman of the Democratic State Convention (1897). In 1896, he was Democratic candidate for Congress. He was appointed special assistant to the United States District Attorney in cases having to do with certain industrial questions, and in 1909 served as special assistant to the Attorney General in the Mondou-N. Y. N. H. & H. R. R. case. In 1914, he was on the commission to investigate the finances of the New Haven Railroad. In 1918, he was appointed manager of the Property Protection Section of the United States Railroad Administration, and the following year became attorney to the Valuation Bureau of the Interstate Commerce Commission. He is the author of *The Liability of Railroads to Interstate Employes* (1911).

DOHSE, RICHARD (1875-). A German historian, born at Lubz, Mecklenburg. He studied at the universities of Munich, Marburg, Geneva and Rostock, specializing on modern languages and history. He traveled in France and Spain and was journalist, correspondent and editor of various papers. His principal works are: *Colley Cibbers Bearbeitung von Shakespeares Richard III* (1897); a volume of verse, *Aus stillen Stunden* (1902); *Kunst für die Jugend* (1902); several books of verse in Low German (1902-14); *Moderne deutsche Literatur* (1920); *Deutsche Literatur von Anfang bis Hebbel* (1921); and *Das Niederdeutsche Drama* (1921).

DOISY, PELLETIER (?-). A French airman who with Sergeant Besin flew from Paris to Peking (1924) and has made some sensational flights in the Orient. He also made a world's record for altitude with 1500 kilograms of useful load for seaplanes.

DOMBROWSKI, ERICH FRANZ (1882-). A German student of theoretical and practical economy, born in Danzig. He became a well known traveler and editor, and a lecturer at Danzig, Kiel, Berlin and Leipzig. He is the author of *Zehn Jahre deutscher Kulturentwicklung vor dem Kriege* (1915), *Das alte und neue System* (1919), and *Politische Köpfe Deutschlands* (1920).

DOMINIAN, LEON (1880-). An American geographer, born at Constantinople, Turkey. He was graduated at Robert College in 1898 and during 1898-1900 studied at Liège. After two years of travel in Turkey, he came to the United States, and became an assistant on the United States Geological Survey in the Southwest, also serving as an instructor in the New Mexico School of Mines during 1904, after which he spent two years in Mexico. In 1907, he settled in New York City and devoted himself to research and writing, but in 1912 went to Washington as a writer of geographical articles for the *National Geographic Magazine*. He became connected with the Department of State in 1918, serving it on various technical matters, especially with the American Peace Conference in France during 1919. Since 1921, he has been United States Consul in Rome. He served as a delegate to the 12th International Geographical Congress in Toronto in 1913 and

to the 2d Pan-American Scientific Congress held in Washington in 1915. He is the author of *The Frontiers of Language and Nationality in Europe* (1917).

DOMINICAN REPUBLIC. See **SANTO DOMINGO.**

DONAI. See **WAR IN EUROPE, Western Front.**

DONNAY, MAURICE (1859-). A French dramatic author (see VOL. VII), whose recent work includes: *Alfred de Musset* (1914); *La Parisienne et la guerre* (1916); *L'Impromptu du paquetage* (1916); *Le Théâtre aux armées* (1916). *Premières impressions* (1917); *Lettres à la dame Blanche* (1917); *Pendant qu'ils sont à Noyon* (1917); *La Chasse à l'homme* (1919).

DORGELES, ROLAND (1886-). A French novelist, who came to the front with the publication of his war novels, *Les Croix de Bois* and *Le Cabaret de la Belle Femme*. In spite of the intensity of his subject, his style is that of a sober realism, which is in many ways the equal of the melodramatic pages of Barbusse's *Under Fire*. His other works are: *La Machine à finir la guerre* (in collaboration with Régis Gignoux, 1916); *La Boule les Ailes* (1921); *Saint Magloire* (1921); *Sous les Ailes de mon moulin* (1922); *Le Réveil des morts* (1923). *Les Croix de Bois* and *Saint-Magloire* were translated into English.

DORR, RHETA CHILDE (?-). An American author and social worker (see VOL. VII). She was war correspondent for a syndicate of 21 newspapers during 1917-18, and became foreign correspondent with headquarters at Prague in 1920. Her later books include *Inside the Russian Revolution* (1917), *The Soldier's Mother in France* (1918), and *Czecho-Slovakia* (1921).

DORSEY, NOAH ERNEST (1873-). An American physicist, born at Annapolis Junction, Md. He was graduated in 1893 from Johns Hopkins, where he was a fellow during 1896-97 and received his Ph.D. After serving as a research fellow at the Yerkes Observatory during 1899 he returned to Johns Hopkins and was an associate in physics until 1901, when he entered the service of the government as physicist to the Bureau of Soils in the Department of Agriculture. In 1903, he transferred to the Bureau of Standards, in which he attained the rank of physicist in 1917. In 1921, he assumed a consulting relation with the Bureau in addition to his private practice. His principal investigations have included the physics of the soil, absolute measurements in electricity and physics of the medical sciences, including applications of X-rays. Besides many articles contributed to scientific journals, he is the author of *Physics or Radioactivity* (1921).

DOTTIN, HENRI GEORGES (1863-). A French philologist (see VOL. VII). His most recent works are *Les anciens peuples de l'Europe* (1916) and *La langue gauloise* (1920).

DOUGALL, LILY (1858-). A Canadian novelist (see VOL. VII). Among her recent works are *The Practice of Christianity* (1914), and *The Christian Doctrine of Health* (1916). She was part author of *Concerning Prayer* (1916); *Immortality* (1917); *The Spirit* (1919); *God and the Struggle for Existence* (1919); *Arcades Ambo* (1919), a volume of poems, and *The Lord of Thought* (1922).

DOUGHERTY, PAUL (1877-). An American marine painter, born in Brooklyn,

N. Y. He was graduated from the Brooklyn Polytechnic Institute and the New York Law School and studied art in Europe, spending much of his time in London, Paris, Florence, Venice and Munich. In 1906, he was elected an Associate of the National Academy and the next year he was made a full member. He is also a member of the National Institute of Arts and Letters. Mr. Dougherty's marine paintings have been exhibited all over the United States and in many parts of Europe and include: "October Seas"; "The Road to Cayey"; "Lake Louise" (Metropolitan Museum, N. Y.); "Sun and Storm" (National Gallery, Washington); "Flood Tide" (Carnegie Institute, Pittsburgh); "Storm Quiet" (Chicago Art Institute); "The Land and the Sea" (Corcoran Gallery, Washington); "Autumn Oaks" (Brooklyn Institute Museum). Among Mr. Dougherty's awards was the gold medal from the Panama-Pacific International Exposition in 1915.

DOUGHTY, ARTHUR GEORGE (1860-). A Canadian historian and archivist (see Vol. VII). In 1917, Doughty was attached to the Canadian Expeditionary Force War Archives Survey and in 1919 he accompanied the Prince of Wales as historian on his Canadian tour. Among his later works appear *The Acadian Exiles* (1915), *A Daughter of New France* (1916), and *Notes on the History of Canada Prepared for the Visit of the Prince of Wales* (1919).

DOUGHTY, CHARLES MONTAGUE (1843-). An English explorer (see Vol. VII). His work in the period under review was devoted almost entirely to the writing of poetry and poetic drama. *The Titans* appeared in 1916 and *Man-soul, or the Riddle of the World* in 1920.

DOUGHTY, HOWARD WATERS (1871-). An American chemist, born at Baltimore, Md. He was educated at Johns Hopkins University, where he received his Ph.D. in 1905. During 1905-06, he was instructor of chemistry at Missouri and during 1907-08, at Wisconsin, after which he went to Amherst, where he became full professor in 1913. His original investigations have been chiefly in the field of organic chemistry, notably on derivatives of trimethyl-paraconic and camphoronic acids and on the reactions with various metals of compounds containing the trihalogen methyl group.

DOUGLAS, ROBERT LANGTON (1864-). An English art critic, lecturer, and author (see Vol. VII). Enlisting in the new army in 1914, he became staff captain, War Office, 1916-17. After 1916, he was director of the National Gallery, Ireland. To the literature of Siennese art, as an authority on which he was best known, he contributed in 1914 an edition (second) of *Histoire de Sienne*.

DOUMER, PAUL (1857-). A French statesman (see Vol. VII). He became minister of state in 1917, and was minister of finance during 1921-22.

DOUMERGUE, GASTON (1863-). A French statesman (see Vol. VII). He held the portfolio for the colonies through the ministries of Viviani and Briand until the Ribot Ministry of March, 1917, when he was sent to Russia to persuade the Kerensky government not to make a separate peace with Germany and Austria. He was elected the twelfth President of France on June 13, 1924, the first Protestant to hold that office.

DOURINE. See VETERINARY MEDICINE.

D'OVIDIO, FRANCESCO (1843-). An

Italian philologist (see Vol. VII). He has published, within the last years, *L'avversione di Ruggiero Bonghi alla tripartita alleanza* (1915), *L'origine della presente guerra* (1915), and *Benvenuto da Imola e la leggenda vergiliana* (1916).

DOWLING, AUSTIN (1868-). An American archbishop, born in New York City. He graduated from Manhattan College in 1887, and after studying at St. John's Seminary and the Catholic University, was ordained to the Roman Catholic priesthood in 1891. He served as pastor in Warren, R. I., and from 1905 to 1912 was pastor of Saints Peter and Paul Cathedral. He was consecrated Bishop of Des Moines in 1912 and Archbishop of St. Paul in 1919.

DOWNS, LAWRENCE ALOYSIUS (1872-). An American railway official, born in Greencastle, Ind. He graduated from Purdue University in 1894 and in the following year began his railroad career with the Vandalia road. He occupied many important positions with the Illinois Central Railroad until 1920, when he was elected vice-president and general manager of the Central of Georgia Railroad. He was the author of *Development of Banking in Illinois* (1914).

DOYLE, SIR ARTHUR CONAN (1859-). A British novelist and spiritualist (see Vol. VII). After 1913, Sir Arthur lengthened his already long list of works with: *The Case of Oscar Slater* (1914); *The Valley of Fear* (1915); *A Visit to Three Fronts* (1916); *History of the British Campaign in France and Flanders*, vols. i and ii (1915-20); *Danger* (1918); *His Last Bow* (1918); *The Guards Came Through* (1920). *A New Revelation* (1918); *The Vital Message* (1920), and *The Wanderings of a Spiritualist* (1921), were written in connection with his studies in the field of spiritualism. He lectured and debated on the subject of spiritualism in Europe and America.

DRAFT ACT. See UNITED STATES, *History*.

DRAFT TREATY OF MUTUAL ASSISTANCE. See WASHINGTON CONFERENCE.

DRAGE, GEOFFREY (1860-). An English sociologist (see Vol. VII). He was active during the War as a member of the Departmental Committees National Register (1915), vice-president of the Royal Statistical Society (1916-18), chairman of the Denison House Committee on Public Assistance (1916), and chairman of the Official Statistics Committee (1919). In 1916, he was attached to the War Office in the Military Intelligence Section, and in the following year was director of the Investigation Board of Agriculture. Among his later works may be mentioned: *Ephemera* (1915); *Reorganization of Official Statistics and a Central Statistical Office* (1916); *Pre-war Statistics of Poland and Lithuania* (1918), and *The Cost of Public Assistance* (1921).

DRAINAGE RECLAMATION. See RECLAMATION.

DRAKE, DURANT (1878-). An American professor of philosophy. He was born at Hartford, and was educated at Harvard and Columbia Universities. In 1912, he joined the faculty of Wesleyan University, and in 1915 became professor at Vassar. He was one of a group of seven who published the *Essays on Critical Realism* (1920). Among his other writings are: *The Problem of Things in Them-*

selves (1911); *Problems of Conduct* (1914); *Problems of Religion* (1916); *America Faces the Future* (1922).

DRAKE UNIVERSITY. An institution at Des Moines, Iowa, founded in 1881. The student enrollment in 1913 was 1594, compared with 1750 in the year 1923-24, with 532 in the summer school of 1923. The faculty in 1913 numbered 80, against 78 in the later year; this figure is exclusive of 19 officers of administration. The library increased from 26,000 to 35,000 volumes. Drake University Municipal Observatory was built by the city of Des Moines in Waverland Park in 1921. Arthur Holmes, Ph.D., succeeded Hill M. Bell as president in 1918 and was in turn succeeded by Daniel W. Morehouse, Ph.D., in 1922.

DREIER, MARY ELIZABETH (1875-). An American social worker, born in Brooklyn, N. Y., and educated in private schools, at home, and at the New York School of Philanthropy. From 1906 to 1915, she was president of the Woman's Trade Union League, subsequently serving on the Executive Committee. From 1911 to 1915, she was a member of the New York State Factory Investigating Commission, and in 1915 was appointed to the Board of Education by Mayor Mitchel. She resigned in order to give all her time to suffrage work, becoming chairman of the Industrial Section of the New York State Woman's Suffrage Party and of the Americanization Committee of the New York State and New York City Woman's Suffrage Party, until 1918. In 1918, she was made chairman of the New York State Committee on Women in Industry of the Advisory Commission of the Council of National Defense and of the Women's Joint Legislative Conference. In 1921, she also became a member of the Industrial Committee of the National Board of the Y. W. C. A., and of the Executive Committee of the New York State Council for the Limitation of Armament.

DREISER, THEODORE (1871-). An American author and journalist (see Vol. VII). His most important later works are: *The Titan* (1914); *The Genius* (1915); *Plays of the Natural and Supernatural* (1916); *A Hoosier Holiday* (1916); *The Hand of the Potter* (1919); *Hey Rub-a-Dub-Dub*, a book of essays and philosophy. From his first novel, he has, with each new book, been accused of immorality. His works show a mind of titanic force dealing with dispassionate insight and compassion with the motives and forces that surround mankind. His extended newspaper work gave him an acute understanding of men and life, and also accounts for his careless, loose style of writing.

DRESEL, ELLIS LORING (1865-). An American diplomatist, born at Boston, Mass., and educated in private schools in the United States, Switzerland and Germany, and at Harvard University. He practiced law in Boston from 1892 to 1915, then went to Berlin as attaché of the American Embassy, and until 1917 was special representative of the State Department there. On the declaration of war by the United States, he was sent to Berne in the same capacity. He organized the Central Committee for American Prisoners, and was the representative in Switzerland of the American Red Cross and of the War Trade Board. He became first secretary of the Legation in 1918, and in the same year, attaché to the Peace Conference

in Paris. He was named honorary counselor to the American Embassy in 1919, but did not enter upon his duties, being appointed American commissioner to Germany in the autumn of the same year. As plenipotentiary of the United States government, he signed the peace treaty with Germany on Aug. 25, 1921. In November of the same year, he became chargé d'affaires in Berlin.

DRESSER, HORATIO WILLIS (1866-). An American author prominent in the New Thought movement. He was born at Yarmouth, Maine, and educated at Harvard University. He began his career in 1879 as telegraph operator and railroad agent in California. He returned to Boston, however, and tried a variety of occupations, finally becoming, in 1896, editor and publisher of the *Journal of Practical Metaphysics*, and, in 1899, of the periodical entitled *The Higher Law*. His writings, which are mostly philosophical, include: *The Power of Silence* (1895); *The Perfect Whole* (1896); *In Search of a Soul* (1897); *Methods and Problems of Spiritual Healing* (1899); *Education and the Philosophical Ideal* (1900); *A Book of Secrets* (1902); *Health and the Inner Life* (1906); *A Physician to the Soul* (1908); *A Message to the Well* (1910); *Human Efficiency* (1912); *The Religion of the Spirit in Modern Life* (1914); *Handbook of the New Thought* (1917), and *The Victorious Faith* (1917). He edited *On the Threshold of the Spirit World* (1919); *A History of the New Thought Movement* (1919); *The Open Vision* (1920); *The Quimby Manuscripts* (1921), etc.

DRESSLER, WILLY OSKAR (1876-). A German writer on art and interior decoration, born in Berlin. His principal works are: *Möbel im Zimmer der Neuzeit* (1901); *Moderne Silbergeräte* (1902); *Geschichte des Porzellans* (1904); *Kunstgewerbe oder angewandte Kunst in Beziehung zur künstlerischen Kultur* (1910); *Neugestaltung der Verwaltung der Kunstangelegenheiten im Reich und in den Bundesstaaten* (1917); *Der Eckstein in der Wirtschaft von den Werkleuten vergessen!* (1921).

DRIESCH, HANS A. S. (1867-). A German biologist and philosopher (see Vol. VII). In 1921, he became professor at the University of Leipzig. His writings after the War were largely concerned with speculative and metaphysical problems. Professor Driesch was also very much interested in psychical research and served on committees investigating various spiritistic mediums. His published works after 1914 include *Leib und Seele* (1916), *Wirklichkeitslehre* (1917), and *Wissenschaft und Denken* (1920).

DRINKWATER, JOHN (1882-). An English poet, playwright, and critic, born at Leytonstone, Essex. He was educated at the Oxford High School and served for 12 years as insurance clerk. He then turned his attention to theatrical enterprises and became manager and producer to the Pilgrim Players, who later developed into the Birmingham Repertory Theatre Company. His first volume of poems appeared in 1908 and his first play, *Cophetua* (in verse), in 1911. After several volumes of verse, he published studies in criticism, among them *Critical Studies of William Morris* (1912); *Swinburne* (1913). Since then he has devoted himself to the writing of plays of which *Abraham Lincoln* (1918), is the best

known to Americans. It is a chronicle play and shows sympathetic insight into the personality of the great American. Other plays are *Loyalties* (1919); *Mary Stuart* (1921); *Seeds of Time* (1921); *Oliver Cromwell* (1921); *Preludes* (1922), and *Robert E. Lee* (1923). The last mentioned play was viewed as a complement to his *Abraham Lincoln*, but was not so successful.

DROP BOMBS. See BOMBING OF VESSELS BY AIRCRAFT; ORDNANCE.

DRUMMOND, SIR ERIC. See LEAGUE OF NATIONS.

DRURY, FRANCIS KEESE WYNKOOP (1878-). An American librarian, born at Ghent, N. Y., and educated at Rutgers College and the University of Illinois. From 1899 to 1903, he was assistant librarian at the Gardner A. Sage library at New Brunswick, N. J.; then went to the University of Illinois library, becoming acting librarian in 1907 and assistant librarian in 1909. In 1919, he was appointed assistant librarian in Brown University library, and became assistant professor in the same university in 1920. In 1918 and 1919, he was employed in the American Library Association War Service. He is known as a compiler and editor. Following are his published works (compilations): *List of Serials in the University of Illinois Library* (1911); *Technical and Scientific Serials in the Library of Providence* (1920); *Some of the Best Dramas* (1917); *Plays of To-Day* (1921).

DRURY COLLEGE. A nonsectarian college founded at Springfield, Mo., in 1873. The number of students increased from 276 in 1914 to 411 in 1924, the faculty from 21 to 25, and volumes in the library from 30,000 to 33,000. The productive funds rose from \$258,165 to \$850,000, and the annual income from \$51,550 to \$85,535. Thomas W. Nadel succeeded James G. McMurtry as president.

DRYDOCKS. See DOCKS.

DUAL NATIONALITY. See JAPAN, *History*.

DUANE, WILLIAM (1872-). An American physicist, born at Philadelphia, Pa. He was graduated at Pennsylvania in 1892; and received his Ph.D. at Harvard in 1897. During 1907-13, he worked as an investigator at the Curie radium laboratory in Paris, then returned to Harvard, where in 1917 he became professor of biophysics. His principal investigations have been studies on the velocity of chemical reactions, short electrical waves, radium emanations and induced activity, alpha rays of radium, heat effects of radioactive substances, ionization, and absorption and emission spectra of X-rays, on all of which topics he has published valuable papers. During the War, he was chairman of the committee on X-rays in the Section on Physical Sciences of the National Research Council.

DUBOIS, CHARLES GILBERT (1870-). American banker and business man, born in New York City, and educated at Dartmouth. Upon leaving college he entered business with the Western Electric Company in New York and within a little over a decade became secretary and supervisor of the company's branch houses; and in 1919, became president. He was comptroller of the American Telephone and Telegraph Company (1907-18) and of the American Red Cross, Washington, D. C. (1917-18). He has held the presidency or director-

ship of many leading trust companies and banking corporations in the United States.

DUBOIS, LOUIS ERNEST, CARDINAL (1856-). A French ecclesiastical prelate. He was born at Saint Calais, Sarthe, and was ordained priest in 1879. He was curate at Saint-Benoit du Mans in 1895, and passed rapidly through the various grades of the Catholic hierarchy. He was Bishop of Verdun in 1901, Archbishop of Bourges in 1909, Archbishop of Rouen in 1916, and Archbishop of Paris in 1920. He became Cardinal in 1916. Cardinal Dubois was a Knight of the Holy Sepulchre and a member of the Academy of St. Thomas Aquinas. His writings included a number of biographies and historical chronicles.

DU BOIS, WILLIAM EDWARD BURGHARDT (1868-). An American editor and author, born at Great Barrington, Mass., and educated at Harvard and the University of Berlin. During the period 1896-1910, he was editor of the *Crisis* and has since given indication of his keen interest in the advancement of the Negro, in his writings: *The Suppression of the Slave Trade* (1896); *The Philadelphia Negro* (1899); *Quest of the Silver Fleece* (1911); *The Negro* (1915); *Darkwater* (1920). He edited the *Atlanta University Studies of the Negro Problem* (1897-1911).

DU BOSE, HORACE MELLARD (1858-). An American Methodist Episcopal bishop, born in Choctaw County, Ala., and educated at Waynesboro Academy, Mississippi, and with private tutors. He was licensed to preach in the Methodist Episcopal Church in 1876, and three years later was ordained. He was a member of the Mississippi Conference from 1877 to 1880, and held various pastorates from 1881 to 1890. From 1890 to 1894, he was editor of the *Pacific Methodist Advocate* in San Francisco; served in various pastorates for the next three years, and became secretary of the Epworth League and editor of the *Epworth Era* in 1898. From 1910 to 1915, he was again pastor, and from 1915 to 1918 was book editor for the Methodist Episcopal Church of the South, and editor of the *Methodist Quarterly Review* in Nashville. He was elected bishop in 1918, being stationed at Berkeley, Cal. He was a member of the Leumencal Conference which took place in 1901.

DUGGAN, STEPHEN PIERCE (1870-). An American author and political scientist, born in New York City and educated at the College of the City of New York and Columbia University. He was associate professor and professor of political science at the College of the City of New York (1896-); and director of the Institute of International Education (1919-), the National Commission for Mental Hygiene, and the Council on Foreign Relations. He published *The Eastern Question—A Study in Diplomacy* (1902), *A History of Education* (1916), and *The League of Nations* (1919).

DUGGAR, BENJAMIN MINGE (1872-). An American educator (see VOL. VII). From 1917 to 1919, he was acting professor of biological chemistry at the Washington University Medical School. He edited the department of physiology in *Botanical Abstracts* for 1917, and was editor for the *Annals of the Missouri Botanical Garden* from 1913. Professor Duggar wrote *Mushroom Growing* (1915), and contributed many articles to botanical magazines.

DUGUIT, PIERRE (1859-). A French jurist, born at Libourne, and educated at the law faculty of the University of Bordeaux. He remained in the university as a member of the faculty, and achieved an international reputation as a sociological jurist. He was the author of a number of books and articles on public and private law, of which the most notable is the *Traité de Droit constitutionnel* (3 vols., 2d. ed., 1924).

DUHAMEL, GEORGES (1894-). A French man of letters, born in Paris. A man of prolific talent, he revealed his capacities quite early. With Jules Romains and Charles Vildrac, he represented what has been called the "unanimist" school; that is to say, a conception of literature analogous to the collectivism of a Durkheim in philosophy. Duhamel's *Civilisation* won the Prix Goncourt in 1919. His works include: *L'Homme en Tête*; *Selon ma Loi*; *La Lumière*; *Des Légendes*; *Notes sur la Technique poétique*; *Propos critiques*; *Compagnons*; *Paul Claudel*; *Le Combat*; *La Vie des Martyres* (1918); *Dans l'Ombre des statues*; *Civilisation* (1918); *Les Poètes et la poésie*; *La Recherche de la grâce*; *La Possession du Monde*; *Entretiens dans le tumulte*; *Les Hommes abandonnés*; *La Miasme des athlètes*; *La Journée des Avez*.

DULUTH. A city and lake port in Minnesota. The population rose from 78,466 in 1910 to 98,917 by the census of 1920 and to 106,289 by estimate of the Bureau of the Census for 1923. Morgan Park, a model city for workmen, was built during the 10 years between 1914 and 1924 by the Minnesota Steel Company for its employees, within the limits of Duluth. It was served by complete sewer and water systems and concrete paved roads, and had a central playground and hospital. A plan was made for the establishment of primary and secondary civic centres near the lake front, and the cutting of several diagonal streets. McDougall Terminal warehouse opened new lines of lake traffic served by special refrigerator carriers.

DUMAS, GEORGES (1866-). A French psychologist, born at Lédignan (Dept. of Gard), and educated in Paris at the Ecole Normale. He passed both the *agrégation* and the doctorate in philosophy, and took the degree of doctor of medicine. He taught philosophy at the college of Chaptal and later became lecturer on psychology at the Sorbonne as well as chief of the psychological laboratory in the Faculty of Medicine. He was a frequent contributor to the *Journal de Psychologie*, the *Revue Philosophique*, and the *Revue de Paris*. On the death of Ribot he took over the editing of the long projected *Traité de Psychologie*. The first volume of this treatise, with contributions from 30 leading psychologists, appeared in 1923. Professor Dumas's chief interests were in the psychology of affective states. His published works include: *Tolstoï et la Philosophie de l'amour*; *Les Etats intellectuels dans la mélancolie*; *La Tristesse et la Joie*; *Psychologie de deux Messies positivistes* (August Comte et St. Simon); *Le Sourire*; *Névroses et psychoses de guerre chez les Austro-Allemands* (1918).

DU MAURIER, GERALD (1873-). An English actor born at Hampstead, and educated at Harrow. His first stage appearance was at the age of 20 at the Garrick Theatre, London. Two years later he joined Herbert Tree in

Shakespearean repertory and also in his father's play *Trilby*. Among his successes are his parts in *Peter Pan*; *The Admirable Orlinton*; *Little Mary*; *What Every Woman Knows*, and his leading parts in Conan Doyle's *Raffles* and McCutcheon's *Brewster's Millions*. He wrote the play, *A Royal Rival*, produced by Lewis Waller; also *Charles I and Charles II*, with the coöperation of his brother, Guy Louis Bussan du Maurier, and *The Dancers* which was produced in New York during the 1923-24 season.

DUMUR, LOUIS (1864-). A French novelist, born at Geneva, Switzerland and educated at the University of Geneva and at the Sorbonne. His earlier works contained amusing descriptions of Genevese Calvinism. After the War, he developed a patriotic war novel with recitals of German atrocities. His works include *Un Coco de génie* (1902); *Les trois Demoiselles du père Maire* (1909); *Le Centenaire de Jean-Jacques* (1910); *L'Ecole du dimanche* (1911); *Nach Paris!* (1919); *Le Boucher de Verdun* (1921); *Les Défaitistes* (1923).

DUNAJEC RIVER. See WAR IN EUROPE, Eastern Front.

DUNCAN, GEORGE BRAND (1861-). An American soldier, born in Lexington, Ky. He graduated from the United States Military Academy in 1886 and was commissioned 2d lieutenant in the same year. During the Spanish-American War he served as captain of volunteers. He was appointed captain in 1899. He rose through the successive grades, becoming colonel in 1916. In the following year he was appointed brigadier-general N. A., major-general in 1918, and brigadier-general U. S. A. in 1920. He served in the Philippines as a member of the General Staff from 1914 to 1917. From the latter year to 1919 he was with the American Expeditionary Forces in France as commander successively of the 26th Infantry, 1st Division, and the 1st Brigade, 1st Division. He commanded the 77th Division from May to August, 1918, and the 82d Division during the Meuse-Argonne offensive. He was awarded decorations by the British and French governments.

DUNHAM, JAMES HENRY (1870-). An American clergyman and educator, born at Westminster, N. J., and educated at Princeton University, Princeton Theological Seminary, the University of Berlin and the University of Pennsylvania. He was ordained in the Presbyterian ministry in 1896, and until 1912 was pastor of the First Church at Mt. Holly. In 1914, he began his work as educator, teaching in the Haverford (Pa.) School and holding the position of professor of ethics in the College of Liberal Arts and Sciences at Temple University, Philadelphia, in 1914-15. In 1920, he was appointed student counsellor on the Federal Board of Vocational Education. He is the author of *Freedom and Purpose—The Psychology of Spinoza* (1916), and *John Fourteen* (1917).

DUNKERS, or DUNKARDS. See BRETHREN, CHURCH OF THE.

DUNLAP, KNIGHT (1875-). One of the leading American experimental psychologists. He was born at Diamond Spring, Cal., and was educated at the University of California. In 1906, he joined the faculty of Johns Hopkins University, becoming full professor in 1916. He was president of the American Psychological Association for the year 1922. His works include: *A System of Psychology* (1912);

Outline of Psycho-biology (1914); *Personal Beauty and Racial Betterment* (1920); *Mysticism, Freudianism and Scientific Psychology* (1920); *Outlines of Psychology* (1923).

DUNN, ARTHUR WILLIAM (1868-). An American educator, born at Galesburg, Ill., and educated at Knox College and the University of Chicago. He began his career as instructor in English and lecturer in sociology at the University of Cincinnati (1896-98). He was also extension lecturer from 1896 to 1900, and from the latter year until 1910 headed the department of history and civics in the Shortridge High School, Indianapolis. From 1906 to 1910 he was director of civic education in the public schools in the same city; in 1910-11, he was civic secretary of the City Club of Philadelphia; in 1911-14, he served as executive secretary of the Public Education Association, New York City; and from 1914 to 1921, he held the office of specialist in civic education in the United States Bureau of Education. In 1920, he was appointed special adviser to the United States Navy in the civic education of men on shipboard, becoming, in the following year, associate national director of the Junior Red Cross, and being advanced to the position of national director in 1921. He is the author of: *The Community and the Citizen* (1907); *The Teaching of Community Civics* (with others; 1915); *Social Studies in Secondary Education* (1916); *Citizenship in School and Out* (with Hannah Margaret Norris; 1920); *Community Civics and Rural Life* (1920); *Community Civics for City Schools* (1921).

DUNN, SAMUEL ORACE (1877-). An American transportation specialist (see VOL. VII). He wrote *American Transportation Question* (1912); *Government Ownership of Railways* (1913); *Railway Regulation or Ownership?* (1918). He also contributed articles to periodicals and lectured frequently on transportation subjects.

DUNNING, WILLIAM ARCHIBALD (1858-1922). An American educator and political scientist (see VOL. VII). He published *The British Empire and the United States* (1914), and a *History of Political Theories* (3 vols., 1902-20).

DUNSANY, EDWARD JOHN MORETON DRAX PLUNKETT, eighteenth BARON (1878-). An Irish author and playwright, born in London and educated at Eton and Sandhurst. He served in the South African War with the Coldstream Guards. In the recent War, he was Captain of the Royal Inniskilling Fusiliers and was wounded in 1916. Many of Dunsany's works are laid in the Golden Age of Spain and are saturated with the romantic spirit of mediæval gloom and colored adventure. Though apparently approved of by the public, he has been characterized by sceptical critics as too volatile and entirely wanting in genuine national spiritedness. His publications include: *The Gods of Pegana* (1905); *Time and the Gods* (1906); *The Sword of Welleran* (1908); *A Dreamer's Tales* (1910); *Tales of War* (1918); *Unhappy Far-off Things* (1919); *Tales of Three Hemispheres* (1920); *The Chronicles of Rodriguez* (1922). Among his plays are: *The Glittering Gate* (1909); *King Argimenes* (1911); *The Gods of the Mountain* (1911); *The Golden Doom* (1912); *The Tents of the Arabs* (1914); *A Night at an Inn; If* (1921).

DUPRÉ, MARCEL (1886-). A famous French organist, born at Rouen. Under his father's instruction, his progress was so rapid that at the age of 12 he became the regular organist at St. Vivien. Later he entered the Paris Conservatoire, where he carried off the first prize for piano in 1905. In 1914, he won the Prix de Rome with the cantata *Psyché*. His meteoric rise to fame began in 1916, when he took Vienne's place at Notre Dame during the latter's protracted illness. In 1920, he created a sensation by playing from memory, in 10 recitals, all the organ works of Bach. Immediately after that event he made a sensationally successful tour of England. On Nov. 18, 1921, he made his American début with the inauguration of the great organ in the Wanamaker Auditorium in New York, exhibiting at the same time his marvelous powers of improvisation.

DURALUMIN. An alloy of Aluminium and Magnesium. See ALUMINIUM; MOTOR VEHICLES.

DURAND, E. DANA (1871-). An American statistician (see VOL. VII). He was employed by the United States Food Administration from 1917 to 1919, and was adviser to the food minister of Poland from 1919 to 1921. In 1921, he was chief of the Eastern European Division of the United States Bureau of Foreign and Domestic Commerce. He contributed articles on economic and political subjects to many economic journals, and in 1915 published *The Trust Problem*.

DURAND, ELIAS JUDAH (1870-1922). An American botanist, born at Canandaigua, N. Y. He graduated from Cornell University in 1893 and was assistant botanist in the experiment station at that university (1895-96) and instructor in botany from 1896 to 1910. In the latter year, he was appointed assistant professor of botany at the University of Missouri, and during the years from 1918 to 1922 was professor of botany at the University of Minnesota.

DURHAM, HENRY WELLES (1874-). An American civil engineer, born in Chicago. He graduated from the School of Mines at Columbia University in 1895, and was engaged on surveys with the United States Geological Survey, and with the United States Nicaragua Canal Commission and with the Isthmian Canal Commission. From 1900 to 1904, he was assistant engineer in charge of construction of the New York subway, and was resident engineer in charge of municipal improvements in Panama, from 1904 to 1907. From the latter date to 1912, he was in charge of the surveys and construction of the Cape Cod Canal, and from 1912 to 1915 was chief engineer of highways for Manhattan Borough. He was a member of the New York National Guard, and served on the Mexican border in 1916. He was appointed major of engineers in 1917 and was given command of the 41st Engineers, which he commanded in France. For a time he was in charge of forestry operations in France and later was in charge of road maintenance. He was honorably discharged in October, 1919. In 1920-21 he was engaged in making plans for the sanitation of several cities in Peru. He wrote *Street Paving and Maintenance in European Cities* (1915).

DURKHEIM, EMILE (1858-1916). A French philosopher (see VOL. VII). He published a

number of brochures on the War and was honored by the French government with the cross of the Legion of Honor. He died in 1916, grief-stricken by the killing of his son at the front. The sociological method of approaching philosophical problems, which he founded, was continued by a host of disciples, among whom may be mentioned Bougle, Hubert and Mauss.

DUSE, ELEONORA (1859-1924). An Italian actress (see VOL. VII). While on an American tour which began in the latter part of 1923, she became seriously ill with a cold and general nervous breakdown, and died at Pittsburgh, Apr. 21, 1924. Her last appearance at the Metropolitan Opera House in New York was an ovation, every seat and all the standing room being occupied. Not only was great grief caused by her death in her native land, Italy, but artistic circles throughout the world mourned and paid tribute to probably the greatest actress of her time.

DUST EXPLOSIONS. See **CHEMISTRY, ORGANIC.**

DUTCH EAST INDIES (NETHERLANDS INDIA). The Dutch possessions in the Malay Archipelago. They have a total area of 733,642 square miles, and a population, by the census of 1920, of 49,350,834. The 1905 census figure was 38,070,782. In 1920 there were 169,355 Europeans, 48,112,706 natives, and 878,986 other Orientals, mostly Chinese and Arabs. By administrative divisions, the 1920 population was divided among Java and Madura (34,984,171), and the Outer Possessions, i.e. the Island of Sumatra (5,852,135), Riau-Lingga Archipelago (223,122), Banca (154,141), Billiton (68,582), Borneo, West Coast (605,402), Borneo, South and East Districts (1,020,599), Island of Celebes (3,108,337), Molucca Islands (622,671), Timor Archipelago (1,146,660), Bali and Lombok (1,565,014). New Guinea was included. Populations of the leading cities in 1920 were Batavia, 2,787,000; Soerabaya, 2,460,000; Semarang, 2,737,000. The great mass of the natives were Mohammedan in faith. Education made steady advances. In 1922 there were 508 public and private schools serving Europeans and people associated with them. Total attendance was 89,382, and expenditure on education amounted to 14,186,399 guilders, a guilder equaling \$.40. There were also 13,138 native schools, with an attendance of 947,015, maintained at a cost of 19,594,992 guilders.

Industry. The majority of the population worked on the land. Total area in use for private agriculture in the whole territory in 1920 was 7,576,000 acres, of which 3,010,000 were in Java; 1,358,900 acres were in lease and 1,651,000 privately owned. Europeans held most of the land leases in Java. Sugar remained the crop of greatest economic importance, and in 1920, 183 factories were serving the industry. The following table indicates the condition of native activities before and after the War as shown in exports, in metric tons:

	1913	1918	1921	1922
Sugar	1,471,423	1,540,100	1,677,137	1,435,808
Coffee	26,019	7,300	43,688	57,360
Tea	26,548	29,958	35,863	41,552
Tobacco	87,832	8,050	46,214	52,087
Rubber	7,047	44,096	73,505	104,942
Copra	229,339	68,578	811,571	839,465
Tin	2,153	11,584	13,547	15,457

Native cultures were rice, maize, cassava, potatoes, coconuts. The live stock industry also

flourished. The government largely controlled the mines. In 1921, the principal coal mines in Java, Sumatra, and Borneo yielded 1,212,665 tons; the tin mines yielded 27,700 tons; and the principal mineral oils, 2,361,509 tons. The oil fields were controlled by the Royal Dutch and Shell Companies. Gold was worked in Sumatra and diamonds in Borneo.

Trade. Total imports, both government and private, exclusive of specie, for the years 1913, 1921, and 1922, were 463,702,000, 1,192,963,000, and 756,391,000 guilders. Exports, similarly, for 1913, 1921, and 1922, were 671,434,000, 1,190,799,000, and 1,142,217,000 guilders. The 1920 export amounted to 2,263,447,000 guilders. The Dutch East Indies' great importance as a market for manufactured goods and a source of raw materials was being recognized by foreign commercial houses. In particular, British, Japanese, Swedish, Belgian, Danish, and German interests were active. Imports from the United States for 1913, 1920, and 1923 were valued at \$3,358,164, \$59,018,190, and \$12,089,786. Exports to the United States were valued at \$4,995,150, \$167,416,000, and \$54,889,400. Shipping entered in 1913 was 6253 steamers of 5,046,000 tons and 2664 sailing vessels of 192,000 tons; in 1921, 9603 steamers of 5,359,737 tons and 6656 sailing vessels of 371,896 tons. Chief ports were Tanjong Priok (for Batavia), Soerabaya, Semarang, Cheribon, and Tegal in Java; Padang and Belwan Deli in Sumatra; Balikpapan in Borneo, Macassar in Celebes.

Communications. In January, 1921, there were 1989 miles of railway both state owned and private; 1721 miles in 1913. Of the former, 1690 were in Java and 299 in Sumatra. Government telegraph and cable lines were 14,748 miles, compared with 12,319 in 1913.

Government. Superior administration was in the hands of the governor-general. A council of five with power of a legislative and advisory nature sat for the whole territory. In 1917 a Volkraad or people's council was erected, with powers to discuss the budget and advise the government. Made up of some 40 members, it included Europeans, natives, and foreign Orientals. The 1913 and 1923 budgets showed revenues of 305,573,000 and 614,080,000 guilders and expenditures of 317,810,000 and 806,942,000 guilders. Deficits were covered by loans. The public debt on Jan. 1, 1923, was 761,683,000 guilders. Extraordinary expenditures of the decade 1913-23 went toward the improvement of the Outer Possessions and the encouragement of industries. Revenues came largely from sales of opium in India, import, export, and excise duties, land revenues, coal, and income taxes. The Dutch East Indies continued peaceful during the decade and Dutch neutrality during the War assured the colony an unchecked prosperity. Progress was steady in the development of the Outer Possessions.

DUTCH NATIONALISTS. See **SOUTH AFRICA, UNION OF.**

DUTCH REFORMED CHURCH. See **PREBYTERIAN CHURCH.**

DUVENECK, FRANK (1848-1919). An American painter, sculptor, and etcher (see VOL. VII). Known as one of the finest technical painters of the United States, he was, up to the time of his death, Jan. 3, 1919, an active figure in American and English art circles. During his later years, after a long period of study and of teaching in Florence, he served

as instructor in the Art Academy of Cincinnati. His "Whistling Boy," reminiscent of Hals, and "Forget-me-not Girl," after the manner of Rembrandt, also his "Portrait of Professor Loeffts," were generally held to be his finest works.

DVORSKY, MICHEL. See **HOFMANN, JOSEF.**

DYER, WALTER ALDEN (1878-). An American author and journalist, born at Roslindale, Mass., and educated at Amherst College. He began on the staff of the *Springfield Union* (Mass.) in 1901, and for the next six years edited various publications, subsequently becoming managing editor of *Country Life in America* (1906-14). He has contributed innumerable articles to magazines, and has written

many publications which include: *The Lure of the Antique* (1910); *The Richer Life* (1911); *Pierrot, Dog of Belgium* (1915); *Creators of Decorative Styles* (1917); *Handbook of Furniture Styles* (1918); *Sons of Liberty* (1920).

DYER, SIR WILLIAM TURNER THISTLETON (1843-). An English botanist (see **VOL. VII**). From 1908 to 1916, he was representative of the University of Oxford at the Gloucestershire Education Committee, and from 1909 was a member of the University of Bristol.

DYES. See **CHEMISTRY, ORGANIC.**

DYNAMIC GEOLOGY. See **GEOLOGY.**

DYNAMOS. See **ELECTRIC POWER STATIONS AND GENERATING APPARATUS.**

E

EARLHAM COLLEGE. A coeducational institution at Richmond, Ind., founded in 1859. The student enrollment increased from 413 in 1914 to 510 at the beginning of 1924, the faculty from 32 to 42 members, and the number of volumes in the library from 19,000 to 30,000. The yearly income increased likewise from \$25,118 in 1914 to \$108,537 in 1924. President, David M. Edwards, Ph.D.

EARTH, AGE OF. See GEOLOGY; PHYSICS.

EARTH INDUCTION COMPASS. See NAVIGATION.

EARTHQUAKE, JAPANESE. See JAPAN, *Effects of Earthquake, and History.* See also EARTHQUAKES.

EARTHQUAKES. About noon on Sept. 1, 1923, Tokyo, Yokohama, Nagoya, and many villages and pleasure resorts of Japan were almost entirely wiped out, in the greatest earthquake disaster of history. Earthquake, fire, and sea-wave took a toll of 200,000 lives and hundreds of millions of dollars in property over an area of about one square degree dwarfing into insignificance each of the long list of similar disasters in the past for which Japan, the most seismic region of the globe, is noted.

The Japanese Islands lie in a series of island festoons fringing the Asiatic Continent, with their convexities facing the Pacific. Outside these festoons, and not far from them, are long narrow troughs in the sea floor, running parallel to the trend of the island groups. The troughs are the downward, and the island festoons the upward, curves of great folds in the crust of the earth; in many cases the folding movement is still going on. Stresses accumulate until suddenly relieved by faulting. The convex side of the festoon slopes more steeply than the other. The Japan Sea to the West is shallow, but on the Pacific side, between the Japan coast and the Kurile Islands, the earth's crust in one place plunges down into the great Tuscarora Deep nearly 27,000 feet, within 110 to 240 miles of the coast. The earthquakes of Japan follow a rule which is general in such cases: they are most numerous and violent on this steep slope. The epicentre of the 1923 quake appears to have been under Sagami Bay, the floor of which underwent great changes, or in the Uraga Channel; the focus was probably shallow.

The first and greatest shock came at 11:58.44 A.M.; there were no foreshocks to give warning. An unusually large number of aftershocks were recorded, 1039 in the five days following the quake, implying that the faulting movement had a pronounced vertical component. The greatest aftershocks were those on Sept. 2, 1923, and Jan. 14, 1924. In Tokyo, 12 square miles were swept by the fire that followed the quake. Modern reinforced concrete structures especially designed to withstand earthquakes came through with a fine showing; the better constructed brick buildings also survived both quake and fire, although in general the brick buildings

proved unusually dangerous. From 1914 to 1921, 199 earthquakes, some semi-destructive, originated around Tokyo, but the immediate neighborhood of Tokyo was quiet. This fact led Omori to forecast a commencement of seismic activity in the latter district after the others had become quiet, since they are all in the same seismic zone; in 1922 he predicted the occurrence of severe shocks within six years.

An earthquake of truly appalling magnitude took place on Dec. 16, 1920, near Pingliang, Kansu, China. The region was thickly populated; many of the people lived in caves in the hillsides, and were buried alive by the landslides; others slept on clay platforms under which fires were kept burning, and such of these as escaped being dropped into the fires were left to die of the cold. The estimates of deaths vary from 100,000 to 1,000,000. The tremor was felt in Tokyo, 1000 kilometers away.

In the diastrophic shock in Central Italy, Jan. 13, 1915, the ratio of deaths to population was the highest ever recorded. Thirty thousand people perished, including 97 per cent of the population of Lapelle, and 90 per cent of the 11,000 inhabitants of Avezzano. Yet the shock was by no means of the first order of magnitude, and the destruction was chiefly due to the faulty construction of buildings. A strong tectonic quake, registered all over the globe, was associated with the eruption of Sakura-jima, Jan. 12, 1914; the epicentre was near the volcano, and the quake was of a character entirely different from that of the usual local volcanic quake.

The more important of the great number of other earthquakes which occurred during the decade 1914-24 were: 1914, May 9, Sicily; 100 lives lost; Linera totally wrecked. 1916, Alaska, a severe quake, but the region affected was almost entirely uninhabited. 1917, June 7, San Salvador nearly destroyed; Dec. 25-29, Guatemala laid in ruins. 1918, Feb. 13, Swatow, China, several hundred perished; Oct. 11 and 22, Porto Rico, 150 lives lost, and a great deal of property destroyed; Apr. 21-23, considerable damage to property in southern California. 1919, Apr. 28, San Salvador partly destroyed; Nov. 27, several villages destroyed in western Asia Minor, and many lives lost; June 29, Central Italy shaken. 1920, May 14, heavy damage in Central Italy; Sept. 7, Carrara and surrounding territory suffered heavily, with 100 towns damaged or destroyed, and hundreds perished; January, southern Mexico; February, Transcaucasia, many villages destroyed; June 22, Los Angeles, Cal., considerable property damage. 1922, Jan. 31, a severe shock occurred off the California coast, resulting in minor damage at several points; Nov. 11 and afterward, Chile, many lives and much property lost. 1923, near Lou-ho-hien, China, 1000 lives lost; May and Sept., Persia; disastrous shocks, Dec., Columbia and Ecuador; Sept., Calcutta, little damage. 1924, Mar. 14-15, five Costa Rican towns destroyed, with con-

siderable loss of life; Apr. 14, southeast of Mindanao, a severe quake.

During 1915-23, inclusive, the average annual number of earthquakes reported from the continental United States was 106. Many of these, particularly in the Mississippi Valley region, were widespread, but little or no damage resulted from any of them. See SEISMOLOGY and GEOLOGY.

EAST AFRICA PROTECTORATE. See KENYA COLONY.

EAST PRUSSIA. See WAR IN EUROPE, *Eastern Front*.

EASTON, FLORENCE (1884-). A British dramatic soprano, born at Middlesbrough-on-Tees, Yorkshire. She was educated in Toronto, Canada, where, at the age of 10, she made her first public appearance as a pianist. Subsequently she studied singing at the Royal Academy of Music in London and with E. Haslam in Paris. In 1903, she made her debut as Cio Cio San with the Moody-Manners Opera Company at Covent Garden. The next year Savage engaged her to sing Kundry for his production of *Parsifal* (in English), which he took on an extended tour of the United States, and in 1906-07 she returned under the same manager, singing in *Madame Butterfly*. From 1907 to 1913, she sang leading rôles at the Royal Opera in Berlin and from 1913 to 1915 at the Stadtheater in Hamburg. At the same time, she appeared at Covent Garden in the Wagner and Strauss performances. From 1915 to 1917, she was a member of the Chicago Opera Company, and then went to the Metropolitan Opera House, New York, where she immediately became one of the prime favorites. In 1904, she married Francis Maclennan, the tenor.

EATON, JAMES SHIRLEY (1868-). An American railway specialist, born in Nashville, Tenn. He graduated from Marietta College in 1889 and for several years was traveling auditor of the Southern Railway. He served as expert in the adaptation of the electric tabulating machines for railroad accounting, and from 1899 to 1903 was statistician for the Lehigh Valley Railroad. After serving as railroad editor for the *Wall Street Journal*, he became railway statistician. He lectured in the Tuck School at Dartmouth and on railroad transportation at New York University. He wrote *Railroad Operation* (1900); *Education for Efficiency in Railroad Service* (1910); *Railroad Expense Handbook* (1911). From 1917 to 1920, he was examiner for the Federal Trade Commission.

EATON, WALTER PRICHARD (1878-). An American author and critic, born at Malden, Mass., and educated at Harvard. During the period 1900-08, he was successively reporter on the *Boston Journal*, a member of the dramatic department of the *New York Tribune*, and dramatic critic of the *New York Sun*. He was dramatic critic of the *American Magazine* (1909-18), and instructor at the School of Journalism of Columbia University. He is the author of many juvenile stories and publications on the theatre, which include: *The American Stage of To-Day* (1908); *At the New Theatre and Others* (1910); *Barn Doors and Byways* (1913); *Plays and Players* (1916); *In Berkshire Fields* (1919); *On the Edge of the Wilderness* (1920).

EBERLE, ABASTENIA ST. LEGER (1878-). An American sculptor, born in Webster City,

La. She studied modeling with Frank Vogan in Canton, Ohio, and at the Art Students' League, New York, with George Grey Barnard. She was elected an Associate of the National Academy in 1921. Her first sculptures were copies of old gravestones in the cemetery at Canton. In New York, she found her inspiration in the life of the East Side, which she has interpreted with a great deal of sympathy. Some of her sculptures, "The Girl on Roller Skates" and "Mowgli," are in the Metropolitan Museum, N. Y. "Little Mother" is in the Chicago Art Institute. Others are at the Worcester Art Museum, Carnegie Institute and other centres. She has exhibited in Europe with success.

EBERLE, EDWARD WALTER (1864-). An American naval officer, born at Denton, Texas, and graduated from the United States Naval Academy in 1885. He served on the *Oregon* in the Spanish-American War, in the Philippine insurrection in 1899, and commanded the Atlantic torpedo fleet from 1911 to 1913. He was superintendent of the United States Naval Academy from 1915 to 1919, and practically rebuilt its general organization and educational system. During 1921 and 1922 he was commander in chief of the Pacific fleet, with rank of admiral, and the administrative ability which he showed in this post, as well as in the many other important places which he had filled throughout his career, led to his appointment in 1923 as Chief of Naval Operations in the United States Department at Washington.

EBERT, FRIEDRICH (1871-). A German statesman, born at Heidelberg. After an elementary education, he learned the saddler's trade, became a journeyman, and finally settled in Bremen. He was actively interested in the Social Democratic party, edited the *Bremer Volkszeitung* in 1893, and was trade-union secretary to the Bremen Burschenschaft in 1900. It was not till 1905, when he was appointed to the Executive Committee of the Social Democratic party, that he became widely prominent in politics. He was sent to the Reichstag in 1912, and was an influential member of his group. He strongly advocated that the working people should defend their country, and tried to obtain a concerted action of all Socialists. He also tried to reconcile the German and Russian interests, but failed. He attended the conference of Socialists at Stockholm in 1918. A strong opponent of the Spartacists, Bolsheviks and Communists, he did more perhaps than any one else to restore order to the country and to suppress insurrections during the revolution in 1918. He was elected first president of the Reich on Nov. 12, 1919, and his term of office was afterwards extended to 1925. He had a strong influence on the intellectual leaders of Germany, many of them becoming converted to the republican idea through contact with him.

ECKERT, CHRISTIAN L. M. (1874-). A German economist, born at Mainz and educated at the universities of Munich, Berlin and Gießen. In 1900, he became law assistant; in 1901, he was called to the University of Berlin as lecturer in political science. The same year he was appointed to fill a similar position in the *Handelshochschule* (School of Commerce) in Cologne, and in the following year he was made professor of political science in Cologne. In 1904, he was called to the University of Bonn. In 1917, he was made *Geheimer Regierungs-*

Rat (Privy Councillor), and in 1919-20, first director of the University of Cologne, which had just been founded. His numerous works include: *Der Fronbote im Mittel-Alter* (1897); *John Ruskin* (in *Schmollers Jahrbuch* XXVI; 1902); *Deutsche Seefahrten nach Südamerika* (in *Schmollers Jahrbuch*; 1904); *Peter Cornelius* (1906); *Bildungsfrage des Journalistenstandes* (1913); *Die wirtschaftliche Bedeutung des Wehrbeitrages, Recht und Wirtschaft* (1914); *Wirtschaftliche und finanzielle Folgen des Friedens von Versailles* (1921). He contributed many scholarly articles to leading periodicals, and edited *Rothschilds Taschenbuch für Kaufleute* (58th ed., 1920).

ECKLES, CLARENCE HENRY (1875-). An American professor of dairy husbandry, born in Marshall Co., Ia. He graduated from the Iowa State College in 1895, and took post-graduate courses at the University of Wisconsin and in Germany and Switzerland. After a year as assistant in dairy husbandry in the Iowa State College, he became professor of dairy husbandry at the University of Missouri, remaining there until 1919, when he was appointed chief of the dairy husbandry division of the University of Minnesota. He wrote *Dairy Cattle and Milk Production* (1911), *Dairy Farming* (1916), and also wrote many bulletins on agricultural subjects and lectured on these subjects in many States.

ECOLOGY. See BOTANY; ZOÖLOGY.

ECONOMIC ENTOMOLOGY. See ENTOMOLOGY, ECONOMIC.

ECONOMIC GEOLOGY. See GEOLOGY.

ECONOMIC ZOÖLOGY. See ZOÖLOGY.

ECUADOR. A South American Republic on the northwest coast between Colombia on the north and Peru on the south. Its area is estimated at 116,000 square miles, but because of still unsettled boundary disputes it cannot be definitely fixed. A maximum claim put the area as high as 276,000 square miles. The estimated population was 2,000,000. Quito, the capital city, had 80,000 inhabitants. Other large cities, with their populations, were Guayaquil, 96,000; Cuenca, 30,000, and Riobamba, 10,000.

Industry. Cacao was the principle crop; the total number of trees was between 80,000,000 and 100,000,000, with an annual yield of 42,000 metric tons. Exports of cacao beans in 1922 amounted to 45,018 metric tons compared with 38,224 metric tons in 1912. Coffee was increasing in importance, with an annual production from 6,000 to 10,000 metric tons. The exportation of tropical fruits such as oranges, bananas, and pineapples to the countries to the south was also important. The production of cotton, lentils, rice, sugar, and tobacco was increasing; ivory nuts and rubber were important forest products, although the output of lumber showed a great decrease toward the end of the period 1914-24. Annual exports of Panama hats were valued about \$600,000. The only mining of importance was carried on by one gold mining company whose output in 1922 was \$877,646 in the form of concentrates. The oil fields of Santa Elena, worked by British companies, were producing 50,000 barrels by 1922 and even more in 1923. In 1922 exports were \$12,033,904 and imports \$8,726,594; the United States took 40 per cent of the exports and furnished 46 per cent of the imports. Cacao constituted 76 per cent of all exports. Principal imports were textiles, foodstuffs, and hardware. Ecuador in 1924

was still suffering from economic depression after the inflation of 1920, and its foreign trade showed little permanent gain during 1914-24. Total exports in 1912 were \$13,689,696 and imports \$10,354,564. The country had only a few small manufacturing plants.

Communications. Little building of railways was done in the period 1914-24. Several short lines were projected and partially completed, notably those from Ambato to Curaray and from Quito to Esmeraldas. In 1923, 400 miles were in operation and 200 miles more were under construction. Wireless telegraph stations were erected at Quito, Guayaquil, and Esmeraldas.

Education. After 1915 the educational organization underwent a series of changes. New curricula were introduced in the primary schools in 1916 and in the normal schools in 1917. In 1922, the 1718 schools in operation were attended by 108,920 pupils as compared with 70,000 in 1911. There were secondary schools in all the provinces but Esmeraldas, and universities at Cuenca, Guayaquil, and Quito.

Finance. The government budget continued to show annual deficits, so that in Dec. 31, 1922, the public debt was 70,101,412 sucres as compared with 40,625,000 sucres in 1914. The budget for 1913 carried revenues and expenditures at \$9,921,000; in 1921, revenues were \$7,927,697, and expenditures \$10,437,720. Interest and amortization of the foreign debt were steadily accumulating because of the fall in revenues. There was serious talk in 1922 of accepting the United States Standard Oil Company's offer of a loan of \$23,000,000. In 1923, the government accepted an English syndicate's loan of \$18,000,000. This was to be guaranteed by customs receipts and was to be applied to the payment of the government's indebtedness of 17,579,393 sucres to the local banks in 1922 and for the interest due on railway bonds. Up to 1914, exchange was maintained at par (1 sucre = \$0.487). The outbreak of the War caused the suspension of the gold conversion of paper, and with the continuing unfavorable trade balance, the value of the sucre steadily fell. From 1917 on, the government attempted to fix a legal exchange rate but an open-market rate prevailed. In December, 1923, the official rate was 4.0 sucres to the dollar, and the street rate, 5.9 sucres.

History. Internal affairs were turbulent well into 1915 under President Plaza. Under President Baquerizo, 1916-20, the administration was busied with fiscal affairs, in which the demands of the Guayaquil & Quito Railroad Company, the leading holder of the foreign debt, played a prominent part; the country was also involved in difficulties with the belligerent nations. The Allies protested against Germany's use of the Galapagos Islands as coaling stations, and in spite of official disclaimers Ecuador's neutrality was questioned. In 1917, however, diplomatic relations with Germany were severed and Ecuador thus technically became a member of the Allied and Associate Powers. Up to 1924 it had not joined the League of Nations. By the treaty of 1916, a boundary commission was appointed to adjust the frontier between Ecuador and Colombia; the work was finished in 1919. The work which was commenced under General Plaza in the cleaning up of Guayaquil in 1913 was renewed in 1918 under Colonel Gorgas and came to a satisfactory conclusion two years

later. In 1920 it was officially reported that the danger of yellow fever had been eliminated not only in Guayaquil but in several adjacent provinces. In 1920 an unsuccessful attempt was made by a British company to purchase the Galapagos Islands with a view to exploiting their valuable guano deposits. The president of Ecuador for 1920-24 was Dr. José L. Tamayo; for the term 1924-28, Dr. Gonzalo S. Cordoba.

EDDY, SHERWOOD (1871-). An American author and a secretary of the Young Men's Christian Association, born at Leavenworth, Kan., and educated at Yale. As a national secretary of the Y. M. C. A., he worked in an honorary capacity among students in Japan, Korea, China, India, the Near East and Russia. Besides works published in England and India, he wrote: *The Awakening of India* (1911); *The New Era in Asia* (1913); *The Students of Asia* (1915); *Suffering and the War* (1916); *With Our Soldiers in France* (1917); *Everybody's World* (1920).

EDGAR, WILLIAM CROWELL (1856-). An American editor and publisher, born at La Crosse, Wis., and educated at a St. Louis high school. He became manager (1882) and editor (1886) of the *Northwestern Miller*, and subsequently president of the Miller Publishing Company. For his part in the relief given to Russian peasants in 1891, he was decorated by the Emperor of Russia. During the War he assisted in the Belgian Relief movement and aided Herbert Hoover in the organization of the American milling industry. His publications include: *Story of a Grain of Wheat* (1903); *Brief in Behalf of American Millers* (1913); *Food Control and Food Fallacies* (1917); *England During the Last Months of the War* (1918); *Rhymes of a Doggerel Bard* (1921).

EDISON, THOMAS ALVA (1847-). An American electrician and inventor. His work in the decade was devoted chiefly to the perfection and improvement of inventions already made. At the outbreak of the War he designed, built and operated successfully benzol plants, carbolie acid plants, and plants for the making of aniline salt and other products. In July, 1915, he was appointed president of the Naval Consulting Board, and in this capacity performed valuable service to the government, for which he made many more inventions. He created lively interest and discussion, in 1923, by the publication of a questionnaire which he was accustomed to submit to college students who applied to him for employment. It comprised questions of wide scope on almost every possible subject, and was designed to test the general knowledge of the applicants. Its usefulness as such a test was much discussed in the public press.

EDMUNDSON, GEORGE (1848-). An English clergyman and historian (see VOL. VII). In 1922, he published *A History of Holland* (Cambridge Historical Series), and *The Journal, Travels, and Labours of Father Samuel Fritz, in the River Amazon, 1686-1723*. The latter was translated and edited from the original Spanish manuscript for the Hakluyt Society.

EDSON, KATHERINE PHILIPS (MRS. CHARLES FARWELL EDSON) (1870-). An American social worker and feminist, born at Kenton, Ohio, and educated in private schools. She devoted her life to problems of public health and industry, and to woman's rights. From 1910 to 1916, she was a member of the State Board

of the California Federation of Women's Clubs. In 1912, she served on the Charter Revision Commission of Los Angeles, and in the same year became a member of the Progressive party's State Central Committee of California, serving for four years. Well known as an arbiter in labor disputes, she was responsible for the Minimum Wage Bill which the California Legislature passed in 1913. From 1916 to 1920, she was a member of the executive committee of the Republican State Committee, and subsequently a delegate to the Republican National Convention (1920), and a member (1920-24) of the executive committee of the Republican National Committee. In 1921, she became a member of the advisory committee of the Conference on the Limitation of Armaments. She has also been member of the executive committee of the National League for Woman's Service, and executive officer of the Industrial Welfare Commission.

EDSTROM, DAVID (1873-). A sculptor, writer, lecturer and teacher who came to the United States in 1880 from Hvetlanda, Sweden, where he was born. At 21 he decided to study art, and worked his way to Stockholm, where he attended the technical schools and the Royal Academy of Fine Arts as a pupil of Borjison. He then went to Florence and Paris, where he studied with Injalbert. He has exhibited in most of the leading cities of the United States and Europe and is best known for his metaphysical sculptures, "Fear," "Pride," "Envy," "Caliban," "The Cry of Poverty." An artist of versatile moods, Edstrom always shows in his work the psychic character of his subject. He has made portrait busts of many important persons.

EDUCATION. See EDUCATION IN THE UNITED STATES; paragraphs on *Education* in the articles on the separate states and on foreign countries; and UNIVERSITIES AND COLLEGES.

EDUCATION, AGRICULTURAL. See AGRICULTURAL EDUCATION.

EDUCATION IN THE UNITED STATES. The report of the United States Commissioner of Education published in 1923 gives the statistics of attendance in elementary schools for 1919-20. The enrollment in public kindergartens was 481,266 and in private kindergartens 29,683, making a total of 510,949. In the elementary schools including the primary and grammar grades there were 18,897,661 pupils in the public schools and 1,485,561 in the private schools, totaling 20,383,222. Of those who attended the public schools, 21.8 per cent were in the first grade, 13.8 in the second grade, and only 8.2 in the eighth grade. The statistics for the last few years of the decade 1914-24 showed that the public elementary schools were making it possible for pupils to progress more uniformly than previously. In 1911, the enrollment in the first grade had been 23.5 per cent of the total, and only 6.4 were in the eighth grade.

The average number of days that schools were in session in 1919-20 was 161.9. This is an increase of more than 17 days over 1900. The average number of days that each pupil attended in 1919-20 was 121.2; in 1900, 99. The average child therefore was in school 22 days more in 1920 than in 1900. The per cent of children 5 to 18 years of age enrolled in school in 1919-20 was 77.8. This was an increase of nearly 5.5 per cent since 1900. At-

tendance in 1920 was more general among children 11 years of age than among those of any other age. About 94 per cent of all children 11 years old were in school in 1920, against 63 per cent of those 6 years old. The revenue receipts were income from permanent funds and lands, \$26,486,735; local taxes and appropriations, \$758,896,451; State taxes and appropriations, \$134,278,753; and from all other sources, \$50,908,896; making a total revenue of \$970,570,835. The total expenditure per capita of population in 1920 was \$9.80. In 1910 the per capita expenditure was \$4.64; in 1900, \$2.84. The total expenditure per pupil in average attendance in 1920 was \$64.16. In 1910 it was \$33.26 and in 1900 \$20.21. The average total expenditure per day for each pupil attending in 1920 was \$.396. In 1910 it was \$.211; in 1900 \$.14. The average annual salary of teachers in 1920 was \$871. In 1910 it was \$485, and in 1900, \$325.

Attendance in Secondary Schools. During the school year 1919-20, 186,862 students were enrolled in public high schools and 184,153 in private high schools and academies; total, 2,371,015. There was also a total of 59,309 students enrolled in the preparatory departments of higher institutions. In 1920 over ten per cent of those who were enrolled in school were in the high school, while in 1900 only 3.3 per cent were in the high schools. The per cents in the various classes in high school were for the first year, 41.6; second year, 26.0; third year, 17.9, and fourth year, 14.5. These proportions between the four classes had remained almost constant from 1912.

Teachers in the Public Schools. The teachers in the public elementary schools in 1920 included 63,024 men and 513,222 women, a total of 576,246. It is estimated that the private schools employed as teachers 6322 men and 38,977 women, totaling 45,299. The public high schools employed 32,386 men and 69,572 women, totaling 101,958. The private high schools employed 5698 men and 9248 women, totaling 14,946.

Costs of Elementary and Secondary Schools. The expenditures for school sites, buildings, furniture, libraries and apparatus in 1920 was \$153,542,852. The salaries for superintendents, principals and teachers was \$613,404,578. For all other purposes the expenditure was \$260,203,779. This made a total of \$1,036,151,209.

American Education Week. From 1919 one week each year was designated as American Education Week. The President issued a proclamation which was printed in full or in part by practically every newspaper in the country. The purpose was to arouse and consolidate the sentiment of the American people on their responsibility toward the children. Evidence was collected by the United States Bureau of Education and the National Education Association indicating that more than 1,000,000 sermons and addresses were delivered on the various subjects suggested for consideration during the week. Clubs of all kinds made education a part of their programme. The American Legion furnished speakers at many civic meetings, and motion picture houses throughout the country gave active support to the movement. Extensive use was also made of the radio. One feature of Education Week was the invitation extended to parents to see the school in action. Thousands

of foreign-born parents thus had their first glimpse of the American schoolroom. In many cities evening sessions of the school were held so that parents might come directly from office or factory.

Educational Investigations and Surveys. During the period between 1914 and 1924 many educational investigations and surveys were conducted by States, cities, townships, and private institutions. The first to attract wide attention was conducted in the City of Baltimore in 1911. Before this, legislative bodies had from time to time examined the schools for the purpose of determining the effectiveness of legal provisions. The Baltimore Survey made use of investigators trained in the field of education. The report concerned itself with the evaluation of existing educational methods within the city and also attempted to suggest remedial measures. Later experience effected a vast improvement in the methods of investigation. Standards were set, and it became possible to rate many features of a school system in terms which could be verified. A list of investigations would be very lengthy. Their significance is indicated by the fact that such surveys were conducted in Vermont, Maryland, Delaware, Ohio, Kentucky, Indiana, and Texas. Other States investigated phases of their work. Among these were an investigation of rural schools in the State of New York; teacher-training in the State of Missouri; and higher education in Colorado. Among the cities surveyed were New York, Philadelphia, Baltimore, Cleveland, Salt Lake City, and Portland, Ore. Investigations were conducted by the Carnegie Foundation, the General Education Board, the United States Bureau of Education, and various other agencies. The staffs for such work consisted largely of staff members of teachers' colleges and normal schools.

The earlier surveys were almost invariably the outcome of dissatisfaction on the part of those interested in the schools. Results were not entirely desirable. Later investigations were concerned with the educational policies to be adopted by either State or city. The outcomes of some of them were remarkable. Business methods of boards of education were improved, school building programmes adopted, and more effective financial and educational methods for the conduct of the schools approved. One important outcome was a demand for more definite knowledge concerning the various elements of cost in the public school systems. Various subjects in the school had been enriched and new studies and departments added with no adequate knowledge of what these changes meant in the way of increased financial responsibilities. Cities added kindergartens and junior high schools to their elementary schools and regular high schools without knowing what these additions would cost. States had in some cases undertaken to guarantee to every one who was qualified an education beginning with the grades and ending with the college and university. The mounting costs of education caused school officials no end of anxiety. Each year saw increasing indebtedness, and in the later years it became more difficult to raise additional funds. Some cities had to resort to the expedient of paying current expenses by means of long term bonds.

School officials, facing these difficulties, found themselves without the detailed information necessary for an answer. In 1921 a group of

persons interested in educational research appointed a committee to draw up a plan and ask support for an educational finance inquiry. As an outcome of the work of this committee the American Council on Education received contributions from the Commonwealth Fund, the General Education Board, the Carnegie Corporation and the Milbank Memorial Fund. The Council then appointed an Educational Finance Inquiry Commission which was given full responsibility for the conduct of the inquiry and whose chairman was Prof. George D. Strayer of Teachers College, Columbia University. The commission was composed of prominent educators. This body employed a staff of investigators. The report of the commission is contained in fifteen volumes published by the Macmillan Company, New York City. It indicates that in the ten-year period ending in 1920 the total educational expenditures of the entire country nearly doubled for capital outlay, nearly trebled for interest, and increased about two and one-half times for current expenses. It was stated that in spite of its rapidly mounting cost, education was receiving a noticeably smaller proportion of total government expenses than formerly. Total government funds devoted to education decreased about one-third; national, about one-fourth, and State, about one-fifth. On the other hand, the total local educational expenditures increased about one-ninth. The report stated that educational expenditures for the country as a whole each year exceeded the educational revenues, leaving a deficit which was 3 per cent of these revenues in 1910, and 5 per cent in 1920. Large numbers of school districts were bonded for approximately the full value of their school property. The average ratio of such debt to school property, however, was well under 50 per cent, although rising rapidly.

In the State of New York the commission studied the costs of instruction in various subjects. The cost in a sample city will suffice to show the character of the work undertaken. In this city the English in grade one cost \$34.43; health instruction, \$4.52, and fine and practical arts, \$9.74. In grade four English cost \$20.48; arithmetic, \$8.90; social sciences, including history and geography, \$8.90; health education, \$6.59; and fine and practical arts, \$8.55. For the first six years the total cost of teaching English was \$158.08, while the total cost per pupil for all instruction in these six grades was \$349.04. The expenses for the seventh and eighth year increased the total expense to \$481.40. If the cost of instruction and supervision in the special subjects be added to the class room teaching, the total expense for the first six years is \$395.32, and for the eight years of the elementary course, \$570.67. The total cost per pupil of kindergartens in New York City was \$74.75; for the ungraded classes, \$133.40.

Illiteracy. No subject connected with education received more attention in the later years of the decade than that of illiteracy. It was first brought to the attention of the American people in a pronounced way by the illiteracy statistics for the army. These were much higher than the figures given in the 1910 census. The 1920 census showed an improvement of 1.7 per cent in the illiteracy situation. This, however, is not consoling when it is remembered that there were more than 5,500,000 persons in our population 10 years of age or over who

could neither read nor write. The census report showed that 1,242,572 native whites were illiterate. This was 2 per cent of the total native white population. Of the foreign-born whites 1,763,740 were illiterate, or 13 per cent of the total foreign-born white population. Of the Negroes, 1,842,161 were illiterate; this was 22.9 per cent of the total Negro population. In Texas 33.8 per cent of the foreign-born white population were illiterate, and of the Negro population in Louisiana 38.5 per cent. The illiterate population represented 6.0 per cent of the total 10 years of age and over in 1920, the corresponding percentages for the last four preceding census years being 7.7 in 1910, 10.7 in 1900, 13.3 in 1890, and 17.0 in 1880. Connecticut was the only State showing an increase in the proportion as well as the number of illiterates. Five States, Montana, Idaho, Wyoming, Utah, and Washington, and the District of Columbia had only three-tenths of 1 per cent illiteracy.

New Departures in Elementary Education. It would be difficult to predict the extent to which some of the innovations in elementary education will influence the schools of the future. Four changes in educational procedure in the decade 1914-24 seemed to have won a foothold.

Junior High Schools. Studies of school attendance beginning in 1907 called attention to the remarkable dropping off of students between the elementary and high school and in the first year of the high school. A study of the reasons for this led to the belief that the lack of coordination between the elementary school and the high school was largely responsible for this condition. Almost none of the subjects studied in the elementary school were continued in the high school. Between the two institutions was a sharp cleavage in organization as well as in teaching methods. The last year of the elementary school was largely devoted to a review of the work of the school. These and other considerations led school officials to formulate plans for the organization of a new element in the school system, which came to be known under various names, most commonly junior high school. This school usually cares for the children of the seventh, eighth and ninth elementary school years. The effort is made to have the courses of study include a wider range of subjects than under the other form of organization. This is for the purpose of giving boys and girls the opportunity to explore various fields and to determine their fitness for such work as will follow in the high school, which under this plan is known as the senior high school. The junior high school, or intermediate school as some prefer to call it, had fulfilled reasonable expectations. Increasing numbers of such schools were organized, and most cities were making provisions for them in their new building programme.

The Platoon School Organization. This form of school organization was designed to meet the newer conditions which exist especially in the larger cities. It was extensively employed in the schools of Detroit. Typical platoon schools have 20 to 28 sections or classes of 40 pupils each. The buildings provide a gymnasium, an auditorium, open air play rooms, special rooms for music, art, literature, science, and library, and "home rooms" which correspond to the usual class rooms. The standard school day is

six hours long, a three-hour session in the morning and a three-hour session in the afternoon. The usual morning session is from 8.30 to 11.30, and the afternoon session from 12.30 to 3.30. Some schools have a somewhat longer noon hour. With the exception of pupils of the first grade and those especially excused, all pupils remain in school six hours and are busy during this entire period. The school membership is divided into two groups or platoons. While one group is engaged in the "home room" or regular room, the other group is attending classes in the special rooms. Thus half of the pupils are in the "home rooms" at any given time and the other half are engaged in special activities. For "home room" activities the school day of 6 hours is divided into four periods of 90 minutes each. Each platoon has "home room" work for 90 minutes in the morning and 90 minutes in the afternoon.

For special room activities, the 6-hour day is divided into twelve 30-minute periods. Each platoon is engaged in special activities during 6 of these twelve 30-minute periods each day. Each pupil spends 90 minutes of the morning in the "home room" under the control of the "home room" teacher and the remaining 90 minutes of the morning in the special activities, 30 minutes in 3 separate special rooms. In the afternoon, he again spends 90 minutes in the "home room" and the remaining 90 minutes in 3 special rooms. The number of special room activities possible in a platoon school is determined by the number of classes or groups of pupils involved. If there are 20 classes, the school must house 800 pupils, or 400 in each platoon. This requires 10 "home rooms" to care for 400 pupils. The remaining 400 pupils may be provided for in special rooms. The cost of buildings for the platoon schools is somewhat greater per pupil in the 20-section schools and a little less in the 28-section schools than in the traditional schools. The capacity of the school building is increased by more than 40 per cent by the platoon organization. The per capita cost of instruction is about the same in both types of schools.

The Dalton Laboratory Plan. Following 1890 many efforts were made to provide individual instruction in the class room. Some of these plans were widely advertised and were introduced into various school systems. In 1924 scarcely an evidence existed of the earlier attempts. Greatest attention was given the Dalton Plan. The originator of this plan, so far as it applies to public school work, is Helen Parkhurst. It was first tried with a group of crippled children in 1919. The next year it was introduced in the Dalton, Mass., High School. Miss Parkhurst spent the summer of 1921 in England, where she conducted a model school according to the "Dalton Laboratory Plan," and her lectures were published. From that time Miss Parkhurst's plan received increasing attention throughout England, and a large number of the schools there were in 1924 organized in accordance with her ideals. In New York City Miss Parkhurst was conducting a school called the Children's University School. A large number of people visited this school. It was estimated in 1924 that several thousand schools of different sizes in the United States were organized according to the Dalton Plan, and various cities and communities were considering the advisability of adopting the organization.

Miss Parkhurst's book, *Education on the Dalton Plan*, had been translated into several languages, and she had been invited by various foreign countries to aid in the reorganization of some of their schools.

The Dalton Laboratory Plan may be applied in the high school and in the elementary school from the fourth grade up. For convenience the different parts of the curriculum are divided into major and minor subjects. The former group includes mathematics, history, science, English, geography, foreign languages, etc.; the latter, music, art, handiwork, domestic science, manual training, gymnastics, etc. Miss Parkhurst advises that the plan be introduced with major subjects first. Each subject is then divided into what would correspond to 20-day periods or jobs, and the pupil accepts the jobs assigned for his class for a month as a contract. Each child has in his possession a complete outline of the work which he will be required to do for four weeks. These outlines, made by the teachers, are explicit. The children are graded much as they would be in a regular public school and are always identified with forms or grades. At the opening of school in the fall the child receives the assignment or jobs that he is supposed to do in the next 20 school days, or 4 school weeks. Having accepted his contract, the child is free to approach his work in any way he may choose. No classes are taught as in the ordinary school procedure. A child may, for example, choose to do all of one subject during the first few days and to leave the other subjects untouched. He knows exactly how much he must do, and he knows at the end of each day of study how far he has progressed. He must complete the entire contract before he can receive other jobs, but he may receive the next contract whenever he has completed the jobs called for in the contract under consideration. If, therefore, he is able to accomplish the work planned for four weeks in three weeks he immediately goes to the next contract. If he cannot complete it in the four weeks he may have a longer time. In this way each child progresses at his own rate.

The different classes or forms meet occasionally, perhaps two or three times a week, for group conferences with their teachers. Aside from these group meetings the teachers deal with individuals, and the pupils call for help when they need it and are required to report on progress in accordance with their assignment. The rooms in which the teachers meet the children are called laboratories instead of class rooms. In the Children's University School is no such furniture as in an ordinary schoolroom. Since the children do not recite as an entire class, there is no need for a large number of seats or desks in a room. They come to the laboratory for the purpose of consulting the books there, or to consult with the teacher.

A system of charts or graphs designed by Miss Parkhurst makes it possible for the teacher as well as the child to know just where he stands. The teachers therefore are able to assist the children in properly apportioning their time. It is claimed that children very soon learn to apportion their time in the most effective way.

The Nursery School or Pre-kindergarten. During the later years of the period various changes had been taking place in the kindergarten. Froebel and his followers introduced

much that was symbolic in the ordinary kindergarten procedure. For a long time there was almost complete divorce between the kindergarten and the first grade. Later, however, the scientific study of the physical and mental development of young children brought about a change in the kindergarten. In the kindergarten itself greater attention is given to the exercise of the abilities which belong to children of that age and which are important in further school progress. Although reading and the other school subjects are not directly taught, the kindergarten child of to-day comes to the first grade better prepared to undertake these subjects than the child who has had no such training. A significant outcome of the study of young children was the formation of a new type of school called the Nursery or Pre-kindergarten School. In such schools children from two and a half years up are received and given such training and exercise as they require. These schools should not be confused with the institutions formed to take care of the young child in order that the mother may be permitted to work. The nursery school receives children from all kinds of homes, and its justification is its educational value. Elaborate researches were being made in several universities in 1924, and there were enough schools of this type to indicate their importance. How expensive such schools would be remained to be demonstrated. Expense seemed likely to handicap their development seriously in the public school system.

The Hershey Industrial School. Late in 1923 Mr. M. S. Hershey announced that he had turned over to the Hershey Industrial School five years before a fund amounting to approximately \$60,000,000. This placed the school next to Girard College in Philadelphia as the richest orphanage in the United States. The school was formally opened in 1910 in Hershey, Pa. Its enrollment in 1924 was 120. It was expected to have at least 1000 pupils in a few years. Mr. Hershey has restricted enrollment, first, to orphans of Dauphin, Lebanon, and Lancaster Counties; secondly, to those born elsewhere in Pennsylvania, and thirdly, to those from any part of the country. It is stated that an effort will be made to have the life of the children as homelike as possible. Each child is allowed to select his own trade. The aim is to make each one self-supporting.

Measurements in Education. In recent years there has been marked progress in the measurement of educational achievement. As long as there was a belief in faculty psychology definite measurements were not essential. A child might, for example, have great difficulty with arithmetic and as a consequence make very little progress in this subject; the earlier conception of psychology justified the belief that this child was gaining from his studies in other ways than measurable progress in arithmetic. Consequently, the more disagreeable and the more difficult the subject might be, the greater would be the benefit that would come from the study. The newer psychology at first denied the existence of transfer in training. Whatever results were obtained in the study of arithmetic, according to this theory, would be measured in the arithmetic itself. The prevailing notion at present is that there will be a transfer of training in so far as the situations under consideration are similar. It is therefore desirable to measure the amount of improvement in

any given subject. A large number of scales or standards were developed for the purpose of measuring achievement in school subjects. In general the instruments of measurement may be divided into two groups. In one group may be found the examinations or tests that have been given to a great number of school children scattered throughout the country. From the results of these examinations the tests have been standardized, usually by determining what the median or average child is able to do in the test. Certain tests in arithmetic and spelling may be considered as typical of this group. In other subjects where the quality of the result is important the standards were developed by obtaining the judgment of a large number of competent individuals on various samples of work. Such samples, when properly arranged and evaluated, become the scale or standard by which others may be ranked. English composition, penmanship and drawing are fields in which such scales or standards were developed. Scales and standards of the types indicated came into very general use in the public schools of the country. To a large extent they took the place of the examinations formerly set by some central office. They served for determining the promotion of children, and later were used in connection with other measurements to determine the efficiency of the teaching. Considerable attention was being given to tests that would locate a student's particular difficulty. Most of these were in the field of arithmetic.

The Federal Education Bill. An educational bill was before Congress in 1924. This bill was similar to those under consideration for several years preceding. It provided for a cabinet member for education, and for an appropriation of \$100,000,000 to be expended by the different States in improving educational facilities. The bill was being supported by more than 20 national organizations.

Vocational Education. Vocational education continued to receive much attention. The enthusiasm which earlier led cities to vote large sums of money for vocational education, when they did not know what form this training should take, no longer existed. It may be doubted whether the appeals which won Federal acts in relationship to vocational education would have been effective in 1924. Still, a large number of carefully planned and scientifically conducted experiments and investigations were being carried on in the United States in the field of vocational education. The War and the experiences which came with the training of disabled veterans cast doubt on the possibility of general vocational training. At the same time the efficiency of specific training was pretty thoroughly demonstrated. In the course of several months of intensified training men had been able to secure a better grasp of the trades than was possible in a much longer period of unspecialized work. Two Federal acts had pronounced influence on vocational education in America. The first of these, known as the Smith-Lever Act, became operative in 1914. This law provided for coöperative agricultural extension work, instruction and practical demonstration in agriculture and home economics for persons not attending or resident in the agricultural colleges. The appropriations provided by this act go to the State agricultural colleges which are required to make plans for the work subject to the approval of the Secre-

tary of Agriculture. The general plan for conducting this work consists in first locating extension agents in several counties of the State to carry on demonstrations, advise the farmers and stimulate them to better work; secondly, the organization of boys' and girls' clubs, largely in connection with rural schools, to conduct some simple agricultural home economics project; thirdly, the organization of a staff of specialists in agriculture and home economics as a part of the faculty of agricultural colleges. These specialists go about the State and assist the extension agents. This law provides \$10,000 annually for each State for its agricultural college. In addition there was available in 1924 an annual appropriation of \$4,100,000 which must be met with an equal appropriation from the States. The Federal funds are allotted to the various States according to the proportion which the rural population of each State bears to the total rural population of the United States. Both the fund received from the Federal government and the equal fund from the State government to balance it must be expended on extension schemes approved by the United States Department of Agriculture.

A second important Federal act relating to vocational education was the establishment of the Federal Board of Vocational Education in 1917. This board was to cooperate with State boards in case the State adopted the provisions of the act. The act provided for aid for salaries of teachers in vocational subjects, the amount to be met by the State; Federal supervision of work and expenditures, and investigations to be conducted by the Board in the several fields of vocational education. The amount of Federal funds available for each of the specified purposes was to vary until the school year 1925-26. From that time on, the amount available for agricultural education would be \$3,027,000; for trade, household economics and industrial education, \$3,050,000; for teacher-training, \$90,000; for investigation, \$200,000. In 1918, 1741 schools with a total of 164,186 students qualified for Federal aid under the Smith-Hughes Act. In 1923 the number of schools had increased to 5700; the students, to 536,528. In 1923, 2673 agricultural schools had 71,298 students; 1634 trade or industrial schools had 325,889 students, and 1393 home economics schools had 139,341. Pupils in vocational teacher-training institutions numbered 20,738. The acceptance of the provisions of the Smith-Hughes Act required legislative action on the part of the different States. This apparently stimulated the States to further action, particularly in reference to continuation education.

Continuation Education. Continuation education was compulsory in several States in 1924. The period during which persons must attend these schools or classes varied. In some States the law operated between the ages of 14 and 16 and in others between the ages of 16 and 18; in still others it is effective between the ages of 14 and 18. Where these schools are established, employed minors within the ages specified, who have not finished 4 years of secondary school work, are usually required to attend 8 hours a week for 36 weeks each year. Such classes are held not less than 4 nor more than 8 hours a week. These part-time continuation classes have to a large measure taken the place of evening schools.

Teacher Training. The report of the United

States Commissioner of Education for 1919-20 showed that the enrollment in the normal schools and teachers' colleges included 19,110 men and 116,308 women, totaling 135,418. The graduates from these institutions in 1920 were 2151 men and 18,861 women, a total of 21,012 qualified to teach. The total receipts for the 371 institutions reporting was \$31,355,389. Prior to 1920 few teacher training institutions had more than a two-year course, and such institutions as gave degrees on the completion of four years' work were usually connected with universities. In 1924 several normal schools had been or were being converted into teachers' colleges with courses of study of three and in some cases four years. The normal schools of New York State had three-year courses, and it was proposed to make them four-year courses at the earliest opportunity. The same condition obtained in some of the other States, notably California and Missouri. Several others, including Massachusetts, Louisiana, Pennsylvania, and Texas, were conducting extensive inquiries into the workings of their teacher training institutions. A Committee on Standards of the American Council on Education defines the normal school or teachers' college as "an institution of higher education with two-year, three-year and four-year curricula designed to afford such general and technical education as will fit students to teach in elementary and secondary schools." The committee suggests the following standards for teacher training institutions:

1. The requirement for admission should be the satisfactory completion of a four-year course of study in a secondary school approved by a recognized accrediting agency, or the equivalent of such a course of study.

2. The requirement for a diploma should be the satisfactory completion of at least 60 semester hours, and the requirement for graduation with the baccalaureate degree the satisfactory completion of at least 120 semester hours.

3. Each course of study leading to a diploma or degree should be recognized separately and only if the following conditions are met: (a) Two-year courses of study leading to diplomas should have a minimum enrollment of 80 students fully matriculated according to the provisions of standard 1 above; (b) Four-year courses of study leading to baccalaureate degrees should have a minimum enrollment of 100 students fully matriculated according to the provisions of standard 1 above, exclusive of any other students.

4. The faculty of a normal school or teachers' college should consist of at least eight heads of departments devoting full time to the work of the institution. With the growth of the student body the number of full-time teachers should be increased so as to preserve a ratio of teachers to students of approximately 1 to 12, exclusive of teachers giving full time to elementary and secondary instruction in training departments.

Teaching schedules exceeding 16 hours per week per instructor, or classes (exclusive of lectures) of more than 30 students, should be interpreted as endangering educational efficiency.

The Visiting Teacher. In every school system may be found children who do not make satisfactory progress. They are not truant, because the well organized attendance divisions assure their presence in the school rooms;

neither are they delinquents or defectives. They are the victims of some type of maladjustment in the school system or home. To meet the needs of children who are misfits, some schools were employing persons with the title of visiting teachers or home and school visitors. A visiting teacher locates the difficulties that may exist and then attempts to adjust conditions so as to enable the child to make more profitable use of the school. She coordinates the efforts of the school, the home, and various independent agencies such as social settlements, civic organizations, parent-teachers' associations and others of similar character.

The first visiting teachers, or home and school visitors as they are sometimes called, were employed during the school year 1906-07 in Boston, New York, and Hartford. In each place the movement was supported by private funds. In 1924 at least 28 cities in 15 States had visiting teachers. The cities finally assumed responsibility for the support and control of the work. California was the only State in 1924 providing for home and school visitors. The Home Teacher Act in that State makes it "permissible for boards of education to employ a home teacher for every 500 units of average daily attendance." A national organization called the National Association of Visiting Teachers and Home and School Visitors had headquarters in New York City.

American Council on Education. The American Council on Education was the central organization in which the greatest national educational associations were represented. Its general object was to promote and carry out cooperative action in matters of common interest to the associations and to the institutions composing them. It has three classes of members, constituent, associate, and institutional. The constituent members are 16 national educational associations. Each is represented by three delegates who vote as a unit at meetings of the council through a designated person. Associate members are educational or scientific organizations having interests related to the work of the council. Associate members may send one representative each to the meetings of the council without the right to vote. Institutional members are colleges, universities, and professional and technical schools contributing not less than \$100 a year to the treasury of the council. Each may be represented at meetings of the council by one delegate without the right to vote. In February, 1921, it had 16 constituent members, 12 associate, and 122 institutional. The budget for 1922 provided for the expenditure of \$27,117.61. Among the projects receiving attention from the various committees of the council were Federal legislation, international educational relations, education for citizenship, the training of women for public service, colleges of liberal arts, and standardization. The council was instrumental in bringing about an investigation of the cost of education and of public resources available to support it. Headquarters are in Washington, D. C.

Carnegie Foundation for the Advancement of Teaching. A summary of the seventeenth annual report of the president of the Carnegie Foundation for the year ending June 30, 1923, states that during the 17 years of its existence the Carnegie Foundation distributed \$9,939,676 in retiring allowances and pensions to 1020 persons. Of this sum \$787,000 was paid to

former teachers of Harvard University, \$677,000 to former teachers of Yale, \$592,000 to former teachers of Columbia, and \$460,000 to former teachers of Cornell Universities. The remainder went to 85 different institutions. There were then operative 398 retiring allowances and 246 widows' pensions, 63 of them granted during the preceding year, entailing an annual expenditure of \$1,022,790. The average allowance paid was \$1593. The maximum allowance had been fixed at \$3600. The total resources of the Carnegie Foundation amounted to \$26,376,000, of which \$15,192,000 belonged to the permanent general endowment, \$8,914,000 to a reserve fund to be spent in the retirement, during the next 60 years, of teachers in associated institutions, \$1,277,000 to the endowment of the Division of Educational Inquiry, and \$628,000 to a reserve fund to be expended in aiding universities and colleges to adopt the new plan of contractual annuities. The Teachers' Insurance and Annuity Association of America, which was established by the Foundation through a gift of \$1,000,000 to provide insurance and annuity protection for college teachers without overhead charges, had written for teachers in 355 different institutions 1519 insurance policies covering \$7,928,000 of insurance and 1175 annuity contracts providing \$1,496,000 annual income at retirement.

The General Education Board. The General Education Board was incorporated by Act of Congress, Jan. 12, 1903. The charter stated that the general object of the corporation is "the promotion of education in the United States of America, without distinction of race, sex, or creed." The funds of the institution were derived from the benefactions of John D. Rockefeller. The report for the year ending June 30, 1923, showed assets amounting to \$128,667,091.53. The income for the year was \$15,899,897.42, and the disbursements were \$6,659,672.94.

From the Board's foundation to June 30, 1923, was appropriated for various educational purposes a total of \$106,214,284.38. Of this amount \$56,517,617.39 had been paid. This left nearly \$50,000,000 appropriated but unpaid. In making payments thus far the Board had used \$12,234,785.24 from its principal funds and \$44,282,832.15 from income. In December, 1919, Mr. Rockefeller gave \$50,000,000 to the Board, "the principal and income of which might, at the discretion of the Board, be used for the increase of teachers' salaries." The report states that "the appropriations during the last four years for the purpose of increasing teachers' salaries have practically exhausted the gift in question." Exclusive of appropriations to schools of education and medicine, the Board had appropriated to general college and university endowments in 291 institutions a total of \$57,662,493.50 from its establishment to July 1, 1923. When the institutions met the conditions under which these appropriations were made, more than \$200,000,000 was to be added to the funds of the institutions concerned. The report indicated a change in the policy of the Board. It stated that "during the last two years the Board has gradually come to the conviction that its possibilities of usefulness in this direction (increasing endowments of colleges) are drawing to an end. The financial resources of higher institutions have been greatly augmented. Internal prob-

lems affecting organization, administration, and instruction have arisen. It would therefore seem to be opportune for the Board to devote its attention to other phases of education."

Institute of International Education. This institute was established in February, 1919, by the Carnegie Endowment for International Peace. As stated by one of its directors, the general aim is to develop international goodwill by means of educational agencies and to act as a clearing house of information and advice for Americans concerning things educational in foreign countries and for foreigners concerning things educational in the United States. The institute pays the traveling expenses of professors on sabbatical leave who are willing to lecture in foreign universities and have been invited to do so. The institute also entertains distinguished visitors and commissions on their arrival in the United States.

Rhodes Scholars. The system of Rhodes scholarships was founded by the will of Cecil John Rhodes. Provision was made for supporting at Oxford University, for a period of three years each, about 176 selected scholars. The United States is entitled to send two students from each State. Candidates must be between 19 and 25 years of age and have completed at least two years of college work. The will outlines the bases of selection as scholarship, character, interest in out-of-door sports, interest in one's fellows, and capacity for leadership. During 1921, 407 American college and university men were applicants for appointment. Thirty-two were appointed.

The Alumni Association of the Rhodes Scholars completed a survey of the work of the American Rhodes Scholars in attendance from 1904 to 1914. The report showed that 351 men were appointed during this period. The occupations of 301 of these are classified as education, 114; law, 72; business, 38; social and religious work, 23; government service, 15; graduate students, 10; scientific work, 10; literary and editorial, 8; medical, 7, and miscellaneous, 4.

The American Oxonian, the official magazine of the Alumni Association, presented a statistical study of the records of the scholars compiled by Prof. R. W. Burgess of Brown University. More than 500 American Rhodes Scholars had been appointed. They represented 172 American universities and colleges, only 39 of which had been represented by as many as 5 scholars. Only 14 per cent of the scholars had had less than a full college course; 19 per cent had done graduate work. "Americans succeed best at Oxford in those subjects of study which are not based on previous preparation, while the record of English students is exactly the other way." The record of the American Rhodes Scholars was particularly good in competition for the degree of Doctor of Philosophy and in law. Most of the Ph.D.'s awarded at Oxford had been given to American Rhodes Scholars, and of the seven Firsts in Jurisprudence awarded in the entire university in 1923, five were taken by American Rhodes Scholars.

Scholarships under La Verne Noyes Foundation. The will of La Verne Noyes provided that the income from his estate should be used for educating men who served in the United States army and navy, or their descendants. The trustees of the foundation made allotments for 30 scholarships for nurses who served with the army or navy of the United

States. They also announced the allotment of 230 other scholarships to be distributed among 22 universities and colleges during 1923-24. Another 100 scholarships were to go to Northwestern University and 40 to Lewis Institute in Chicago. The total was 400 scholarships. It was announced that ex-service men and women desiring to avail themselves of these scholarships should make application to the college or university of their choice.

University Centre of Research in Washington. According to the articles of organization, "the purpose of the University Centre of Research in Washington, D. C., shall be to promote and facilitate research in archives, libraries, and other collections located in the District of Columbia on the part of students in the graduate departments of American and foreign universities and of others." The activities of the University Centre were limited to history, political science, economics and statistics, and international law and diplomacy, up to 1924. It was expected that there would later be opportunity for investigators in all fields of learning. The University Centre is not an institution in the ordinary sense of the word. It is rather an organization for the purpose of rendering aid, especially information on the location of desired material, to investigators in certain fields. It makes no charge for its services. See also LAW, PROGRESS OF, *Reformation in Legal Education*.

EDWARD, (ALBERT CHRISTIAN GEORGE ANDREW PATRICK DAVID), PRINCE OF WALES (1894-). The eldest son of King George V and Queen Mary of England, born at White Lodge, Richmond Park. The Prince began to prepare for the navy when he was eight years old; in 1907, entered Osborne and in 1909 the Royal Naval College at Dartmouth. Upon becoming a midshipman, the Prince was appointed to H.M.S. *Hindustan*. In October of 1912, he entered Magdalen College, Oxford, as a freshman, but his university career was cut short by the outbreak of the War and on Aug. 7, 1914, he was gazetted a 2d lieutenant in the Grenadiers Guards and shortly afterward joined the 1st battalion at Warley Barracks, Essex. During the War he served as aide-de-camp to Sir John French, with the Expeditionary Force in Flanders and in France, later with the Mediterranean Expeditionary Force in Egypt and subsequently on the Italian front. At the time of the Armistice he was serving with the Canadian Corps, and in the early part of 1919 became attached to the Australian Corps in Belgium. The Prince visited Canada and the United States in 1919, on the H.M.S. *Renown*, and in the next year went to New Zealand and Australia by way of the Panama Canal. Upon his arrival in England in October, 1920, he was given a magnificent reception and a banquet at Buckingham Palace. Just a year later, he made a visit to India on the *Renown* and in 1923, another hasty visit incognito to his ranch in Canada.

Since birth, the Prince has been the object of the preparation and enthusiasm that befitted one some day to be the monarch of the British Empire. His career has been characterized by its democratic simplicity, all the more enhanced perhaps by the charming personality of the Prince himself, which has made him the cynosure of admiration not only at home but abroad.

EDWARDS, ALFRED GEORGE (1848-). An English clergyman, the first Archbishop of Wales, born at Llanymawddwy, and educated at Jesus College, Oxford. He was ordained curate of Llandingat, Carmathen, in 1874, becoming headmaster of the college, Landover, a year later. He became vicar and rural dean of Carmathen in 1885, bishop of St. Asaph in 1889, and in 1920, after the disestablishment of the Welsh Church, was created Archbishop of Wales. His publications include: *The Church in Wales* (1888), *Common-Sense Patriotism* (1894), and *Landmarks in Welsh Church History* (1912).

EDWARDS, CLARENCE RANSOM (1859-). An American soldier, born at Cleveland, Ohio. He was graduated at the United States Military Academy in 1883, and entered the United States Army as second lieutenant in the 23d Infantry. By successive promotions, he attained the rank of major-general and was retired in that grade in December, 1922, after 40 years of service. He participated in the campaigns in the Philippines, serving as adjutant-general on General T. W. Lawton's staff in 1899. In 1902, he was made chief of the Bureau of Insular Affairs, on account of his intimate acquaintance with conditions in outlying possessions. He retained this office until 1912, when he returned to the line and during 1915-17 was in command of the United States troops in the Panama Canal Zone. Later, he had charge of the Department of the Northeast, where he organized in 1917 the 26th Division; he was in France during 1917-18 serving on front line duty. On his return to the United States, he was assigned to the command of the First Corps area with headquarters in Boston. He was given the Croix de Guerre with palm and made an officer of the Legion of Honor.

EELS, BREEDING PLACE OF. See FISHERIES.

EGAN, MAURICE FRANCIS (1852-1924). An American scholar and diplomat (see VOL. VII). From 1907 until 1918, he was United States Ambassador to Denmark. In addition to publishing *The Ivy Hedge* (1914), and *Ten Years on the German Frontier* (1919), he has been a prolific contributor to *Century*, *Atlantic Monthly*, *Yale Review*, etc.

EGERTON, HUGH EDWARD (1855-). An English historian (see VOL. VII). He published *British Foreign Policy in Europe* (1917), and *British Colonial Policy in the 20th Century* (1922).

EGYPT. A kingdom in northeastern Africa since Feb. 28, 1922, when the British protectorate terminated. The total area of Egypt proper, including the Libyan Desert, the region between the Nile and the Red Sea, and the Sinai peninsula, is about 350,000 square miles; but the cultivated and settled area, i.e. the Nile Valley and Delta, is but 12,226 square miles. The population for this section was, by the 1917 census, 12,750,918; this made a density of 1061 per square mile, an increase of 12.6 per cent over the last decennial census. The increase for 1897-1907 was 14.9 per cent. The estimated population in 1922 was 13,551,000. The largest towns had the following populations in 1917: Cairo, 790,939 (654,476 in 1907); Alexandria, 444,617 (332,246 in 1907); Port Said, 75,192 (49,884 in 1907); Suez, 30,996; Tanta, 74,195; Mansura, 49,238; Zagazig, 41,741; Asyut, 51,431. The 1917 census showed 11,623,753 Moslems, 856,670 Orthodox Christians (Copts),

47,465 Protestants, 107,531 Roman Catholics, and 59,581 Jews. The country had 238,661 foreigners and 452,263 nomads. Of Moslems, 947 per 1000 were illiterate in 1917; Orthodox Christians, 829; Catholics and Protestants, 531; Jews, 562, and others, 934; total, 921. Education made no advance in the period 1914-22. The total of native and foreign schools was reduced from 8720 to 6501. The native elementary schools, called "Maktabs," for the most part under the control of the provincial councils, decreased from 7590 to 5463. The total number of students was 537,270 and 511,671 respectively. Although the total of male students diminished, the number of female students increased almost 24 per cent. The total number of girls was 79,573 at the beginning and 99,402 at the end of the period. Egyptian schools in 1921-22 numbered 6175, of which there were only 282 schools for girls. Egypt had, besides "Maktabs," colleges of medicine, law, engineering, and agriculture, a military institution, special technical schools, secondary schools, higher primary schools, etc. Besides native schools, there were British, American, French, Greek, Italian, and other foreign schools. Much of the native agitation against British rule crystallized about the failure of the British to increase the facilities for education. After 40 years of British domination, it was pointed out, 92 per cent of the men and 99 per cent of the women were still illiterate. The British policy had been directed almost exclusively toward the furtherance of secondary education, and even here the equipment was inadequate. Because of the failure to found a state university, the natives sought instruction at the university of El-Azhar (Cairo), the chief centre of Moslem orthodoxy, and the anti-occidental spirit which resulted was inevitable. The education charge in the budget remained low constantly, the proportion in 1922-23 being only 3.8 per cent of the total expenditure.

Agriculture. In 1920-21, the cultivable area of Egypt was reckoned at 8,129,055 feddans (1 feddan = 1.038 acres), of which 2,774,686 were uncultivated. About 37 per cent of the population was engaged on the land. The cultivation of cotton was the most important single activity; 1,465,136 feddans were sown with it, in 1922, as compared with 1,723,094 in 1912. The yield in 1922-23 was 578,682,000 pounds. The government frequently had to take measures to restrict the acreage because of the neglect of food crops. For the years 1921-23, for example, only one-third of each holding could be planted in cotton. In 1921-22 1,462,221 feddans under wheat yielded 40,643,000 bushels, compared with a yield of 35,731,000 bushels in 1913-14; barley, 361,231 feddans and 11,985,000 bushels (12,050,000 bushels in 1913-14); maize, 2,027,000 feddans; and millet, 259,490 feddans. Thus the food crops steadily declined in the face of the growing cotton culture. In 1921-22, 62,608 feddans were under sugar cane, as compared with 50,029 in 1912. In 1913 the sugar export amounted to 5,133 metric tons, valued at £79,068, and this increased in 1923 to 37,550 metric tons, valued at £1,057,767. In 1913, 690,644,548 pounds of raw cotton, valued at \$127,310,414, were exported; in 1923, 740,162,120 pounds valued at \$232,231,771. To supplement the Assuan dam for the reclaiming of waste areas, a large irrigation project was announced in 1920. This was to include a dam at

Gebel Aulia, near Khartum, with a storage capacity of 2,000,000,000 cubic meters, or twice that of Assuan, for the service of at least 2,000,000 acres of waste land.

Mining and Manufacturing. Principal mineral products in 1921 were, in metric tons, phosphate rock, 122,024; manganese iron ore, 55,065; petroleum, 178,284. The increase in the last was particularly marked, for up to 1912 petroleum was hardly produced at all. In 1913 the output was only 12,700 tons. The manufacture of cigarettes, the leading industrial activity, visibly declined after 1913. In 1923 the amount of tobacco imported for the making of Egyptian cigarettes was 6,667,715 kilos; this was more than 1,500,000 kilos below the 1913 figure. In 1913, 493,716 kilos of cigarettes were exported; in 1923, only 187,914 kilos. Imports from China became important during the War.

Trade. For 1913, imports were \$139,047,323; 1920, \$382,053,600; 1921, \$219,256,537; 1922, \$196,736,078; 1923, \$212,348,853. Exports for 1913 were \$157,993,704; 1920, \$320,501,479; 1921, \$143,606,445; 1922, \$221,172,538; 1923, \$273,836,564. The year 1922 was the first to show a normal condition since 1913 and a favorable trade balance was restored. In both 1920 and 1921 there were heavy adverse trade balances, but for 1922 the foreign trade showed a favorable surplus of \$24,436,460; in 1923, \$61,487,711. In 1913 this had been about \$19,000,000. Cotton continued in the place of leading prominence, its exports totaling 90 per cent of the entire export trade. Next in importance were cottonseed, refined sugar, cottonseed cake, cigarettes, onions, eggs, etc. Leading imports in 1923 were cotton and cotton textiles (\$77,490,581); metal, metal goods, and machinery (\$25,126,267); wheat and wheat flour (\$9,966,302), coal (\$7,616,438), tobacco (\$5,949,082), building materials (\$7,857,279). The fluctuations in flour imports showed something of the part cotton played in Egyptian economic life. Imports for 1913 were \$10,000,000; 1920, \$24,000,000; 1921, \$25,000,000; 1922, \$8,000,000; 1923, \$10,000,000. The restrictions on cotton-planting, begun in 1921, account for the smallness of the 1922 figure. In 1913 Great Britain was the leading country of origin of Egyptian imports; it sent 30.5 per cent of the whole. The United States ranked ninth with 1.9 per cent. In 1922, the proportions were: Great Britain, 34 per cent; United States, 3.8 per cent. In 1923 the percentages were 33 and 3.7, respectively. The last two figures for the United States were a distinct falling off from the 1920 and 1921 proportions of 10.6 and 15.1. Proportions by countries of destination of Egyptian exports were, for 1913, Great Britain, 43.1 per cent, and the United States, 7.8 per cent; for 1923, Great Britain, 48 per cent, and the United States, 12.4 per cent. In 1919 and 1920, the United States proportions were 22 and 30 per cent. The American purchases of raw cotton were significant. In 1913, 66,712,453 pounds (\$12,188,240) were purchased; in 1923, 106,871,384 pounds (\$33,357,798). Transit trade totaled \$18,462,978 in 1923 and \$10,342,144 in 1913. Re-exports were \$6,878,635 in 1923 and \$2,885,473 in 1913. Alexandria handled 90 per cent of the total trade in 1913 and 90 per cent in 1923. Port Said and Suez handled 8.4 per cent in 1913 and 8.2 per cent in 1923. In the conversions in this list, the following rates of ex-

change, based on the average annual fluctuations, were employed: 1913, Egyptian £ = \$4.99 or normal value; 1920, £E = \$3.75; 1921, £E = \$3.95; 1922, £E = \$4.54; 1923, £E = \$4.69.

Communications. No important railroad construction was accomplished during the period 1914-24 except the continuation of the line from Salhia to Quantara, which joined with the line across the Sinai peninsula to Jerusalem by a bridge over the Suez Canal. The bridge was removed in 1921 because it obstructed the Canal traffic. In 1924 a railway 217 miles long was begun, from Kassala to Port Sudan. Total mileage on Mar. 31, 1922, of state-owned railways (single and double track) was 2319 miles. In 1919 a Ministry of Communications took over control of all railway, telephone, telegraph, post-office, ports, and lighting facilities. Cairo and Assuit had wireless stations, and an air station was located at Cairo.

Finance. In 1912 revenues were placed at £E15,900,000, and expenditures at £E15,400,000. During the War, deficits were evident for the first time in the country's financing, the 1914-15 preliminary budget showing an adverse balance of £E1,460,000. The fall in prices during the year, left the very large deficit of £E15,600,000. In 1921-22, the accounts had been restored to their normal relationship, with an expenditure of £E37,747,000 and a revenue of £E41,803,000. For the fiscal year 1923-24, the budget estimates were £E34,905,000 revenues and £E34,355,000 expenditures. The reserve fund in 1923 amounted to £E2,190,000. In 1922 the amount of the public debt was £E92,761,540. The 1923-24 budget carried £E4,616,509 for debt service. The National Bank, the bank of issue, had in circulation in January, 1924, notes to the value of £E33,326,000. The gold reserve in January, 1924, was £E3,340,000.

Economic Conditions. The break in the cotton market in 1914 was only temporary, for the quick recovery of 1915, due to increased war demands, ushered in a five-year period of unprecedented prosperity. Cotton prices by 1920 were 10 times as high as those of the last pre-war period, with the result that it was possible for traders to invest great sums in foreign securities out of their profits. The peasants (fellahin) suffered because of the neglect of food crops, and the cost of living in the high year 1920 trebled the figures of 1914. The increase in the cost of living may be illustrated by the following 1914 and 1919 prices: mutton, per oke, from \$.50 to \$1.50; veal, \$.40 to \$1.00; butter, \$.50 to \$2.50; frying oil, \$.25 to \$.2. The government was compelled to purchase wheat abroad for sale at home at nominal prices, and subsidies to meet the increased cost of living began to play an important part in the budget. This figure was £E2,500,000 in 1922-23. The fall in cotton prices in 1921 brought real suffering. Labor agitations increased and strikes were frequent, particularly among dock laborers and street railway employees. Index of cost of living, based on the figure of 100 for 1914, was, for 1921, 180; 1922, 147; 1923, 133; February, 1924, 135.

History. On Dec. 18, 1914, the empty suzerainty of Turkey was factually terminated when the British Foreign Office declared Egypt a British protectorate. On the following day the reigning khedive, Abbas Hilmi, was deposed, and his uncle Hussein Kamil was set on the throne with the title Sultan of Egypt. The British

rule thus inaugurated did not terminate until Feb. 22, 1922. Martial law was at once declared, and the meeting of the Legislative Assembly was postponed. Under the high commissionerships of Sir H. McMahon (1915-16), who succeeded Lord Kitchener, and Sir R. Wingate (1916-19), Egypt was put on a war footing. By 1915 some 40,000 British troops had arrived in the country. The problems of the government increased in difficulty in the face of strong pro-German and pro-Turkish agitation and newly roused nationalistic aspirations. The growth of a powerful British bureaucracy which seemed to eliminate all hope of real native participation in the government, and the failure of the Legislative Assembly to convene, were particularly responsible for increasing the impatience of the educated Egyptian. Other equally serious grounds of complaint against British rule were the cruel treatment of native soldiers, the censorship of opinion, the suppression of native newspapers of the free movement suspected of nationalistic sympathies, and of political discussion in the state schools; and finally, the heavy requisitions of animals and produce imposed on the fellahin during the War. The democratic hopes held out by the Allies induced a section of the more moderate Nationalists to hope for a favorable hearing at the British Foreign Office, and two of their leaders, Zaghlul Pasha and Adli Pasha Yeghen, repeatedly made efforts to present their case. The refusal of the British to entertain these appeals and the subsequent deportation of Zaghlul Pasha on Mar. 9, 1919, to Malta, at the order of the puppet Sultan, Ahmed Fuad (1917-), poured oil on the flames with the result that the ensuing disturbances took on serious proportions. Participation was universal, the fellahin, much to the surprise of the British, joining with the educated classes in the disorders, and the Copts taking sides with the Mussulmans. Riots broke out at Cairo and Tanta in March, 1919, and British soldiers, firing into the mobs, killed many. Railway lines were torn up, and Cairo was isolated as a result of the cutting of telegraph wires; Alexandria was the scene of popular disturbances; a British detachment was besieged by fellahin in Assuit; the Arabs were breaking in from the west. Lord Allenby, appointed as special high commissioner in March, 1919, vainly attempted pacification but was met by a strike of officials at Cairo, again with a result of bloodshed. Zaghlul Pasha, now a popular hero, was permitted to return from Malta, but the political strike continued, and transportation was broken off. In April, 1919, Rushdi Pasha was invited to form a government once more, but after two weeks his ministry, unable to handle the situation, resigned. Meanwhile Zaghlul had repaired to Paris to place his country's case before the Peace Conference. But he was never given a hearing, for President Wilson, on behalf of the United States, had recognized the British Protectorate within a short time of his arrival. In December, 1919, a British mission, headed by Lord Milner, finally arrived in Egypt, only to be boycotted universally. Disorder prevailed, and the heads of El-Azhar university threw the weight of their influence on the Nationalist side. After four months the mission returned to England to take up its discussion with Zaghlul and the other members of the Egyptian delegation at Paris. The result of these meetings was the

so-called Milner-Zaghlul Agreement. Its most important points were the recognition of Egypt by Great Britain as a constitutional monarchy with representative institutions, and a guarantee to Great Britain of special rights made necessary by her interests in Egypt, including the right to defend Egyptian territory, to maintain a military force on Egyptian soil, to name a British financial adviser to supervise the debt service and a judicial adviser in the Ministry of Justice. Others provided for the calling of a constituent assembly, the creation of a legislature with ministerial responsibility, religious toleration, and protection of the rights of foreigners. The problem of the Sudan remained unsolved. The agreement was unfavorably received by the Egyptian Nationalists, who took umbrage at the provisions made for the financial and judicial advisers, the maintenance of a British military force, and the failure of the mission to specify directly that the protectorate was ended. The Milner report was submitted to the British Parliament on Feb. 18, 1921. Meanwhile a new Egyptian ministry, headed by Adli Pasha, proceeded to the selection of a delegation to treat with Great Britain concerning a new understanding. Zaghlul Pasha refused to serve on this delegation except on the acceptance of certain preliminary conditions, the abolition of martial law, the independence of Egypt as the basis of the negotiations, and the appointment of the majority of the delegates by the Egyptian people. These conditions were refused, and Zaghlul took a hostile attitude toward the new government; in this he was supported by most of the Nationalists, who sought the calling of the Legislative Assembly for the purpose of carrying on the negotiations. Riots again took place in Cairo and Alexandria in May, 1921, with the result that the British suppressed Nationalist newspapers and arrested agitators. In Alexandria, in particular, the casualties were heavy; Greeks, among the foreign population, suffered severely. The Egyptian delegation, headed by Adli Pasha, remained in London from August to November, 1921, but the discussions ended in no tangible results, partly because of the Egyptian refusal to tolerate a British military force and partly because Winston Churchill, who had succeeded Lord Milner as Secretary of the Colonies, was less willing to recognize the necessity for self government. The winter of 1921 saw a renewal of disorders. The arrest and removal of Zaghlul Pasha and 56 followers, first to Suez and then to the Seychelles Islands, whence Zaghlul was later transferred to Gibraltar before his release on Mar. 30, 1923, was followed by street fighting and another political strike on the part of government officials, together with the adoption of a policy of passive resistance, on Jan. 23, 1922. The seeming impasse and the visit of Lord Allenby to England to counsel the termination of the protectorate forced the hand of the British government, with the result that in February, 1922, Lloyd George made a unilateral declaration incorporating the termination of the protectorate, the abolition of martial law, security for the communications of the British Empire in Egypt, defense of Egypt against foreign aggression, protection of foreign interests and of minorities in Egypt, and guarantees of British interest in the Sudan. On Feb. 28, 1922, the protectorate was officially terminated; on March 16 the Sultan Ahmed

Fuad was officially proclaimed king as Fuad I. On March 14 the English House of Commons approved the government's Egyptian policy by a vote of 202 to 70. Under Rushdi Pasha a commission set to work to formulate a constitution. The new constitution promulgated in May, 1923, after many stormy preliminary sittings of the commission, contained the following provisions: Egypt is declared a sovereign, free, independent state with an hereditary, monarchical, and constitutional government; Islam is established as the national religion and Arabic as the official language; compulsory free education for both sexes is assured; legislative power is vested in the King in consultation with the Senate and the Legislative Assembly; the King may declare war and make peace through a cabinet; parliamentary assent is needed for the declaration of offensive war, and all treaties of peace and alliance are ineffective without parliamentary ratification; the ministry is responsible to the Parliament; two-fifths of the senators are renominated by the King, and the remainder are elected; the assembly is elected by universal manhood suffrage; the rights of the Egyptian Debt Commission and the Capitulations are not to be affected by legislation. Representation of racial minorities, greater freedom for women, the predominant position claimed by England in regard to Egyptian foreign relations and the military protection of the Suez Canal, all points of sharp contention, were not included in the constitution, nor was the question of the Sudan settled. The Zaghlulists continued in opposition because of the failure of the constitution to incorporate a bill of rights. The unsettled internal affairs led to frequent changes of ministries. Sariwat Pasha resigned on Nov. 30, 1922, after holding office since March 1. Tewfik Nessim Pasha, his successor, was compelled to resign on Feb. 5, 1923, because of his willingness to relinquish the Egyptian claim to the Sudan. After a month of political bargaining a new ministry was formed by Yehia Ibrahim Pasha on March 15. The turbulence in politics indicated with what dissatisfaction Egyptians still looked on the settlement. Feminism and a rampant nationalism which would accept nothing but complete independence were the order of the day, and rioting and outrages were only too frequent. The Egyptian government patterned an ineffectual attempt at retaliation after the methods of the British administration and instituted a rigorous censorship on May 31. The return of Zaghlul and the renewed activities of his executive committee made the campaign preceding the preliminary elections of September 27 bitter. Zaghlul's programme called only for Egyptian independence, and the wholehearted support which his party received showed how thoroughly the country, especially the rural districts, subscribed to the sentiment. As a result of the balloting conducted in September, November, and January, 1924, the Nationalist party was returned with an extraordinary majority, 176 seats out of a total of 214. On January 17 Yehia Pasha resigned; and on January 28, Zaghlul, the outcast and political exile, saw his work crowned with success by the offer of the Premiership. He at once accepted, and in the first days of February he was installed in office amid great rejoicings. One of his first acts was to interrupt Howard Carter's excavations at the tomb of Tutankhamen (q.v.) and to put the work under the con-

trol of the Egyptian Department of Antiquities. In July, 1924, it was reported that Mr. Carter had been invited to resume his work in 1925. See ARCHÆOLOGY.

EIGHT-HOUR DAY. See HOURS OF LABOR.

EIGHT-HOUR LAW. See LABOR ARBITRATION.

EINHORN, MAX (1862-). An American physician and pioneer in gastroenterology, born in Grodno, Russia. After graduation from the gymnasium at Riga he received the degree of M.D. from the University of Berlin in 1884, migrating shortly afterwards to the United States. Having established himself as a gastroenterologist in New York, he was made professor of medicine in the New York Postgraduate School and Hospital and a visiting physician to the German Hospital. In connection with his special work in gastroenterology, he has devised many new forms of apparatus either for diagnostic or therapeutic work, which are known by his name. One of the most recent and best known of these is the Einhorn duodenal bucket. In addition to being an assiduous contributor to periodical literature, he has written several standard textbooks, as follows: *Diseases of the Stomach* (1896); *Diseases of the Intestines* (1900); *Practical Problems of Diet and Nutrition* (1905); *Lectures on Diatetics* (1914); *The Duodenal Tube* (1920).

EINSTEIN, ALBERT (1879-). A great German-Swiss physicist and author of the special and general theories of Relativity (see RELATIVITY), born at Ulm, Württemberg. Einstein spent his youth in Munich, where his father controlled electro-technical works. He studied at the University of Zurich and supported himself by teaching at the *Technische Hochschule*. Einstein's next few years were years of painful struggle and gradual advancement. Tutor at Schaffhausen from 1900-01, he returned to Zurich for a year, and then became examiner of patents at the federal patent office in Berne. It was while earning his living as a government employee that Einstein published his special theory of relativity as a solution for the paradoxes of the Michelson-Morley experiment (1905). This theory embraced at the time only the interrelationships of space and time measurements, and it was while working out the problems and implications set by this theory that Einstein was led in the next 10 years to generalize his conception so as to include gravitational phenomena, and subsequently electromagnetism as well. In the meantime, having become a Swiss citizen, Einstein was called in 1909 to teach at the University of Zurich, and in 1911, to the University of Prague. The next year, however, he returned to the *Technische Hochschule* in Zurich with the title of full professor. By this time Einstein's reputation had spread throughout the scientific world, and in 1913 he was invited to lecture before the Prussian Academy of Science. The next year he received a research professorship without restrictions from the *Kaiser Wilhelm Institut für Physik* and the University of Berlin.

The outbreak of the War found Einstein formulating specifically the general theory of relativity and indicating certain empirical tests. A revision of the complicated mathematical calculations enabled the theory in 1919 to account for the displacement of the perihelion of Mercury within 1 second of actual observations,

where the theory of Newton had left a discrepancy of 42 seconds. The eclipse of the sun in May, 1919, as observed in Brazil also confirmed the deflection of the sun's rays in the neighborhood of the solar mass as predicted by the theory. Einstein now leaped into world fame over night, and was saluted as the greatest physicist since Newton. He visited England, the United States, Italy, and France, and in each country received great ovations and honors. On his return to Germany, Einstein busied himself with the problems of the quantum theory of radiation, upon which he had published papers dating back to 1907. The phenomena covered by this theory concern the behavior of sub-atomic masses and fall at present outside the range of the relativity principle which provides continuous and invariant equations for systems of large masses. Quanta form therefore the next objective of the Relativity theory, but it has seemed to many scientists doubtful whether the Einsteinian principle could be extended to such phenomena without considerable modification. In his extra-scientific life, Einstein was a fairly typical European intellectual. In politics, he was a liberal with socialistic sympathies. During the period of political effervescence in Germany, he suffered from persecution at the hands of reactionary and anti-Semitic partisans, and threats against his life were reported. While he was in the United States, he took a public interest in the activities of Jewish Zionists.

Einstein's published works include, in addition to numerous papers contributed to learned periodicals, the following books: *The Special and General Theory of Relativity* (Eng. trans., 1920); *Sidelights on Relativity* (Eng. trans., 1922); *The Meaning of Relativity* (containing the Princeton lectures delivered 1921); *The Principle of Relativity* (a collection of essays by Einstein and others, 1923); *Untersuchungen über die Theorie der "Brownschen Bewegung"* (1922). See PHYSICS, *Relativity*.

EINSTEIN, LEWIS (1877-). An American diplomat and author, born in New York, and educated at Columbia University. His first diplomatic post was as third secretary at the American Embassy in Paris (1903-05), and since that time he has been at the embassies of: London (1905-06); Constantinople (1906 and 1908); Peking, China (1909); Costa Rica (1911-13), as envoy extraordinary and minister plenipotentiary; Constantinople (1915), as special agent of the State Department; Bulgaria (1915-16), as American diplomatic representative in charge of British interests; and Czechoslovakia (1921-), as envoy extraordinary and minister plenipotentiary. His works include: *Luigi Pulci and the Morgante Maggiore* (1902); *The Relation of Literature to History* (1903); *American Foreign Policy by a Diplomatist* (1909); *Inside Constantinople* (1917); *Prophecy of the War*; *Tudor Ideals* (1921).

EISELEN, FREDERICK CARL (1872-). An American university professor, born at Mundelsheim, Germany, and educated at the gymnasium in Landsberg, Germany, at New York University, Drew Theological Seminary, the University of Pennsylvania, Columbia University and the University of Berlin. In 1902, he was appointed professor of Semitic languages at the Garrett Biblical Institute, becoming dean in 1919. In 1918, he was made professor of Biblical literature in Northwestern University.

He is the author of: *Sidon—A study in Oriental History* (1907); *A Commentary on the Minor Prophets* (1907); *Prophecy and the Prophets* (1909); *The Worker and his Bible* (1909); *The Christian View of the Old Testament* (1912); *Books of the Pentateuch* (1916); *The Psalms and Other Sacred Writings* (1918); *The Prophetic Books of the Old Testament* (1922).

EISELSBERG, FREIHERR ANTON, BARON VON (1860-). An Austrian surgeon known especially as a teacher of surgery, born at Steinhaus. He received his medical degree from the University of Vienna. In 1893, he was appointed professor of surgery in the University of Utrecht, Holland, and in 1896 resigned to accept the corresponding chair at Königsberg. In 1901, he was made professor of surgery in the University of Vienna. He has written comparatively little, his only considerable work being his *Krankheiten der Schilddrüse* (1901). In 1918, appeared his *Festschrift*, which marked the 25th year of professorial activity; this comprised Vol. ex of the *Archives für klinische Chirurgie*, of which he is co-editor, and is made up wholly of papers by numerous prominent surgeons who were formerly his pupils.

EISNER, KURT (1867-1919). A German Socialist and publicist, born in Berlin. He became a journalist, and was many times imprisoned on account of the extreme radical character of his writings. From 1898 to 1905, he was a member of the editorial staff of *Vorwärts* in Berlin; he was subsequently on Socialist papers in Nürnberg and Munich. During the War he turned against his party because it supported the War, and in 1918 was charged with treason at Munich for inciting munitions workers to strike, but he was released. On November 7 of the same year, he held a mass meeting in Munich which led to the overthrow of the Bavarian monarchy and the creation of a revolutionary government with Eisner as president. His policy was extreme. He supported the Workmen's and Soldiers' Councils, and was opposed to the centralizing policy of the Berlin government. He finally agreed, however, to the reestablishment of the federal system and the election of a National Constituent Assembly. But in the meantime, a Bavarian Assembly had been elected. This fortified the fears of the reactionaries, who already hated Eisner sufficiently. As he was going to open the Assembly on Feb. 21, 1919, he was assassinated by Count Arno, and Munich was plunged for a time into a state of Bolshevism. See BAVARIA.

ELECTRIC AUTOMOBILES AND TRUCKS. See MOTOR VEHICLES.

ELECTRIC BOILERS. See BOILERS.

ELECTRIC CRANES. See ELECTRIC MOTORS IN INDUSTRY.

ELECTRIC DRIVE. See SHIPBUILDING.

ELECTRIC FURNACES. The application of electric furnaces was becoming more general and the construction of the furnaces standardized in 1924. Three classes may be recognized, resistance, arc, and induction. The resistance furnace employs a nichrome or calorite conductor like that used in household heating devices, maintained at a high temperature by suitable current, usually alternating current. A furnace which will hold 1500 pounds of brass employs 300 kilowatts. Temperatures up to 1800°F. may be obtained. Arc furnaces also use alternating currents as a rule, because of

the preference for a transformer for the supply to a motor-generator set. A notable example of an arc furnace is that of the United States Naval Ordnance plant which holds 40 tons of steel and takes 3300 kilowatts normally in the form of three-phase currents at 110 volts. Its maximum current is 21,200 amperes per phase. The transformers are supplied with 6600 volts, three-phase. The induction furnace was the last developed. It is made in small sizes for scientific work and then usually works at very high frequencies. In the larger sizes, for metals such as copper or brass, it works at frequencies as low as 8.5 cycles. In this type of furnace the molten metal itself forms the secondary of a transformer, and the voltage is induced in it by an iron core running through the centre of a circular pot. They are manufactured for as high a rating as 300 kilowatts at 2200 volts on the primary. The repulsion induction furnace is a special form in which the secondary is so placed with respect to the primary that the leakage flux keeps the molten metal flowing by the eddy currents induced in it.

ELECTRIC GENERATORS. See STEAM ENGINES AND TURBINES.

ELECTRICITY, THEORIES OF. See CHEMISTRY.

ELECTRIC LIGHT AND POWER. See MUNICIPAL OWNERSHIP.

ELECTRIC LIGHTING. Striking achievements in the field of electric lighting in the period 1914-24 were: the great improvement in the efficiency of the incandescent lamp and the increase in the intensity of illumination used in general practice. In these 10 years the old favorites, the carbon lamp and the metallized filament lamp, had practically disappeared from the market, and the tungsten filament lamp reigned supreme among incandescent lamps and also superseded the arc lamp in new installations except for display effects. In 1919 the manufacture of the metallized filament lamp was abandoned, and in 1923 only 7 per cent of the lamps made were of the carbon filament type, the remainder were tungsten lamps. These lamps, known to the trade as Mazda, are made in two styles. In one, the Mazda B lamp gives 8 to 12 lumens per watt, in the C type the bulb is filled with an inert gas such as nitrogen, or, more recently, argon. The B lamp is about three times as efficient as the old carbon lamp, and the C lamp about four times as efficient. The C lamp was at first made only in the largest sizes; later it was made in all but the smallest standard sizes.

On account of the changes in the shape of the filament and in the distribution of the direction of the light from these newer lamps, it is no longer possible to compare lamps by the candle power, which is an intensity in a definite direction. Therefore the illuminating engineer has adopted a definite *quantity* of light as the standard of comparison and has called it the lumen. A lumen is most easily understood as the amount of light that would fall on a sheet of paper one foot square placed so that all parts of it were just one foot distant from a candle of one candle-power. Thus lamps are now sold on the basis of the light they give in all directions instead of in only one direction, as formerly. A point source of light of one candle-power gives 12.56 lumens. The average Mazda B lamp gives 8 to 12 lumens per watt,

and the Mazda C from 12 to 18 lumens per watt. The old carbon lamp gave about 3.4 lumens per watt. Statistics show the growth of the use of incandescent lamps and the improvement in their efficiency:

	1913	1923
Total lamps sold in year	105,000,000	225,000,000
Aggregate wattage .	4,700,000,000	12,400,000,000
Aggregate lumens ..	29,500,000,000	150,750,000,000
Average lumen per watt	6.3	12.1

The effect of this improvement on the pocket-book of the consumer is demonstrated by the total expenditure for electric lighting in the United States in 1923; this was \$600,000,000 for the new high efficiency lamp. If lamps of the low efficiency type common 15 years ago had been used the bill would have been three times as much. The improvement of the incandescent lamp in the last 15 years means a saving of \$1,200,000,000 per year. New York City alone pays a bill of \$700,000 annually for current for lighting its 2800 miles of streets.

Scientific measurements of the prevailing intensities of artificial illumination and of the most desirable intensities has shown that a very great increase is desirable, profitable, and, in some cases, necessary to the preservation of the eye-sight of the nation. Thus in school rooms an illumination of three foot-candles used to be considered good, but now eight foot-candles is recommended. Investigations in the industries have shown that by multiplying prevailing intensities three times, the production of a factory may be increased 20 per cent. There is also a very close relation between industrial accidents and quantity of illumination, and it is accepted that an increase in intensity in dangerous locations very definitely decreases the chances of accidents to industrial workers.

The Illuminating Engineering Society developed a Code of Standard Practice in Illumination which has had a beneficial effect in improving methods, and several States have adopted codes for the regulation of the illumination of factories, streets, schools, etc. By an agreement between manufacturers of lamps and electric lighting companies, the number of special voltages for incandescent lamps was reduced to three standards, 110, 115, and 120. All standard lamps are made for these voltages. A great deal of scientific work was done on the design of fixtures for incandescent lamps, and the name of luminaire was officially given to such devices. The main requirements are to direct the light uniformly in a desired way (downward) and to eliminate glare. Enclosed luminaires are now the usual practice, and some sort of reflecting surface above or inside the luminaire is used to throw the light downward where it is usually desired and most needed. In the scientific study of illumination new measuring devices have been developed, and various forms of illuminometers are in use. By these, the illumination at any place may be read as easily as the page of a book.

While the tungsten filament lamp is much richer in blue and green than the older types of lamps, it still falls far short of daylight in its color content. The gas-filled or C type is better than the vacuum lamp on account of the higher temperature of its filament. To overcome the defect in color a special lamp is man-

ufactured in which the bulb is tinted a bluish-green, which absorbs the excess of red and yellow of the filament and thus gives a reduced amount of light with a better distribution of colors. This is known as the daylight lamp. By means of outside screens a real reproduction of daylight may be obtained with this lamp. This is found useful in matching colored cloths, and physicians employ it in examinations of inflamed internal membranes, as in the nose and throat.

To facilitate the making of moving pictures at night with better color effect than that given by the mercury lamp, a very large size of tungsten incandescent lamp has been developed which takes 30,000 watts, 1000 times as much as the usual lamp in the home; it gives a proportionate quantity of light. The high intensity gas-filled lamp has been adapted, by giving the filament a special shape which approximates a point source, to use in stereopticons and moving picture machines for projection purposes. It is rapidly superseding the arc lamp on account of the reduced fire hazard. Consult Croft, *Practical Electrical Illumination and Standard Lighting* (New York).

ELECTRIC MOTORS IN INDUSTRY.

The steel mills of the United States were gradually superseding their steam and gas engines by electric motors in the decade 1914-24. At the end of that time, 5,000,000 horse power of electric motors were in use in American steel mills, in sizes up to 8000 horse power. The most striking application was that of driving enormous rolling mills by direct connected electric motors. This had become standard practice. The majority of motors are of the three phase induction type, which includes the largest motors; but some direct current motors of 4000 horse power are in use. These motors start, stop, and reverse the rolls by electric control and are noted for their quick responses to the control. In some special cases, where a variable speed is required, the Scherbius system of speed control is used. In this a large induction motor is used to drive the load, and its secondary electric circuits are connected to a polyphase alternating current commutator motor, which in turn drives an induction generator connected to the same electric mains as the principal motor. By electrical control of the commutator motor, it is made to take more power from the secondary of the load motor, which therefore decreases in speed. This power is returned to the line by the induction generator. By adjusting the power taken by the commutator motor, the speed of the main induction motor may be controlled through a wide range without wasting the energy as would be done with rheostats.

Mining. The mining industry showed a notable trend toward the substitution of electrical machinery for steam engines and the use of purchased power instead of isolated plants. In the year 1923 electrically operated mine hoists aggregating 40,000 horse power were installed. Eighty per cent of these were for alternating currents. The sizes of motors ranged from 100 horse power to 2000 horse power. In 1924 the mining industry ranked second in the United States in the aggregate capacity of electric motors in use, with its 2,890,000 horse power and third in the consumption of electrical energy from central stations.

Mine Hoists. The most usual application is to mine hoists. All new hoists are electrically

driven, and many old steam driven hoists are being changed over to electric. Installations are of three kinds:

(a) Direct drive of the hoist by a large three-phase induction motor taking power from the supply lines. This is the simplest and cheapest arrangement but puts a variable load on the electrical system. An example is that of the Tennessee Coal and Iron Company at Muscoda, Ala., in which an 1800 h.p., 2200 volt three-phase motor superseded a steam engine in hoisting a load of 27,000 pounds up a slope of 5000 feet at a speed of 2700 feet per minute. For lowering, the motor is reversed electrically.

(b) A direct control motor is used to drive the hoist, and this is supplied from an alternating current-direct current motor generator set operating on the Ward-Leonard system, by which the control of the speed is most conveniently and economically accomplished. The set has a three-phase synchronous motor, which by its good power factor assists in the voltage regulation of the distribution system. For example, the Vandalia Coal Company of Indiana has a number of such sets in which an 800 h.p., 500 volt direct current motor drives the hoist through gearing, and this motor receives its power from a motor-generator set having a synchronous motor operating from the alternating current supply lines and driving a suitable direct current generator. By changing the field current of this generator the speed of the hoist motor is regulated.

(c) The Ilgner-Ward-Leonard System, in which the motor generator set contains an induction motor, a fly-wheel, and a direct current generator. A speed controller so regulates the set as to cause it to take a fairly uniform amount of power from the supply lines while delivering a very variable power to the hoist motor. An example is the Cleveland Cliffs Mining Company of Michigan. The duty is to raise 12,000 pounds of iron ore per trip, up a lift of 2700 feet at a speed of 1800 feet per minute. One 900 h.p. direct current motor drives the hoist and is supplied by a motor-generator set having a 30-ton fly wheel. The hoist motor takes, at most, 1700 h.p. from the set, a large part of which is supplied by the fly wheel, so that the peak demand on the supply lines is only 960 h.p.

The very general application of electric motors to hoists, cranes, loaders, etc., has resulted in important changes in the design and a great development in the machinery and its application. These devices have been built in much larger sizes than previously. One example of the magnitude which such apparatus has reached is the Baltimore and Ohio coal loader at Curtis Bay, Md., near Baltimore. This loader will unload 8000 tons of coal per hour from coal cars and deliver it to the hold of a ship at a somewhat slower rate. The coal is conveyed along the pier by eight parallel belts driven by electric motors, all controlled by one operator on the bridge of the pier. The coal is transferred automatically to transverse belts which drop it into the vessel alongside the pier. To fill the spaces between the hatches in the hold of the vessel a trimmer is used. This trimmer throws the coal a distance of 50 feet, if necessary, and each trimmer handles 100 tons per hour. By this means a vessel has been loaded with 9500 tons in 9.5 hours; this task would have required

200 men for 25 hours if hand trimming had been used.

Electric Cranes. Electric cranes were being built in 1924 in very large sizes as well as small and were equipped with alternating current motors or direct current motors specially adapted for the purpose. An electric crane of unusual magnitude has been built for service in a shipyard. It has a maximum height of 230 feet, a length of boom of 300 feet and a hoist of 170 feet. It is capable of lifting loads of 350 tons. Several motors aggregating 300 h.p. are used for the various movements, all controlled from a central point.

Electric Shovels. Electric shovels were replacing the familiar steam shovels and were built in larger sizes than the steam shovels. A large size shovel is rated at 300 tons, has a bucket capacity of 8 cubic yards, and can be filled and emptied in 45 seconds. One man controls all the operations by means of two controllers, one for each hand, and foot pedals. It contains four direct current motors for working, aggregating from 500 to 600 h.p. These direct current motors are supplied by a motor generator set in the cab consisting of a three-phase alternating current synchronous motor for 4000 volts driving a 250 volt direct current generator of suitable capacity.

Electric Drills. The enormous activity in the oil industry made it worth while to develop a standard electric-driven drill in which it is possible to use a three-phase alternating current motor of from 50 to 100 h.p. to drive the drill by means of gearing and chain drive. The motor can take power from a cheaply installed transmission line tapping a main transmission system.

Brush Shifting Motor. A new adjustable-speed polyphase motor was brought out, known as the brush shifting motor, in which the speed may be nicely controlled within a wide range by shifting the brushes. Its most general application was for blowers in power plants.

Clock Motor. An interesting development was the clock motor, a small synchronous motor for actuating clocks. It is connected with the alternating current mains of a central station in a customer's house, and as the frequency of the system is kept constant the clock runs at constant speed and repeats the time of a master clock in the power house. Averaged over 24 hours it will keep excellent time, but it may run a second to the minute fast or slow for short periods.

Position Indicator. The position indicator is a similar device, a repeater which has had an important application on shipboard. It consists of one master and several repeater synchronous motors whose fields are supplied with single-phase alternating current and whose three-phase stators are connected in multiple and located at distant points. At whatever point in its angular position the master is set the several repeaters will show accurately, and if the circuit is broken and reestablished the repeaters will adjust themselves correctly. Consult Annett, *Electrical Machinery* (New York) and the books referred to under **ELECTRIC POWER STATIONS AND GENERATING APPARATUS**.

ELECTRIC POWER STATIONS AND GENERATING APPARATUS. The business of the electric central stations increased in the interval between 1914 and 1924 at a rate almost equivalent to a doubling every five years, so that

these stations in 1924 supplied 57 per cent of the energy used in all the industries of the United States and had a capitalization of \$5,000,000,000. This is indicated by the following statistics of central stations:

	1913	1923
Capacity in kilowatts . . .	7,000,000	22,000,000
Output, millions of kw. hrs.	16,800	52,000
Gross earnings	\$337,000,000	\$1,200,000,000

The principal users of the output of the central stations were:

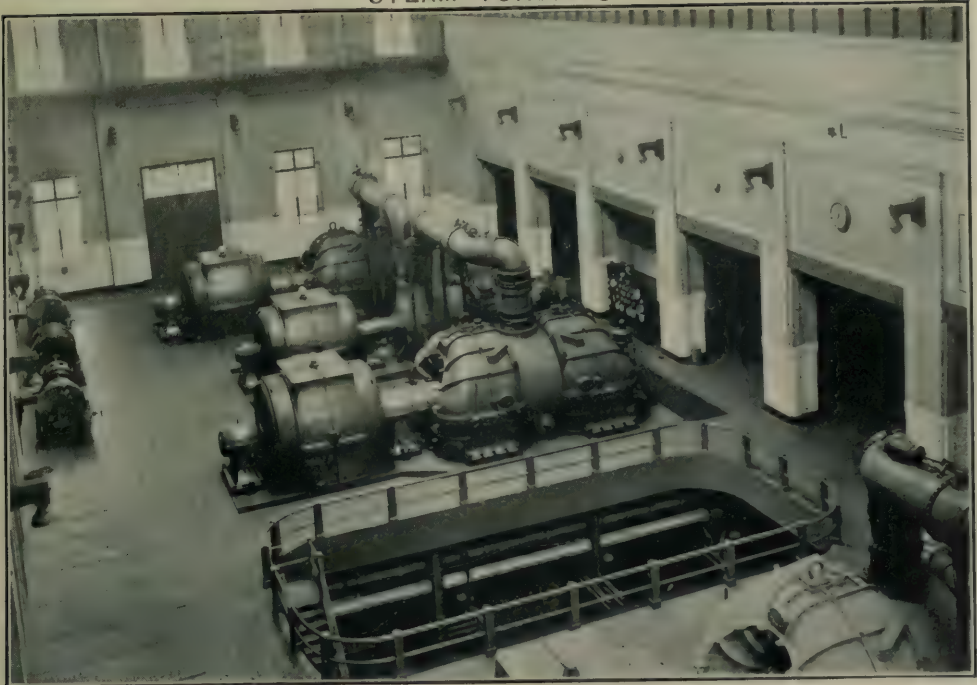
	1923	H. P.	Millions of kw. hrs.
Iron and steel industry	4,956,000		8,115
Mining industry	2,890,000		4,113
Chemical industry	2,197,000		6,074

This growth in the use of electric power exerted an important economic influence by increasing the production and decreasing the cost of manufacture as a result of the increased substitution of mechanical power for manual labor. Census figures show that in all the industries of the United States the gross production per year amounted to \$3400 per employee with the use of 3.5 h.p. of mechanical power per employee, while in Great Britain the production was \$1200 and the power 1.6 h.p. per employee. All other countries fell below Great Britain. With the increasing cost of coal it was found more economical to generate the electric energy in large central stations where the coal can be used most efficiently and where coöperation makes the load more steady, or, in technical phraseology, where the load factor is better. The same cause has resulted in a very notable increase in the number and size of the hydroelectric stations. These are generally operated in a system containing steam stations, and the load is allocated by a load dispatcher so that the most economical stations (hydro) operate all the time, and the less economical only carry the peak loads.

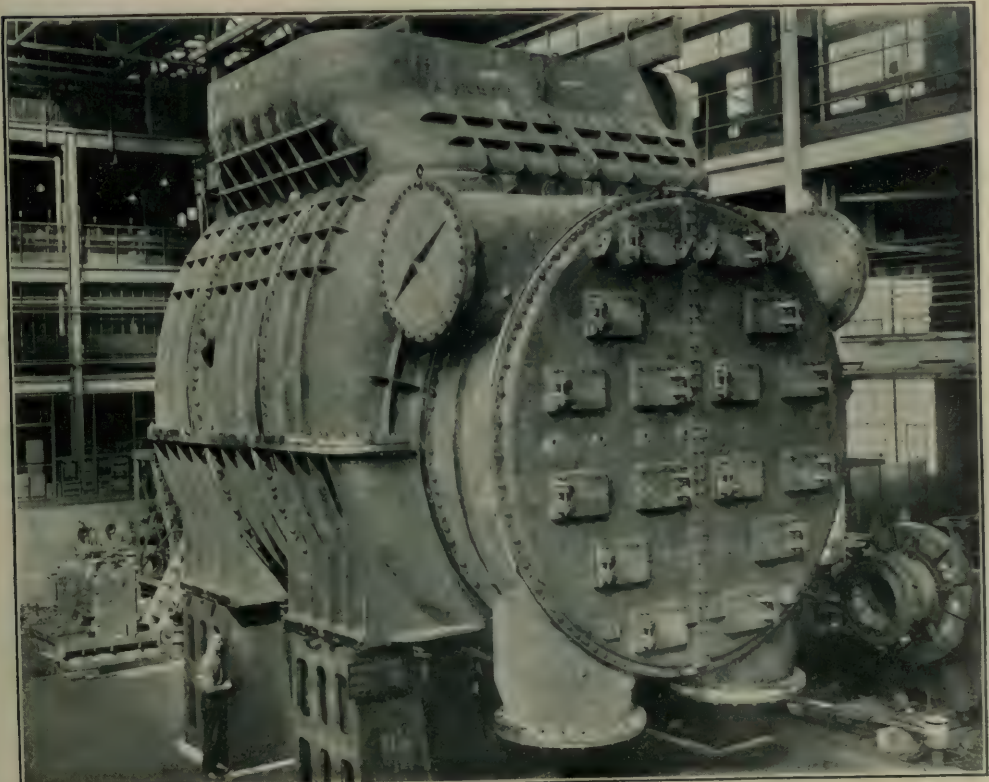
Generators. The most striking development in electric generating apparatus was the steady growth in number and size of steam turbo-generator sets and the practical extinction of the slow speed engine-driven sets. In 1914 a unit of 30,000 kilo-volt-amperes (40,000 h.p.) was considered noteworthy; in 1923 several units of 62,500 kva. (84,000 h.p.) were constructed. With the increase in capacity there has also been a steady increase in the steam pressure and temperatures used in the turbines. Thus from 215 pounds gauge and 150°F. superheat, practice has advanced to 600 pounds and 725° maximum temperature, making it possible to obtain one kilowatt-hour at the bus bars for 17,000 in the full B.t.u., giving an overall efficiency about 20 per cent.

Many improvements were made in the design of the electric generator itself so that this great increase in power capacity is obtained with only a small increase in the dimensions and weights. Modern generators weigh much less per kilowatt than those of 1914. This was made possible by pushing the peripheral speed up to about 25,000 feet per minute, by the use of mica insulation on the armature and asbestos on the fields, and by improving the ventilation. Efficiencies of 98 per cent and higher are common in these generators. A notable change in practice was

STEAM TURBINES



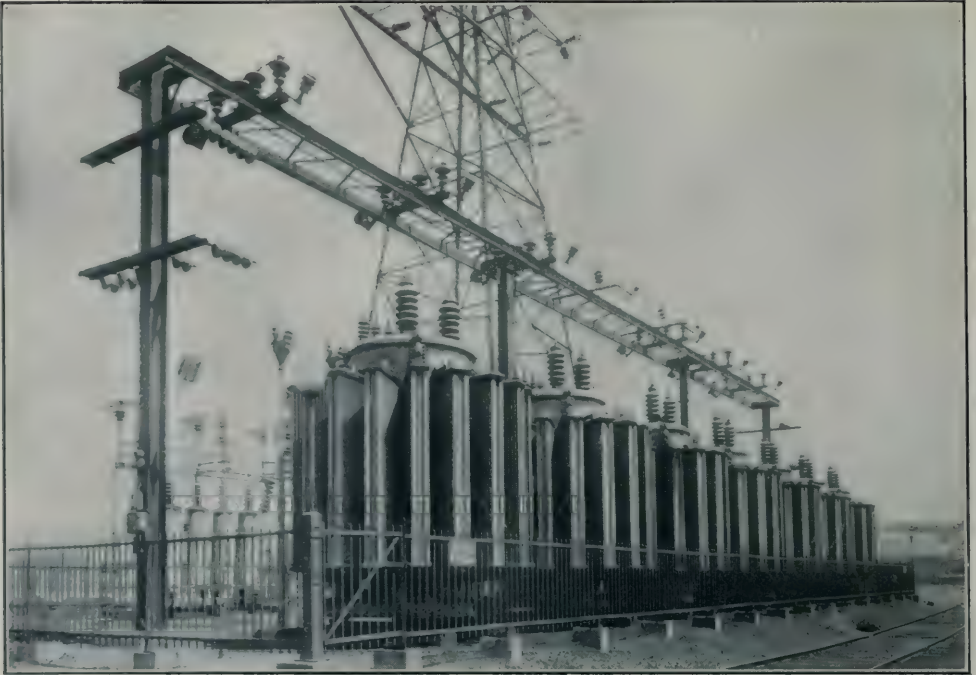
THE 70,000 KVA THREE-ELEMENT TURBINE GENERATOR IN THE COLFAX STATION OF THE DUQUESNE LIGHT COMPANY



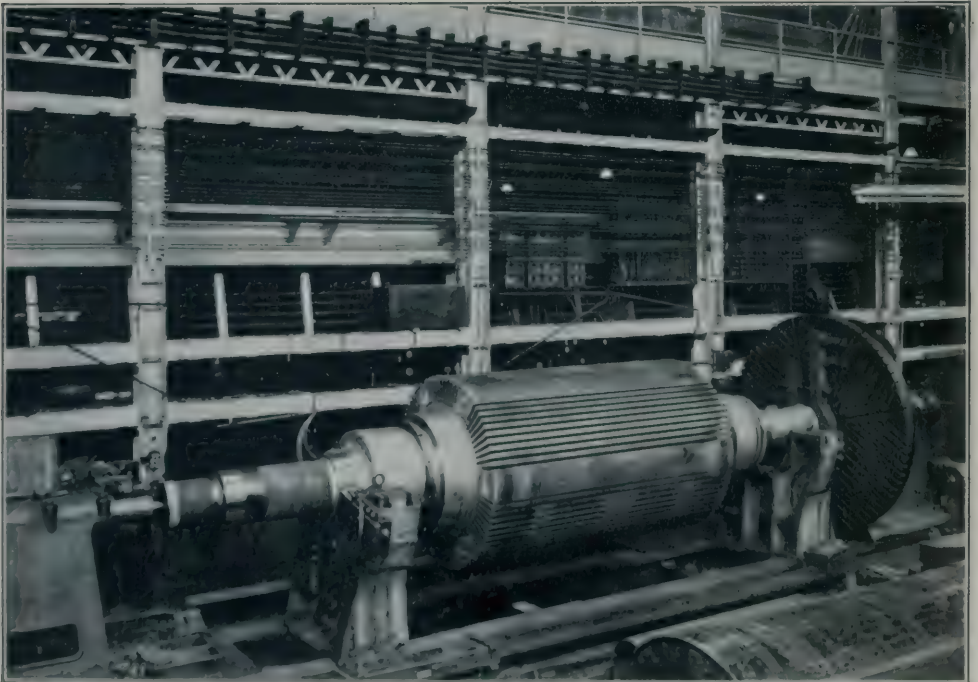
PHOTOGRAPHS FROM WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY

RADIAL FLOW SURFACE CONDENSER USED WITH STEAM TURBINE IN HUDSON AVENUE STATION OF BROOKLYN EDISON COMPANY

ELECTRIC MACHINERY



Installation of Seven-Radiator Type of Oil-insulated Self-cooled Transformer at Outdoor Substation of the Duquesne Light Company at Brunot's Island



PHOTOGRAPHS FROM THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY

Rotor for 62,500 Kva Generator (the largest built up to 1924) installed in the Hudson Avenue Station of the Brooklyn Edison Company

the rapidly increasing use of closed circuit ventilation. The air for cooling purposes, after passing through the generator and carrying off the heat, is sent through a radiator like that used on an automobile, except that the water cools the air, or the air is passed through a spray of water to which it gives up its heat, and then is returned in closed ducts to the generator to be used over again. The advantage of this is that no dust nor dirt is carried into the generator to clog its air ducts.

The development of a successful voltage regulator had a marked effect on the design of large alternating current generators; freed from the requirement of good inherent regulation in the machine, the designer has freer hand in his design and can economize in material. There was a steady trend toward 60 cycles as the standard frequency. It is now possible to obtain synchronous motors and converters of large sizes which will operate entirely satisfactorily at this frequency, so that the principal reason for choosing 25 cycles has disappeared.

As a result of the increase in the size of the generating units and particularly the increase in length, the type of set using a vertical shaft went out of favor and the horizontal shaft came into universal use. The improvements in the efficiency of these generating sets was so rapid that it was the rule to scrap a perfectly good set after a few years' use and buy a new and larger one, because the new one would require so much less coal in a year that the saving in cost of coal would more than pay the interest on the cost of the new set. Some of these large sets use \$1,000,000 in coal each year, so that a saving of 10 per cent is substantial. This is what is meant by obsolescence.

A feature of the development of steam turbines was the two cylinder machine in which the turbine is divided into two parts, one for high pressure steam and the other for low pressure steam. Each part has its own generator, connected in parallel electrically, but independent physically. The same steam passes first through the high pressure turbine and then through the low pressure part to the condenser. This design is particularly desirable with the reaction type of turbine which has a tendency to be long and clumsy in dimensions.

In the design of power stations a change to be noted was the smaller number and larger capacity of the units as a result of the greater reliability of the newer machines and also of economic conditions. Central stations cultivated off-peak load customers, such as those that use power many hours per day, and therefore improve the load factor of their stations; that is, they raised their average all-day load to approach more nearly their maximum peak load. On account of the very good efficiency of large size units, as compared to smaller sizes, and a new business policy on the part of the central stations resulting in more reasonable rates, the isolated plant is becoming more and more rare. Almost all recent new buildings and industries obtain their electrical energy from a public service company instead of installing an independent generating plant. The growth of hydro-electric stations was very great because of the high cost of coal. Many a station of this type which some years earlier faced bankruptcy showed a good profit in 1924, and many new stations were built, although the cost of construction was almost double the 1914 figure.

The size of generating units used increased rapidly. In 1916 the largest water-wheel generators in service were of 18,000 kw.; 1921, 232,000 kw., 1922, 45,000 kw., and 1924, 65,000 kw. The operating speeds were increased each year so that a 60,000 kw. machine of 1924 was not much larger than an 18,000 kw. machine of eight years previous.

Circuit Breakers. With the growth in the size of units and the increase in station capacities it was necessary to develop new, larger, and more powerful circuit breakers or switches to open up the circuits in case of trouble or short-circuits. The type breaking the circuit under oil became universal in alternating current systems, and these were developed and constructed to cut off successfully short-circuits taking thousands of amperes at thousands of volts. Some circuit breakers installed were capable of interrupting 1,500,000 kilo-volt-amperes, and the manufacturers stated their willingness to construct breakers capable of interrupting 3,000,000 kva. (4,000,000 h.p.)

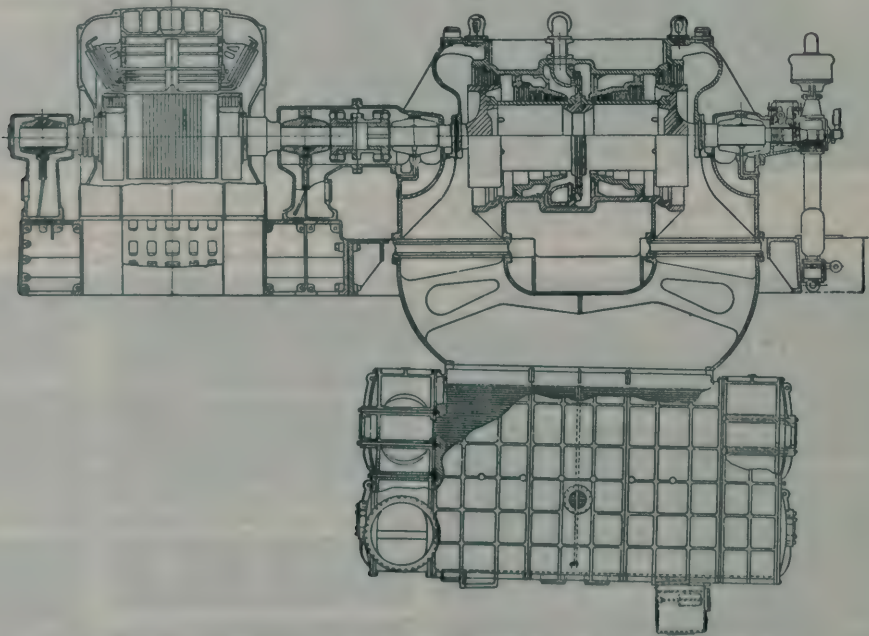
Control and Protection of Circuits. In 1914 the practice of protecting generators by inserting reactors or inductance coils in series with them to limit the current which would flow on short-circuit was new and not general. In 1924 every large station had several of these devices designed to limit the current to a certain definite maximum value. Some stations connected these in the generator leads as well as in the feeders; the latter was the more usual connection. The control and protection of large distributing systems was furthered by the development of relays accomplishing innumerable purposes indicated by their names, overload relay, low voltage relay, reverse current relay, time relay, etc. These were ingenious electromagnetic devices designed to open large circuit-breakers when any one of these various phenomena occurred. One of the notable developments in electrical engineering is the increase in number and kinds of relays and their applications. A new type of switching equipment came into general use, the truck type safety switch. This is an oil switch mounted on a rolling truck and so arranged that when the switch is open, the switch and its truck may be rolled out into an open passageway, so that it is left entirely disconnected from all potential and is safe and convenient for inspection and repair. The phase balancer is a machine which was developed and installed in some large power systems. It is a special form of synchronous motor connected to the lines of a polyphase system; its function is to maintain a balanced load on the different phases of the generators even if the load on the system is very unevenly distributed between phases. This results in better voltage regulation and better generator efficiency.

As a matter of good economic policy it was found desirable to interconnect all neighboring power systems, so that in case of an overload or an accident in one system, energy might be supplied by another. In the case of systems of the same frequency this is done by transformers, but with two systems of different frequencies, e.g. 60 and 25, a frequency converter must be used. This may consist of two machines of like power on the same shaft, one having 10 poles for 25 cycles and the other 24 poles for 60 cycles, but this is an expensive arrangement. A new set was developed in 1923 consisting of a

37,000 kva. induction motor with 14 poles for the 60-cycle system and a 25,000 kva. 25-cycle synchronous motor with 10 poles. The induction motor takes power at 60 cycles and tends to run at 514 revolutions per minute but is held to 300 revolutions by the other machine. Thus the secondary of the induction motor generates power at 25 cycles, slip frequency, which may be turned into the 25-cycle system along with the power developed by the synchronous machine. In case the demand is in the opposite direction the frequency of that system becomes slightly less than 60 cycles, and the induction motor becomes an induction generator and delivers power at the frequency of the system, while the 25-cycle machine operates as a normal synchronous motor.

Bibliography. Among the more notable works on electric power stations and generating apparatus published between 1914 and 1924 were Croft, *Central Stations* (New York, 1920); Fernald and Orrok, *Engineering of Power Plants* (New York, 1920); Gebhardt, *Steam Power Plant Engineering* (New York, 1912); Langs-

ing in 1924 was the movement for the construction of a super-power transmission system, a forward-looking scheme for the combination of all producers and users of mechanical power in a given geographical district of the United States into one large electrical network. The advantages sought are reliability, secured by the ability of the various power houses to help each other out in case of accident to one; greater economy, through the use of most efficient stations all the time and the less efficient only when actually needed; better load factor, from less variable demand made by a greater number and variety of users in the system; shutting down of wasteful stations; reduction in the cost of fuel by concentrating the load at those places where fuel can be obtained most conveniently, and utilization of water power wherever practical. The plan contemplated several districts at first and a final interconnection of these districts as they spread toward each other. California was the heart of the first district where it went into actual operation. Here the plan was well under way in



LONGITUDINAL SECTION OF MODERN STEAM TURBINE AND ELECTRIC GENERATOR

dorf, *Principles of Direct Current Machines* (New York, 1916); Lawrence, *Principles of Alternating Current Machinery* (New York, 1916); Morecroft, *Continuous Current Circuits and Machines* (New York, 1923); Morecroft, *Alternating Current Circuits and Machines* (New York, 1924); Rushmore and Lof, *Hydro-Electric Power Stations* (New York, 1918); Weingreen, *Electric Power Plant Engineering* (New York, 1922).

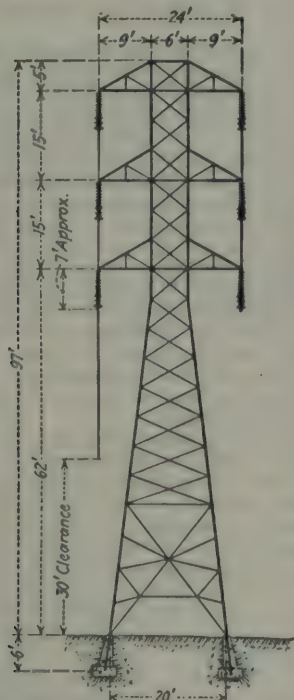
Consult also the following journals for special articles in this field: *Transactions of the American Institute of Electrical Engineers* (New York); *Electrical Journal* (Pittsburgh, Pa.); *Electrical World* (New York); *General Electric Review* (Schenectady).

ELECTRIC POWER TRANSMISSION AND DISTRIBUTION. The most striking subject of discussion in transmission engineer-

ing in 1924, for on account of the scarcity of coal, the generation of power was in the hands of a few corporations which could cooperate readily.

Another interesting district was that of the North Atlantic States. Here it was proposed to install a 250,000-volt transmission line from Boston to Washington through New York, Philadelphia and Baltimore, with possible branches to the coal fields of Pennsylvania. It was proposed that all the large generating plants in this district should connect up to the system and supply power, and that all the small plants of individual factories be shut down, since they could save money by buying from the large system. In his report to the Secretary of the Interior, W. S. Murray estimated that 10,000,000 h.p. was used in the industries in this district, and 7,000,000 h.p. used by the railroads; that the load factor of this power

was about 15 per cent and that by combination this load factor could be raised to 50 per cent or 60 per cent. This meant that the 17,000,000 h.p. in use could be replaced by 6,000,000 h.p. properly located and controlled, and that 30,000,000 tons of coal could be saved each year and the railroads relieved of the congestion caused by the useless and uneconomic transportation of this coal. The same authority estimated that it would cost about \$1,250,000,000 capital to accomplish the change and that the resultant saving would be \$300,000,000 per year, or 24 per cent on the investment. This was for only one geographic district. The difficulty was to get so many different interests together and assure to each its share of the saving or gain.



Elevation of a high tension line tower with strings of insulators, ring shields, and conductors.

Transmission Lines. The most important accomplishment of the period in transmission engineering was the adoption of 220,000 volts as a working potential for transmission lines and the practical operation of two such lines. Previously 165,000 was the highest potential used in regular practice. The two lines installed were both in California. The Southern California Edison Company had a line 240 miles long installed and planned in 1924 to extend it. Incidental to the use of 220,000 volts as a working potential, the manufacturing companies built transformers for 1,000,000 volts for laboratory purposes to test out the apparatus to be used in the 22,000 volt lines. Transformers in sizes up to 16,000 kva., built for commercial purposes, were arranged with 130,000 volt high-tension windings for a Y connection on 220,000 volts with the neutral grounded. The line itself used large steel towers, eight to the mile, carrying the three conductors in a horizontal

plane, hanging from strings of suspension insulators. Each string of insulators was protected by a static shield consisting of a metal ring surrounding and concentric with the insulators. This ring was connected to the conductor and reduced the potential strain on the insulators by giving the electrostatic field a more uniform distribution. Authorities disagreed as to whether an overhead ground wire or lightning arresters were of any benefit on lines of this high potential. In the Southern California line the conductors were 0.95 inch in diameter, were stranded aluminium cable with a steel core, and were spaced 210 inches apart. Experimental research indicated that with conductors of about 1 inch in diameter the loss from corona would not be important. The duplicate lines of 6 conductors were carried on 2 lines of steel towers so that the minimum clearance above ground was 30 feet. The insulators were of the disc suspension type, 13 in each string, and shielded with rings.

The outdoor type of switching station became usual rather than exceptional. With the increase in the potential used the space required for the switches, circuit breakers, and lightning arresters became so great that it was expensive to put them in a building, and they could all be made water-proof. Oil-cooled transformers and water-cooled oil-insulated transformers continued to lead the air-cooled in number of applications and were improved by the addition of a device known as the oil conservator, a reservoir attached to the oil tank and above it so that the transformer tank proper was always full and completely sealed from the atmosphere. This reduced oxidation of the oil, moisture in the oil and the danger of explosive gases. The increase in length of transmission lines raised a serious problem in the regulation of the voltage and the power factor of the system. This was met by the use of synchronous condensers with relays controlling the field excitation to hold the voltage and power factor at predetermined values. In a 220,000 volt line it was proposed to place such a device in circuit every 100 miles. Single units of this character of 30,000 kva. were placed in service. The use of the static condenser for alternating current distribution circuits grew considerably. These were oil-insulated static condensers connected to the end of a distribution system to improve the power factor and voltage regulation of the system. They operated at about 2200 volts, and if the voltage of the system were much less than this, auto-transformers were used to step up the voltage.

The oxide film lightning arrester was brought into quite general use. It consists of a number of units in series, depending on the voltage of the system, each unit constructed of two conducting plates separated by a short space filled with oxide of lead in the form of a powder, paste or pellets. Ordinarily this material is non-conducting, but an excess potential breaks through and allows a discharge current. This current heats the material in the small area through which it flows, and this heat changes the character of the material at that particular point into an insulator, thereby healing up the punctured spot. These are used for voltages up to 135,000.

The transmission of energy by underground cables, as in large cities, was improved by the use of improved insulating materials, resulting

in the successful operation of cables at much higher potentials. In 1914 the highest voltage was 13,000, but in 1924 three conductor cables for 33,000 volts had been installed and single conductor cables for 44,000 and 66,000 volts were in use. See **ELECTRIC SUBSTATIONS**.

Bibliography. Consult Baum, *Atlas of the United States of America Power Industry* (New York); Meyer, *Underground Transmission and Distribution* (New York); Peek, *Dielectric Phenomena in High Voltage Engineering* (New York); Reyneau and Seelye, *Economics of Electrical Distribution* (New York).

ELECTRIC RAILWAYS. In 1914 the New York Central; the New York, New Haven, and Hartford; the Northern, the Butte, Anaconda and Pacific, and the New York terminal of the Pennsylvania Railroad were the outstanding accomplishments. In the succeeding 10 years were added to this list the Norfolk and Western, 1915; Pennsylvania Railroad (Philadelphia), 1915; Chicago, Milwaukee and St. Paul, 1916; Bethlehem (Chili), 1918; Paulista (Brazil), 1920, and the Vera Cruz-Mexico City, under construction in 1924. These were equipped by American manufacturers, and so were the Paris-Orléans in France and the Spanish Northern. Numerous roads of lesser importance were also equipped with electric locomotives. The majority of these installations were fitted with the high voltage (2400 or 3000) direct current system; the Norfolk and Western and the Pennsylvania used the alternating current system.

The Norfolk and Western is typical of the alternating current roads. This covers the division from Bluefield, W. Va., to East Vivian; the service consists of hauling coal trains of 3250 tons up a 1.25 per cent grade at a speed of 14 miles per hour, requiring 3200 h.p. at the locomotive. Twelve electric locomotives of 264 tons replaced 33 steam locomotives of the Mallet type. The electric locomotives take current at 11,000 volts, 25 cycles, single-phase, from an overhead trolley. This is converted to three-phase currents by a phase converter on the locomotive and supplied as such, at a suitable voltage, to the three-phase induction motors which drive the locomotive. The merit of the combination was that the three-phase motors are more efficient than single-phase motors; they are constant speed motors which will regenerate power on down-grades automatically at a definite speed and thus act as brakes; finally, by means of this converter a single overhead trolley may be used to supply three-phase motors. The St. Paul Railway put into operation a section of 440 miles in Montana in 1917 and a second section of 220 miles in Washington in 1920. The first includes the heavy mountain grades of 2 per cent. Both are equipped with an overhead trolley operating at 3000 volts direct current, from which the electric locomotives of 290 tons take current. These locomotives are capable of hauling trains of 2500 tons up the grades at 16 miles per hour, giving 3000 h.p. continuously, and each locomotive makes the entire run of 440 miles without change or lay-off. The train crews are changed in the middle of the run. The locomotives also use regenerative electric braking when descending grades; that is, the electric motors act as generators, hold the train at a desired speed, and return the energy of the descending train to the line to be used elsewhere. This railroad

takes its electric energy from existing public utility companies, which in turn derive it mainly from water power. In Norway and Sweden the single-phase system was considerably extended, and in Italy the three-phase system was further developed and extended.

Among urban street railways the rapid and general adoption of the light weight or one-man safety car was the outstanding feature. This is a very light car of moderate passenger capacity, usually having two motors of 20 h.p. The car doors are arranged to open and close automatically, interlocking with the control of the motors so that the car cannot be started until all doors are safely closed. With this precaution it is safe for one man to act both as motorman and conductor; this reduces the cost of labor, and the light weight reduces the power required.

The development of the automatic substation was an achievement of the period, and the increase in its use was phenomenal. It was employed in many applications and industries, but its most general and important field was the electric railway. This is a substation for the conversion of the high-voltage alternating-current power of the transmission line to the low-voltage direct-current power of the trolley or third rail. The station contains transformers, converters, and switches, operated by relays so that the machinery is started up just when it is needed and shut down when the demand has ceased, without the intervention of any human labor. The relay controls all the operations. An inspection of a few minutes each day is all the human attention the station requires. See **ELECTRIC SUBSTATIONS**.

Some interesting tests were made at Erie, Pa., in the fall of 1923 to determine the maximum current which can be collected from an overhead trolley and the limit to the power of a locomotive on such a system. Currents of 4000 to 5000 amperes were collected at speeds of 50 to 60 miles per hour from two No. 000 wires by one pantograph trolley pressing upward at a pressure of 35 to 40 pounds. With 3000 volts on the trolley this is equivalent to about 20,000 h.p. per locomotive.

Consult Morison, *Railroad Electrification* (New York); Richey, in *Transactions of the American Institute of Electrical Engineers* (New York); *General Electric Review* (Schenectady); *Electric Railway Handbook*, (New York). See **RAPID TRANSIT**.

ELECTRIC SHIP PROPULSION. The art of propelling ships by electric motors had practically its entire development since 1913, when the first vessel so equipped, the American collier *Jupiter*, was put into commission. She had two 3000 h.p. three-phase induction motors on twin propeller shafts deriving their power from one steam turbo-generator of 5450 kilowatts. At the time of the Naval Disarmament Conference, the United States had built and under construction 20 electrically propelled vessels, mostly of the largest size, 30,000 tons each. Many of these were discontinued, but the U.S.S. *New Mexico*, *Tennessee*, *California*, *Maryland*, *Colorado*, and *West Virginia* were completed. These battleships were in commission in 1924. Each of them had four propeller shafts and four motors aggregating 32,000 h.p. Under construction were some airplane carriers having 180,000 h.p. of electric motors per ship. The battleships all use changeable pole induction motors capable

ELECTRIC RAILWAYS



ELECTRIC LOCOMOTIVE FOR HANDLING HEAVY-TONNAGE TRAINS ON THE NORFOLK AND WESTERN RAILROAD

Built by the Westinghouse Electric & Manufacturing Co. and the Baldwin Locomotive Works, this high-capacity electric locomotive takes current from the overhead trolley at 11,000 volts, which is stepped down by a transformer to 250 volts at the terminals of single-phase induction motors. These by means of gearing and rod drive act on the driving wheels as shown above.

ELECTRIC RAILWAYS



ELECTRIC FREIGHT LOCOMOTIVE OF THE CHICAGO, MILWAUKEE AND ST. PAUL RAILWAY
Built by the General Electric Company and operating at 3000 volts direct current

of operating at two different speeds, usually 16 and 21 knots. As an example, the *Maryland* had two electric generators of 13,000 kilowatts each, driven by steam turbines at 2000 revolutions per minute. Her four propeller shafts were each driven by an induction motor rated at 7000 h.p. at 175 r.p.m. with 24 poles for 21 knots speed, and 1700 h.p. at 118 r.p.m. with 36 poles for 16 knots. One of the important advantages of electric propulsion for such vessels is the ability to reverse any propeller with full power at a second's notice. Steam turbines alone cannot be reversed so quickly or with so much power. The ability to operate conveniently and efficiently at two different speeds is another point in its favor, and the light weight and good efficiency obtained by the use of the high speed turbines is a third. Over 45 ships, aggregating 550,000 h.p., had been equipped for electric drive up to 1924.

A development particularly adapted to freight vessels was the use of Diesel engines driving electric generators which in turn drive the motors on the propeller shafts. The Diesel engine is difficult to start, to reverse and to build in large sizes. With the electric system any number of units may be used, connected into an electric system, and the engines may run continuously in the same direction, the stopping and reversing being done at the motors.

ELECTRIC SHOVELS. See **ELECTRIC MOTORS IN INDUSTRY.**

ELECTRIC SUBSTATIONS. The development of apparatus for substations kept pace with other advances. Synchronous converters were built, of larger capacity and for higher speeds, and the weight per kilowatt decreased. The improvement in 60-cycle converters was notable; by 1924 there could hardly be any prejudice against them. The substation for converters or motor-generator sets was revolutionized; it was made independent of all labor for attendance. By the development of ingenious relays, these automatic substations start up when needed; the machines are brought up to speed, synchronized with the supply system, and connected to the load circuit. This idea was first put into effect in 1916, and in 1924 hundreds of such stations were in operation, in sizes up to 4000 kilowatts and for voltages up to 3000 on the direct current side. This idea was first introduced in the electric railway systems (see **ELECTRIC RAILWAYS**) and was so successful that it was adopted for industries, mines, and even small isolated water power plants forming part of a system. Thus it is possible to place a water power station in some out-of-the-way place where hydraulic development is cheap, have it feed current into a system when power is desired, and yet have it require no attendants in the station. An inspector visits these stations regularly and tests them out; that is all the attention required. A water power station of this character for 7500 kilowatts capacity was installed near Little Falls, N. Y.

ELECTRIC THEORY. See **CHEMISTRY.**

ELECTRIC WELDING. The uses of electric welding became so important during the War that the United States government fostered a special organization to study and develop the art. Under this stimulation research was carried on, new methods devised, and new applications found. A large part of the repair work on the German steamers interned in 1914 and

taken over by the United States in 1917 was done by electric welding. Ships were built in which welding was substituted for riveting. Electric generators were devised which so regulated the current as to give a uniform character of weld. While most of the welding was done with direct current, alternating current could also be used.

ELECTROMETALLURGY. See **ELECTRIC FURNACES.**

ELECTRON, ELECTRONIC THEORY. See **PHYSICS.**

ELEMENTS. See **CHEMISTRY; PHYSICS.**

ELEVATED RAILWAYS. See **RAPID TRANSIT.**

ELIOT, SIR CHARLES EDGEUMBE (1864-). An English diplomat and Orientalist (see **VOL. VII**). He was British High Commissioner in Siberia in 1918, and in 1919 was appointed British Ambassador to Japan. He published *Hinduism and Buddhism* (1921).

ELIOT, CHARLES WILLIAM (1834-). An American educator (see **VOL. VII**). He favored the League of Nations and was a strong supporter of President Wilson and his administration. In his writings and lectures he has stressed in particular his condemnation of the standardization of education and industry. He was presented with a medal for distinguished service by the National Council of Civic Reform in 1923. He published *The Road Toward Peace* (1915), and *A Late Harvest* (1924).

ELIOT, SAMUEL ATKINS, JR. (1893-). An American author born in Denver, Colo., and educated at Harvard University. He studied the German and English theatres and went on the stage with Miss Horniman's Repertory Company in England. In 1914-15, he was play reader and stage manager for Winthrop Ames in New York. In the latter year he joined the Washington Square Players; in 1916-17, directed the Indianapolis Little Theatre and in 1917-18, the Cincinnati Art Theatre. He wrote books on the theatre and made many translations from Wedekind. His works include *Little Theatre Classics* (3 vols., 1918-21), *Erdgeist* (1914), *Pandora's Box* (1914), and *Tragedies of Sex* (1923). The three last are translations.

ELIOT, THOMAS STEARNS (1888-). An American poet and critic, born at St. Louis. He studied at Harvard, the Sorbonne and Oxford. From 1913 on he made his home in London. He first attracted attention with his *Poems* (1920), a thin sheaf of 63 pages containing some of the best pieces of the decade. He was preëminently an ironist and his mocking, possibly only clever, poems stirred and antagonized the modern literary world. The *Waste Land* (1922), a poem of little more than 100 lines, was at first bitterly contested: by some it was put down as an important achievement, by others as a plain hoax. But the former opinion seemed the more nearly correct, for in spite of its obscurities, pedantries, and often perverse symbols, the *Waste Land* with its feel of the essential aridity of the modern life and its fine poetical passages, was a memorable work. Mr. Eliot's critical studies were considered by some even more noteworthy than his poetry. His *Sacred Wood* (1920) shows the first English attempt, since Matthew Arnold, to formulate a thoroughgoing æsthetic creed applicable to literature and life. In 1922 he became the editor of the *Criterion*, a finely balanced periodical devoted to the arts.

ELISAVETPOL. See AZERBAIJAN.

ELIZABETH. A manufacturing and residential city of New Jersey. The population rose from 73,409 in 1910 to 95,783 in 1920, and to 103,947, by estimate of the Bureau of the Census, for 1923. An ordinance was adopted in 1922 zoning the city into three residential, three business, and three industrial districts. A city planning commission was engaged in developing in 1924 a comprehensive plan for future growth. The city had 238 manufacturing establishments, six banks, and two savings banks in 1924.

ELIZALDE, RAFAEL HECTOR (1873-). A South American diplomat, born at Guayaquil, Ecuador, and educated at the National College of San Vicente del Guayas and the University of Guayas. Before being appointed envoy extraordinary and minister plenipotentiary to the United States and Cuba in 1916, he served his country at various South American embassies, assisting in the settlement of the boundary line between Ecuador and Colombia. He is the author of *Labores Diplomáticas* (1912), *Organización de Partidos Políticos* (1913), and *Riqueza Obliga* (1914).

ELLIOTT, EDWARD (1874-). An American lawyer, professor and banker, born at Murfreesboro, Tenn., and educated at the universities of Princeton, Berlin and Heidelberg. From 1898 to 1915 he was successively instructor in Latin and jurisprudence, preceptor in the department of history, politics and economics, and professor of politics at Princeton University. He was also dean of the college from 1909 to 1912. In 1913, he went to the University of California as lecturer on international law, and from 1916 to 1920 was professor there. From 1917 to 1920, he was director of the Federal Reserve Bank of San Francisco, and in 1921 became vice-president of the Security Trust and Savings Bank of Los Angeles. He is the author of the following works: *Die Staatslehre John C. Calhouns* (1903); *The Biographical Story of the Constitution* (1910); *Selected Documents in International Law* (1914); *American Government and Majority Rule* (1915); *State Bank Membership in the Federal Reserve System* (1919). He also contributed articles to periodicals.

ELLIOTT, HOWARD (1860-). An American railway official (see VOL. VII). In 1913, he was appointed president of the New York, New Haven and Hartford Railroad Company, serving until 1917, when he resigned and was appointed chairman of the Commission on Inter- corporate Relations for that road. In 1918, he was appointed president of the Northern Pacific Railway, serving until 1920, when he was appointed chairman of the board of directors. During the War, he was a member of the special committee on national defense of the American Railway Association. He was a member of the executive committee of the Louisiana Purchase Exposition and was a member of the American Railway Association and other associations and societies.

ELLIS, HENRY HAVELOCK (1859-). An English psychologist and author (see VOL. VII). Among his later works are: *The World of Dreams* (1911); *The Task of Social Hygiene* (1912); *Impressions and Comments* (1914, Second series, 1920); *Essays in War-time* (1916); *The Philosophy of Conflict and Other Essays* (1919); *Little Essays of Love and Vir-*

tue (1922); *Kanga Creek, an Australian Idyll* (1922); *The Dance of Life* (1923).

ELLIS, WILLIAM THOMAS (1873-). An American journalist and author (see VOL. VII). In 1917, he spent six months in Russia and in the year following was correspondent on the Persian, Caucasus, Rumanian and French fronts. He was special correspondent of the New York *Herald* and associated newspapers in the Balkans (1919) and represented the Chicago *Daily News* and associated newspapers at the Conference on Limitation of Armament at Washington, D. C. (1921-22).

ELLWOOD, CHARLES ABRAM (1873-). An American sociologist (see VOL. VII). He published *The Social Problem* (1915, 1919), *An Introduction into Social Psychology* (1917), and *The Reconstruction of Religion: A Sociological View* (1922).

ELMIRA COLLEGE. An institution for women at Elmira, N. Y., founded in 1855. It practically doubled in size during the decade 1914-24. The student enrollment increased from 234 to 500, the teaching staff from 22 to 43, and the library from 11,000 to 20,000 volumes. The endowment grew from \$134,572 to \$776,644 and the annual income from \$76,635 to \$265,650. Ten new buildings were erected, including one large and several smaller dormitories, a large dining commons, a faculty house, and a dean's house. The campus was enlarged, and a library building, the first unit of which was to cost \$150,000, was in course of construction in 1924. Frederick Lent, Ph.D., D.D., LL.D., succeeded A. Cameron MacKenzie, D.D., LL.D., as president.

EMBRYOLOGY. See ZOOLOGY.

EMERGENCY FLEET CORPORATION. See SHIPBUILDING; SHIPPING.

EMERSON, JOHN (1874-). An American playwright and producer born at Sandusky, Ohio, and educated in Chicago and New York. He acted and produced plays for Daniel Frohman, William Harris, the Shuberts, Clyde Fitch and others until 1910. He wrote and played in *The Conspiracy* (1912) and *Step Lively* (1913). He wrote and produced motion pictures for D. W. Griffith, Douglas Fairbanks, Mary Pickford, Constance Talmadge and others until 1922, and later formed the Emerson-Loos Company, writers and producers of motion pictures.

EMERTON, EPHRAIM (1851-). An American historian (see VOL. VII). He became president of the Cambridge Historical Society in 1921. Since 1914 he has published *Beginnings of Modern Europe* (1917), *The Defensor Pacts of Marsiglio of Padua* (1920), and *Learning and Living*, essays (1921).

EMERY, HENRY CROSBY (1872-1924). An American economist (see VOL. VII). In 1916, he went to Russia to make a study of the commercial, industrial and financial conditions there for the Guaranty Trust Company of New York City, and was returning in March, 1918, when he was taken prisoner in the Åland Islands by the Germans. On Oct. 22, 1918, he was released, and arrived in the United States on November 10. In 1921, he was made manager of the Peking, China, branch of the Asia Banking Corporation with headquarters in New York. While on the way to San Francisco from Shanghai, on board the steamship *President Lincoln*, he died of pneumonia, Feb. 6, 1924.

EMMET, WILLIAM LE ROY (1859-). An American electrical engineer and inventor,

born at New Rochelle, N. Y. He graduated from the United States Naval Academy in 1881, left the navy in 1883, but rejoined it during the Spanish-American War. He was with the General Electric Company from 1892. He made important inventions in steam turbines, received the Edison medal in 1919, and the Elliott Cresson medal in 1920. He was a member of the Naval Consulting Board in 1915, and chairman of the committee on submarines. He wrote *Alternating Current Wiring and Distribution* (1894), and contributed articles to the technical magazines on electrical and mechanical subjects.

EMMONS, WILLIAM HARVEY (1876-). An American geologist, born at Mexico, Mo. He was graduated at Central College in 1897, and received his Ph.D. at the University of Chicago in 1904. After serving as an aid in the United States Geological Survey during 1904-06, he returned to the University of Chicago, where he remained until 1912, having been advanced to the associate professorship of economic geology in 1909. After that time he was professor of geology and head of the department at Minnesota, and director of the Minnesota State Geological Survey. His principal investigations have been concerning a genetic classification of minerals, the ore deposits of various mining districts in Nevada, Montana, Colorado, Maine, and New Hampshire. He has published important reports in the United States Geological Survey series, on regionally metamorphosed ore deposits and the segregated veins, as well as petroleum geology. He served on the United States Geological Survey as assistant geologist during 1906-10 and as geologist, 1910-15, and was, besides, an associate editor of *Economic Geology*.

EMPLOYERS' LIABILITY. See **WORKMEN'S COMPENSATION**.

EMPLOYMENT BUREAUS. See **LABOR LEGISLATION**.

ENDOCRINOLOGY. See **SECRETIONS, INTERNAL**.

ENELOW, HYMAN GERSON (1876-). A Russo-American rabbi born in Russia, and educated at the universities of Chicago and Cincinnati, and the Hebrew Union College, Cincinnati. He became rabbi of Temple Emanu-El, New York, in 1912. During the War he served overseas as commander and general field secretary of the Jewish Welfare Board (1918-19). Among his works may be mentioned: *Aspects of the Bible* (1911); *The Jewish Life* (1915); *The Synagogue in Modern Life* (1916); *The Faith of Israel* (1917); *The War and the Bible* (1918); *The Adequacy of Judaism* (1920); *The Jew and the World* (1921).

ENEMY ALIENS. See **UNITED STATES, History**.

ENGEL, CARL (1883-). An American musicologist and composer, born in Paris. While studying philosophy and literature at the University of Strasbourg, he also pursued the course in music with Professor Jacobsthal. In Munich, he studied composition with L. Thuille and musicology with Professor Sandberger. He came to the United States in 1905, where he soon became known as an ardent advocate and exponent of futurism, contributing to American and English periodicals. From 1909 to 1922 he was editor and musical adviser for the Boston Music Company. In 1922, he succeeded O. G. Sonneck as chief of the Music Division of the Library of Congress. His compositions, all

ultra-modern, consist of smaller pieces for piano, piano and violin, and songs. He is the author of *Alla Breve: From Bach to Debussy* (1921).

ENGEL, EDUARD (1875-). A German writer born at Stolp in Pomerania. He studied Sanskrit and medieval languages at the University of Berlin, but later devoted himself to modern literature, especially German. He edited a selection of *Byrons Tagebücher* (1904), and wrote on the Shakespeare-Bacon problem, *Shakspeare-Rätsel* (1904). His later works are: *Geschichte der deutschen Literatur* (1906); *Geschichte der deutschen Literatur des 19. Jahrhunderts und der Gegenwart* (1908); *Goethe, der Mensch und das Werk* (1911); *Deutsche Stilkunst* (1911); *Deutsche Meisterprosa* (1912); *Ein Tagebuch: 1914-19* (1920); *Die Weisheit Goethes* (1920). He later edited a popular history of German literature and a popular edition of Goethe's works.

ENGELHARDT, EMIL (1887-). A German clergyman and writer who was born in Nundorf. Most of his works are concerned with the cultural position and future of Germany, among them being: *Die Zukunft des Auslandsdeutschtums* (1916); *Auf deutschen Vorposten* (1916); *Fichtes Erziehungsgedanken und die deutsche Volkshochschule* (1918); *Tat und Freiheit, ein Fichtebuch* (1918); *J. G. Fichte, ein deutscher Mensch und Denker* (1919); *Fichtes Briefe an Braut und Gattin* (1920); *Erlöser Liebe* (1920); *Minne und Liebe* (1920); *Rabindranath Tagore* (1921).

ENGERT, T. JOSEPH (1882-). A German professor of philosophy and pedagogy. Since his début with *Der naturalistische Monismus Haeckels* (1907), he has written a number of works dealing with religious problems and with the War, among them, *Vom Sinn des deutschen Krieges* (1916).

ENGINE, STEAM. See **STEAM ENGINES AND TURBINES**.

ENGINEERING FOUNDATION. See **DAMS**.

ENGINEERS, MILITARY. See **ARMIES AND ARMY ORGANIZATION**.

ENGINES, MARINE. See **SHIPBUILDING**.

ENGLAND. See **GREAT BRITAIN**.

ENGLAND, CHURCH OF. This denomination is represented in the United States by the Protestant Episcopal Church. It is the established church of England, and the King of England is the supreme governor, with the right to fill vacant archbishoprics and bishoprics. For administrative purposes the country is divided into two provinces, the Convocation of York and the Convocation of Canterbury, each under the control of an archbishop. In 1914 Parliament provided for the disestablishment of the church in Wales, which was delayed on account of the War until Mar. 31, 1920. Under the Church Enabling Act of 1919 a National Assembly of the Church was established, to deliberate on all church matters except its spiritual doctrines and the duties of the ministry. The act carried with it the power to establish three houses composed of bishops, clergy, and laity, to which members were elected in 1920. The membership of the church fell from 2,359,599 in 1915 to 2,220,194 in 1923, and the number of pupils in the Sunday schools from 2,541,000 to 2,233,111. The income from voluntary offerings in 1914 was between £7,000,000 and £8,000,000, as compared with an income in

1923 of £6,862,948. The number of clergymen remained about the same. A controversy arose in the church during the period, over the action of two African missionary bishops in joining and taking communion with nonconformist missionaries at Kikuyu in 1914. Accusations of heresy were made, but the missionaries were upheld by the report in the following year of the Central Consultative Body of the Church, to which the matter was referred.

ENGLAND, GEORGE ALLAN (1877-). An American author born at Fort McPherson, Neb. He was graduated from Harvard in 1902, and a year later published *Underneath the Bough* (1903). Other works of his include: *The Story of the Appeal* (1914); *The Air Trust* (1915); *The Great Crime* (1917); *Their Son* (1919); *The Flying Legion* (1920).

ENGLISH HISTORY. See GREAT BRITAIN.

ENGLISH LITERATURE. See LITERATURE, ENGLISH AND AMERICAN.

ENNEKING, JOHN JOSEPH (1840-1916). An American landscape painter. He was born in Munster, Ohio, and studied in Munich and chiefly with Bonnat and Daubigny in Paris. In 1876 he settled in Boston, where he was closely associated with George Fuller and George Inness. Especially after 1882 his art became increasingly subjective. He had a facility in catching and reproducing atmospheric conditions in his canvases. This facility is illustrated in his treatment of November twilights and forest scenes. Ralph Davol said of him, "Enneking was a modern romanticist combining qualities of the impressionist, luminist and tonalist. He divided tones into their primary elements and obtained color vibrations by laying on fresh paint in gentle juicy pounces with a narrow brush, carefully tucking in the edges of his strokes to preserve a delicate, volatile play of light." He is represented in the Museums of Worcester and Boston and in many New England private collections.

ENTOMOLOGY, ECONOMIC. The importance of insect control in the United States and the prevention of the enormous loss which the country pays each year as tribute to insect supremacy was recognized by the Federal and State governments in the making of liberal appropriations. Inasmuch as the free productive agricultural land was practically exhausted, the country must depend upon reclamation work for an extension of crop area, on a more intensive agriculture, and on elimination of the loss by insect pests and plant diseases in order that production may keep up with the increase in population. The work in economic entomology has kept pace with the sciences in invention and in the adaptation of scientific knowledge to its use. The chemist, engineer, electrician, and other scientists have been called upon to aid in solving the problems of insect control. The work accomplished in the United States has laid a firm foundation. To a number of the leading educational institutions of the country, which have given courses that have prepared the student in the sciences that are fundamental in the work and the technical knowledge, belong much of the credit for what has been accomplished.

The losses caused annually by insect pests in the United States are estimated by entomological authorities to reach the enormous sum of \$2,000,000,000. While many factors complicate the problem, it is the general conclusion that in an

average year with no unusual attack the loss caused to crops is about one-tenth of the total production. The indirect losses caused by insect-borne diseases reach a large sum. The loss of productive labor in the United States through the sickness and death resulting from malaria is figured at \$100,000,000, or more, and from all insect-borne diseases at over \$350,000,000. With the introduction of new pests from abroad and with the rise and spread of other native insects, this loss may be expected to increase unless the status quo can be maintained through the application of preventive and control measures by the hand of man.

During recent years new pests of vast economic importance have been unwittingly introduced from abroad and become established, including the pink bollworm, European corn borer, Japanese beetle, Oriental peach moth, pine shoot moth (*Evetria buoliana*), European earwig, European red mite (*Paratetranychus pilosus*), satin moth (*Stilpnotia salicis* L.), and others. A second class, consisting of earlier introduced pests which have continued to spread and increase in importance includes the gipsy moth, brown-tail moth, cotton boll weevil, alfalfa leaf weevil, Argentine ant, Mexican bean beetle, pear thrips, and citrus blackfly. Others, which may be referred to as a third class, have risen and assumed alarming prominence, such as the potato leaf hopper, beet leaf hopper, pea moth, apple red bugs, and camphor thrips, and the fruit-tree leaf roller. To a fourth class belong untold numbers of pests of no less importance that are threatening to enter our borders, of which the Mediterranean fruit fly is the most important. Other pests, such as the codling moth, San José scale, Hessian fly, chinch bug, spring grain aphid, corn rootworm, bollworm, cotton leaf worm, army worm, the grasshopper, cabbage worm, Colorado potato beetle, citrus white fly, grain weevil, and others, continue their ravages, and, though they may at times be checked by climatic conditions and natural enemies, necessitate eternal vigilance on the part of the American agriculturist.

In combating these pests the entomologists have adopted strategic means of every kind, and the resulting advance in preventive and control measures has been epoch making. Resorting to legislative means, Congress enacted the Federal Plant Quarantine Act of Aug. 20, 1912, which immediately became effective as to certain quarantines, and is administered by the Federal Horticultural Board, consisting of five members appointed by the Secretary of Agriculture. A quarantine against insect pests and diseases of plants from abroad has been established and maintained, inspectors having been stationed at every port of entry by land and sea. It would not be surprising, with the opportunities afforded, if, in spite of this vigilance, now and then a foreign pest should make its entry undetected, for they are often exceedingly elusive in the method of their introduction. However, with the exception of the pink bollworm, which gained entrance from Mexico before its lodgment there was discovered, no important pest is known to have become established in the United States since the enforcement of the act. Not the least important work of that Board are the quarantines established and maintained within the United States against the spread of a number of our most important pests. The investigational and control work is carried on

by the Federal government through the Bureau of Entomology and the Horticultural and Insecticide and Fungicide Boards. In the States the work is conducted by the experiment stations, State entomologists, and, in several instances, by crop pest commissions. The Federal Bureau of Entomology, of which Dr. Leland O. Howard is chief, administers the work through its several divisions. In 1924 it had 83 field stations in 32 States and Territories and three foreign countries. The State experiment stations have conducted investigations on hundreds of projects and have maintained vigilance and afforded local aid in control. The interstate spread of pests has been prevented to a large extent through State regulations requiring that nursery stock be free from infestation, and these are enforced by rigid State inspection.

Pink Bollworm. In November, 1916, the occurrence of the pink bollworm in the Laguna district of Coahuila, Mexico, within 200 miles of the Texas border, was discovered, and an embargo was placed upon the importation of Mexican cotton. It was found the following year that the larvæ had been introduced in carloads of cotton seed shipped from Mexico before the quarantine in November, 1916, infestations being found at points in several counties in Texas and Louisiana. The infested areas were at once quarantined, and eradication work was pressed with vigor under appropriations by Congress, apparently with success, as the last pink bollworm in the United States, aside from the Mexican border, was found in 1922. In order to prevent its entrance, houses have been erected at ports of entry on the Mexican border for the fumigation of freight cars from Mexico where they may have served as carriers of cotton and cotton seed, and all cotton from abroad has been fumigated in large cylinders with hydrocyanic acid gas in vacuum in order to destroy any larvæ present. The pest has been introduced into Brazil, as well as Mexico, with seed, it being estimated to have caused a loss of \$27,500,000 in Brazil in 1918. It was introduced into the Hawaiian Islands about 1908 and was discovered in Porto Rico in 1921, where it has spread throughout the island. This moth, which originated in India and is now a source of great loss in Egypt, whence it has spread to other cotton-producing countries, and which constitutes one of the greatest menaces that have ever come to the American cotton industry, had not previously been known to occur in America, although prevalent in practically all of the other cotton-producing regions of the world, in all of which it has caused widespread destruction.

European Corn Borer. Late in the year 1917 the widely distributed European and Asiatic pest *Pyrausta nubilalis* Hubn., a moth whose larva is a borer, was discovered to have become established in an area approximating 100 square miles in several counties in eastern Massachusetts, where it caused serious injury to corn and particularly to sweet corn. The investigations which have followed show that the pest had been introduced from Europe in broom corn. This borer attacks all of the corn plant above ground except the leaf blades, its most serious injury being caused by the second brood larvæ, a large percentage of which, after hatching, immediately enter the ear, their injury resembling that of the well-known corn earworm.

The pest winters as a partly grown larva in the stems of plants, finishing its feeding and pupating in its burrow in the spring. In addition to corn, it attacks large-stemmed weeds, dahlias, gladiolus, and other cultivated plants. It has spread from Massachusetts into New Hampshire, and infestations have since been found in the vicinity of Schenectady in the Hudson Valley in New York, in northeastern Pennsylvania and southwestern New York, in Ohio in the vicinity of Lake Erie, and in southern Ontario. The destruction of cornstalks to a point below the ground level is an important measure in checking its ravages.

Japanese Beetle. The green beetle *Popillia japonica* was introduced from Japan with nursery stock and became established near Riverton, N. J., where it was discovered in the summer of 1916. The beetle attacks the foliage of many kinds of fruits, vegetables, and ornamental plants, and the larvæ feed on the roots of plants and on decaying vegetable matter. Investigations of its biology and control have been conducted, and a quarantine has been established to aid in preventing its dissemination. It has, however, continued to spread, and by the fall of 1922 an area of 773 square miles had become infested.

Oriental Peach Moth. The Oriental peach moth, which attacks the terminal twigs of the peach, plum, and cherry, stunting their growth, and also infests the fruit of the peach, was first discovered in the District of Columbia in 1916 and is known to have spread as far north as Connecticut. It is supposed to have been introduced with flowering cherry trees from Japan.

Pine Shoot Moth. The destructive pine shoot moth was found in 1914 to have been introduced from Europe and to have become established in 10 localities in three States from Massachusetts to Pennsylvania, and the following year it was recorded from 20 localities in nine States, in none of which except on Long Island had it lasted for longer than two years.

Gipsy Moth. The gipsy moth was introduced by accident from Europe into Massachusetts about 1861. Work against it has been carried on since the early '90's, at first by the State of Massachusetts alone and since 1901 by the Federal government and the States, but it has continued its spread. Encouraging results have, however, been obtained in work with native and introduced parasites. Investigations have shown that the natural spread of this moth, the female of which is wingless, is accomplished mainly through young caterpillars' being carried by high winds. The pest in 1914 was entering the eastern border of New York State in the course of its spread, and it was proposed to establish a barrier zone some 25 miles wide extending from Long Island Sound northward and up the Hudson Valley to the Canadian border. More recent accidental introductions of the pest on nursery stock have been successfully eradicated, except that of 1910 in New Jersey, where work was under way in 1924.

Brown-tail Moth. The brown-tail moth is another defoliating pest which was accidentally introduced into the United States, near Boston, from Europe. Since its introduction, about 1892, it has spread as far north as Nova Scotia and covers practically all of New England. The moth takes its name from the tuft of golden brown hairs at the tip of the abdomen. In the early fall the young caterpillars spin tents at

the end of twigs, incorporating leaves, in which they spend the winter, these tents being very conspicuous after the leaves fall. In the spring the caterpillars leave the tents and feed on the foliage until June, when their development is completed. In addition to its injury from defoliation, it is a source of great annoyance from the hairs of the caterpillar, which break off at molting time and, being carried through the air, produce a painful rash. Its control is aided by cutting off and removing the tents in winter, by the application of arsenate of lead, and by parasites, many of which also attack the gipsy moth.

Cotton Boll Weevil. The boll weevil, which entered Texas in the vicinity of Brownsville about 1892, has continued its spread and by 1924 had occupied practically all of the old cotton-growing area of the United States. Appropriations made by Congress for investigations and control work with it have amounted to nearly \$1,500,000. As a result of extensive investigations for its control, a highly toxic, finely divided calcium arsenate has been prepared, which is applied in a dust with high powered dusting machines constructed for the purpose. Its application in a dust is quite generally employed and in molasses to a less extent. A new method developed in Florida which combines dusting and the removal of the squares until the weevils have largely emerged from hibernation, followed by dusting, was being tested in several States. In 1913 it was discovered that a wild cotton-like plant which grows in canyons in Arizona is the host plant of a new variety of the cotton boll weevil. The danger from this form lies in the possibility of its spreading into the cotton fields in the irrigated districts of the vicinity and becoming a destructive pest.

Alfalfa Leaf Weevil. This European insect, accidentally introduced into the United States and first discovered in Utah in 1904, continued to spread and by 1924 had become the source of considerable injury in Colorado, Idaho, and Wyoming, as well as in Utah. Appropriations by Congress led to control work, in which particular attention was given to the introduction of parasites, as high as 25 per cent of the weevil larvae having been killed in 1916 by the increase of parasites introduced from Europe.

Argentine Ant. This enemy of field crops, fruits, stored products, household supplies, etc., which was first discovered in the United States at New Orleans in 1891, continued to spread, and colonies were known to be established as far distant as Alabama and Texas.

Mexican Bean Beetle. The bean beetle, which originated in Mexico but has occurred epidemically in the southwestern United States for 75 years, appeared near Birmingham, Ala., in July, 1920, spread rapidly, and became of great economic importance as an enemy of beans of all kinds through its defoliation of the plants.

Pear Thrips. The pear thrips, which for many years has been the source of serious injury to deciduous fruits through attacking the blossom, particularly of pears, prunes, and cherries, in the Santa Clara Valley, Cal., and later appeared in British Columbia, was discovered in New York State in 1911 and has become of considerable importance in the Hudson River Valley fruit belt. In 1915 it appeared in Maryland and was a source of injury to an orchard in the vicinity of Baltimore.

Mediterranean Fruit Fly. This destructive enemy of no less than 80 different subtropical fruits and vegetables, especially citrus fruits and particularly the orange, was first discovered in Hawaii on the Island of Oahu in 1910. Since that time it has increased rapidly and spread into other islands. Control work has led to the introduction of a number of parasites, several of which are responsible for a considerable reduction in its infestation. This fruit fly has been the most serious drawback to fruit growing in the countries where it is established, its introduction into Bermuda many years ago having resulted in the destruction of the fruit growing industry of that island. In order to combat and aid in preventing its introduction into the United States on the mainland, several emergency appropriations have been made by Congress, and all means for prevention are being employed by the inspection service of the Federal Horticultural Board, the Plant Quarantine Act having made it possible to establish and maintain a quarantine against it.

Codling Moth. Investigations of this insect, which is responsible for the greater part of our wormy apples and pears, causing a loss estimated at \$20,000,000 annually, led to the dissemination of information as to the proper dates to apply arsenicals.

Peach Borer. This destructive borer in the lower trunk of the peach tree in 1924 was being effectively controlled by the use of paradichlorobenzene placed about the trunk and kept covered with soil for several weeks. The gas escaping from the chemical enters their galleries in the tree and destroys the borers.

Other Insects. Among other insects which have been introduced or become of great economic importance are the European red mite, first discovered in Canada in 1915 and a source of injury through its attack upon the leaves of the apple, plum, etc., in the northeastern United States; the European earwig, which first appeared in Rhode Island in 1911 and in Washington State in 1915 and is a source of injury to garden plants and flowers; the popular defoliating satin moth, from Europe, which was first discovered near Boston, Mass., in July, 1920; the Australian tomato beetle, first observed in Mississippi in 1921; the camphor thrips, first discovered in Florida in 1912; the pea moth, which is increasing in importance in Wisconsin; the sweet potato weevil, which was first discovered in this country in 1875 but which began to spread and increased in importance about 1920; the fruit-tree leaf roller, which has increased in importance due to its resistance to insecticides; the potato leaf hopper, which causes tipburn of the potato, and others.

Control Measures. A notable advance has taken place in the knowledge of biological, insecticidal, mechanical, and other means of insect control. Search has been made and parasites of a considerable number of pests have been discovered and introduced from foreign lands. New insecticides have been discovered, and others have been adapted for more efficient control. Notable among the new insecticides is paradichlorobenzene, which has been successfully used in the control of the peach tree borer. The lubricating oils have been found to form emulsions that are highly effective against scale insects on citrus, the San José scale, etc. New forms of arsenicals have been perfected,

notably calcium arsenate in dust form, as employed in combating the boll weevil, Bordeaux oil emulsion spray for citrus insects, etc. Nicotin applied in a dust form has proved very effective as a means of control of the walnut aphid and a large number of other pests. Borax has been found to be effective, economical, and practical in the destruction of fly larvæ in horse manure, and hellebore is also effective for this purpose. Corrosive sublimate has been found to be highly effective against root-maggots. New methods of preparation and application of cyanide gas for combating citrus pests have been developed. New mechanical developments include tests of the use of the airplane in applying dusts for control of the boll weevil, gipsy moth, etc. New machines for the application of sprays and new hand and power dusters have been invented or improved, and numerous mechanical devices have been developed.

Apiculture. Investigations of bee diseases, the greatest handicap with which the beekeeper has had to deal, resulted in a number of discoveries of great importance. A disease of the brood which has often been mistaken for one of the foul broods and to which the name "sac-brood" is given has been found to be due to a filterable virus. The deadly Isle of Wight disease of the adult bee, occurring in Great Britain and on the Continent, was discovered to be caused by the mite *Acarapis woodi* in the tracheæ, and an embargo has been placed upon the importation of bees in order to prevent its introduction into the United States.

ENVER PASHA (1881-1922). A Turkish soldier, born at Abana. He dabbled in the Young Turk movement for his own ends, and sought to bring about a revolution (1908) in the Macedonian mountains against the Sultan, thus bringing into effect the old constitution of 1876. In spite of his victorious entry into Constantinople and the reduction in the Sultan's revenues and property, Enver Pasha received only a position as military attaché in Berlin, where he became quite pro-German. During the Italo-Turkish War he took command of Benghazi and wrote a book on the period called *Tripoli*. In February, 1913, he brought about a coup d'état during the peace negotiations. He shot the War Minister, Nazim Pasha, and shared the power of the government with the Young Turk Committee. In January of the following year, he appointed himself major-general and minister of war.

Upon the outbreak of the War in 1914, Enver assumed complete control, allied himself with the Germans, and when the collapse of Turkey came he fled to Germany. He was condemned to death in 1919, but with the help of friends, managed to remain hidden, and later to escape to Russia, where it was reported that he became imbued with an idea to recover the Ottoman Empire in mid-Asia. However, both Constantinople and Moscow were against him, and in a skirmish with the Bolsheviks in July, 1922, he was shot and killed.

ENZYMES. See CHEMISTRY, PHYSICAL.

EPIDEMIC. See INFLUENZA.

EPILEPSY. Experience with epilepsy in soldiers during the War confirmed the belief that all manifestations which come under this head may have a common origin; yet it became increasingly difficult to distinguish between primary and secondary or symptomatic epilepsy. Cranial injuries were found able to give rise to

any or all of the clinical expressions of the disease; in some cases the malady does not appear until more than a year after the injury. Nor did it appear necessary for the sufferer to have a strong hereditary predisposition to the disease; as a matter of fact the medical selection of troops automatically eliminated many degenerate individuals.

Within the years 1914-24 attempts were made to bring epilepsy within the domain of psychoanalysis on the ground that the disease had a subconscious mental factor. Dr. Pierce Clark of New York published many articles to show that these patients are sometimes improved by psychoanalysis. The most sensational advance in connection with epilepsy was the introduction of the synthetic drug luminal, allied in composition with veronal. The public was cautioned not to expect too much from this innovation, but it seems certain that it could very largely replace bromides with none of the severe constitutional effects of the latter. The dose, which is small, need not be increased to hold its effect; indeed, it is too powerful to warrant any attempt to increase it. Since 1920 this drug was very thoroughly tried out; most reports were distinctly favorable. It may also be used to spare bromides and thus diminish the likelihood of bromide intoxication.

EPIRUS, NORTHERN. See ALBANIA.

EPISCOPAL CHURCH. See PROTESTANT EPISCOPAL CHURCH.

EPSTEIN, JACOB (1880-). An American sculptor, active chiefly in London. He studied with George Gray Barnard in New York and at the Ecole des Beaux Arts in Paris. He was an experimentalist in style in his early work, much of which was purely abstract in character. In his sculptured portraits he treated each sitter in a style corresponding with his character. Of extraordinary technical resourcefulness, he follows the traditions of dramatic sculpture by working with ridges and bosses rather than by the architecture of his planes. He is peculiar in the vehement violation of actuality in the individual head. His principal works include the monument to Oscar Wilde in the cemetery of Père Lachaise, Paris; 18 nude figures outside the office of the British Medical Association; "Christ," a very radical conception which caused much controversy; "The Sun God"; a series of powerful portrait heads, including Admiral Lord Fisher (Imperial War Museum, London); the bronze "American Soldier," Metropolitan Museum, New York; several versions of Mrs. Epstein; the Duchess of Hamilton, and a number of others in the collection of John Quinn, New York. Consult the monograph by B. Van Dieren (London, 1920).

ERB, NEWMAN (1850-). An American railway official, born in Breslau, Germany. In 1853, he came with his parents to the United States. He was educated privately and in the public schools of St. Louis. For several years he practiced law, serving as general attorney for several railroads. From 1886 to 1898, he was president of the Western Telegraph Company. He was president and receiver of several important railroads in the West and South. He constructed and was president of the St. Louis, Memphis and Southeastern Railroad and was president and director of the Wisconsin Central Railroad in 1908-09. He was president of the Minneapolis and St. Louis Railroad and the Iowa Central Railroad for several years and

was a director and official in many important corporations, chiefly connected with railways.

ERDMAN, CHARLES ROSENBURY (1866-). An American theologian born at Fayetteville, N. Y., and educated at Princeton University, and the Princeton Theological Seminary. He was ordained in 1891, and after serving various pastorates, returned to the seminary at Princeton as professor of practical theology in 1906. He has been a delegate to Presbyterian conventions and world assemblies, and is the author of *The Ruling Elder* (1904); *Sunday Afternoons with Railroad Men* (1907); *Coming to the Communion* (1912); *Gospel of John, an Exposition* (1916); *The Gospel of Mark, an Exposition* (1917); *The General Epistles* (1918); *The Acts* (1919); *Matthew* (1920); *Luke* (1921).

ERDMANN, BENNO (1851-1921). A German philosopher (see Vol. VIII). The veteran Kantian scholar died in January, 1921. His last work, *Grundzüge der Reproduktionspsychologie* (1920), concerned itself with the movement of thought and imagination.

ERIE. A manufacturing and summer resort city of Pennsylvania, and a port on Lake Erie. The population rose from 66,525 in 1910 to 93,372 in 1920, and to 112,571, by estimate of the Bureau of the Census, for 1923. Presque Isle Peninsula, including about 2500 acres of land which formed a protecting arm before the harbor, was set aside as a State park by the State of Pennsylvania, and various plans were proposed for developing it. City planning and zoning were highly developed. A grade crossing programme entered into by the city and the railroads was to include the erection of a new union dépôt. A stadium seating 25,000 was under construction in 1924, by public subscription. In 1921 a high pressure reservoir was built; in 1924 an interceptor sewer with a disposal plant was being constructed.

ERITREA. An Italian colonial possession in Africa on the west coast of the Red Sea. Area, about 45,800 square miles; native population in 1920, 402,793. Europeans numbered 4681; of these 4283 were Italian. Asmara, the seat of government, had 14,711 inhabitants, 2500 of them Europeans; Massawa, the leading port, 2645, with 360 Europeans. The export trade by sea comprised dried hides, palm-nut seeds, tinned meats, salt, mother-of-pearl, conch shells, flaxseed, rubber, and tanning materials; the sea-borne import trade, wines, cotton and cotton goods, mineral oils, cement, sugar, coffee, fats, and soap. Imports in 1912 were valued at \$3,637,000; in 1919, \$9,120,000, based on an average value of the lira at \$0.114; in 1921, \$4,730,000, on a lira value of \$0.04. Exports for 1912, 1919, and 1921 were \$1,750,000, \$4,674,000, and \$1,204,000. The transit trade in 1921, principally by Abyssinia, was valued at \$1,112,618 in imports and \$1,132,840 in exports. At Massawa 204,400 tons of shipping entered in 1912, and in 1921, 354,256 tons. After 1912, 65 miles of railway were completed from Asmara to Cheren. In 1922 work was under way on a line of 54 miles from Cheren to Agordat. At Massawa and Asmah wireless stations were established to keep the colony in constant communication with Italian Somaliland and Italy. For 1922-23 the colonial budget balanced at 27,548,737 lire, or \$1,377,400 at the average rate for 1922 of \$0.05. In 1912 governmental costs were about \$1,250,000. The railways

were opening up a cotton area computed at 100,000 acres. Efforts to attract Italian settlers proved unsuccessful, because the highlands, the only areas suitable for European colonization, were already well filled by Abyssinians. The colony was not yet self-supporting.

ERIVAN, ARMENIAN REPUBLIC OF. See ARMENIA.

ERMAN, HEINRICH (1857-). A German jurist, born in Berlin, and educated at the universities of Leipzig and Berlin. In 1883, he was appointed professor at Lausanne, and was subsequently professor of Roman law in Geneva. He was made honorary professor at Lausanne in 1902, and later at Münster-in-Westfalen. His written works include contributions to periodicals and the following books: *Zur Geschichte der römischen Quittungen und Lösungsakte* (1883); *La Restitution des frais de procès en droit romain* (1892); *Servus vicarius, Vesclave de l'esclave romain* (1896); *Recht und Prätor* (1903); *Bedeutung der Bodenreform für eine aufstrebende Stadt* (1907); *Behandlung der Aktionen in den nachklassischen Rechtsbüchern* (1908); *Grundzüge für ein Kriegerheimsstätte-Gesetz* (1916).

ERMATINGER, EMIL (1873-). A Swiss author and professor at the technical high school of Zurich, born at Schaffhausen. He studied law and philosophy at Swiss universities, but later devoted himself to teaching and writing. He is the author of a volume of verse (1900), and of several novels, among them *Weggeführten* (1902) and *Der Weg ins Leben* (1909), but he is best known for his critical, biographical and historical works, which are: *Antike Lyrik in modernem Gewande* (1898); *Die Weltanschauung des jungen Wieland* (1907); *Gottfried Kellers Leben, Briefe und Tagebücher* (1915); *Die deutsche Lyrik in ihrer geschichtlichen Entwicklung von Herder bis zur Gegenwart* (1921). He is also the editor of the complete works of Gottfried Keller.

ERNLE, ROWLAND EDMUND PROTHERO, first BARON, (1852-). An English economist, born at Clifton-on-Teme. He was graduated from Balliol College, Oxford, in 1873, and was connected with that university as fellow and proctor until 1884. In 1913, he was appointed a member of the Royal Commission on Railways and in 1915-16 was a member of important committees on the production of food. From 1894 to 1899, he edited the *Quarterly Review*, and from 1916 to 1919 was president of the Board of Agriculture. His writings include: *Pioneers and Progress of English Farming* (1887); *The Psalms in Human Life* (1903); *The Pleasant Land of France* (1908); *English Farming, Past and Present* (1912).

ERNST, PAUL (1860-). A German writer of essays, dramas and fiction, born at Elbingen. He studied at the universities of Göttingen, Tübingen, Berne and Berlin. In his first efforts, the one-act plays *Lumpenbagasch* and *Im chambre séparée* (1898), he was influenced by the naturalism of Arno Holz, but later found himself in the volume of poems *Polymeter*, the two one-act tragedies *Wenn die Blätter fallen* and *Der Tod* (1899), and the volume of fiction, *Sechs Geschichten* (1900). After a sojourn in Italy he published some translations, *Altitalienische Novellen* (1902), selections from *Des Knaben Wunderhorn* and a special edition of Arnim's *Isabella von Egypten* (1903). He has since written a number of novels—*Die Prinzessin des*

Ostens, Der schmale Weg zum Glück (1903), *Der Tod des Cosimo* (1912); *Die Hochzeit* (1913); *Saat auf Hoffnung* (1915), *Die Taufe* (1916), *Der Nobelpreis* (1917)—a volume of short stories, *Komödiantengeschichten* (1920), and a drama, *Preussengeist* (1915). His book of essays, *Der Weg zur Form* (1906), and *Der Zusammenbruch des Idealismus* (1919), attracted much attention.

ERSKINE, JOHN (1879-). An American university professor of English (see Vol. VIII). He published: *The Moral Obligation of the Intelligent, and Other Poems* (1915); *The Shadowed Hour* (1917); *Democracy and Ideals* (1920); *The Kinds of Poetry* (1920); *The Literary Disciple* (1923). In addition, he has edited several publications and held the educational directorship of the American Expeditionary Forces.

ERVINE, ST. JOHN GREER (1883-). An English dramatist and novelist, born at Belfast, Ireland. His first play, *The Magnanimous Lover* (1907), possessing a distinctly moral flavor, was produced at the Abbey Theatre, Dublin, in 1913. Two years later he was manager of the same theatre. During the War he was a lieutenant in the Royal Fusiliers and was wounded (1918) in France. He is the writer said by Arnold Bennett to be "probably unequaled by any other playwright" in England, who had in his work "combined great skill, fine ideas and perfect sincerity with immense popular success." He wrote the following plays, all of them produced either in Dublin, London, or New York: *Mixed Marriage* (1910), a four-act play; *Jane Clegg* (1911), produced at the Gaiety Theatre, London, in 1912, and later in New York; *John Ferguson* (1914); *Mary, Mary, Quite Contrary*, in which Mrs. Fiske appeared in New York in 1923; *The Wonderful Visit* (with H. G. Wells). Among his other publications are: *Four Irish Plays*; *The Ship*; *Eight o'Clock, and Other Stories* (short stories); four novels, *Mrs. Martin's Man*, *Alice and a Family*, *Changing Winds*, *The Foolish Lovers*; a political study, *Sir Edward Carson and the Ulster Movement*, and *The Lady of Belmont* (1924), a play in five acts.

ERZBERGER, MATTHIAS (1875-1921). A German politician, born at Butthausen (Württemberg). He began his career as a school-teacher, then was a journalist, becoming a member of the staff of the *Deutsches Volksblatt* (Stuttgart) in 1896. His political career began in 1903, when he was elected to the Reichstag as representative of the Catholic Centre party. During the War he at first made extravagant efforts to increase German annexations, but later became just as active in furthering peace negotiations. It was he who instigated the "Peace Resolutions" drawn up by the Reichstag in 1917; and when, in 1918, he succeeded Bethmann-Hollweg as Secretary of State, he conducted the Armistice negotiations, and signed the agreement on November 11. Upon becoming Finance Minister of the Reich in 1919, his worst troubles began. On account of a legal controversy with Dr. Helfferich, the Nationalist leader, he was forced to resign; and, although he was returned to the Reichstag in 1920, he abstained from politics for a time. This same year he published a pamphlet justifying his war policy, but this did not overcome the animosity of his opponents, the Conservatives and National Liberals who criticized him

not so much for his peace negotiations as for his financial policy, which hit capital and landed interests. His supporters were the Catholic working classes. The culmination of the attacks upon him was his assassination on Aug. 26, 1921.

ESENWEIN, JOSEPH BERG (1867-). An American editor, born in Philadelphia, and educated at Albright College, Millersville Normal School, Lafayette College, Richmond College and the University of Omaha. He was president of Albright Collegiate Institute in 1895-96, and in the following year held the position of educational director of the Y. M. C. A. at Washington Heights, New York City. After a year of foreign travel, he became professor of English in the Pennsylvania Military College at Chester, subsequently giving up teaching (1903) to become manager of the *Booklovers' Magazine*. Two years later he was made editor and manager of *Lippincott's Magazine*, a position which he held until 1914. In 1915 he became editor of *The Writer's Monthly*, Springfield, Mass. He is known both as a lecturer and writer. His published works, besides articles contributed to Charles Dudley Warner's *Library of the World's Best Literature*, include: *Songs for Reapers* (1895); *Modern Agnosticism* (1896); *Feathers for Shafts* (1897); *Writing the Short Story* (1909); *Lessons in the Short Story* (1910); *Short Story Masterpieces* (1912); *Writing the Photoplay* (1913. Rev. ed., with Arthur Leeds, 1919); *The Art of Public Speaking* (1915); *Writing for the Magazines* (1916); *Children's Stories and How to Tell Them* (1917); *Russian Short Story Masterpieces* (2 vols., 1919).

ESHER, REGINALD BALIOL BRETT, second Viscount (1852-). An English politician and author, born in London, and educated at Eton and Trinity College, Cambridge. He was a member of Parliament from Penryn and Falmouth (1880-85), secretary to the Office of Works (1895-1902), chairman of the War Office Reconstitution Committee (1904), a permanent member of the Committee of Imperial Defense (1905-), and from 1909 to 1913 was chairman of the Territorial Force Association of the City of London. King Edward VII appointed him one of the editors of *The Correspondence of Queen Victoria* (1907). Among his publications are: *Footprints of Statesmen* (1892); *Today and To-morrow* (1910); *Influence of King Edward*, Essays (1914); *After the War* (1918); *The Tragedy of Lord Kitchener* (1921).

ESKIMOS. See ALASKA, *Natives*; ETHNOGRAPHY, *Northern Peoples*.

ESPERANTIDO. See INTERNATIONAL LANGUAGE.

ESPERANTO. See INTERNATIONAL LANGUAGE.

ESTHONIA. A republic on the Baltic Sea, made up of the former Russian government of Estland, the northern part of Livland, the islands Saaremaa, Hiiumaa, and Muhumaa, and parts of the Petseri district of the Pskov government and the Gdowski district of the Petrograd government. Esthonia became a republic on Feb. 24, 1918, after the Bolshevik *coup d'état*. By treaty with Russia on Feb. 2, 1920, and by an agreement with Latvia, her sister republic to the south, Esthonia's political borders were extended to coincide with her ethnographic limits. The area is put at 18,000 square miles, and the population, according to the census of

1922, at 1,110,538. Of these, 95 per cent were Esthonians and the rest Germans, Russians, Jews, Finns, Swedes, and Letts. The capital, Reval, had 160,000 in 1917, and in 1923, 126,543 inhabitants. Narva, the chief manufacturing centre, was credited with a population of 27,975. Five-sixths of the population were Lutherans, and the rest were Greek Orthodox and Roman Catholics.

Industry. The great proportion of the population was busied on the land. Up to the passage of the land reform bills of 1919, property was concentrated mostly in the hands of the Baltic barons and the clergy, of German descent; native Esthonians were merely farm hands or small peasant proprietors. By the bill of Oct. 10, 1919, an ambitious programme was projected for the almost complete confiscation of these large estates and their allotment among the peasants and soldiers. Some indemnity was provided for, but the basis was not to be the real value but the size of the land tax. By 1922 the report was that 22,000 additional small farms had been created, averaging 40 to 55 acres. Lack of capital for buildings and deterioration of farm stocks imposed almost insuperable difficulties on the realization of the programme. Of the total area of 10,851,500 acres, forest land, owned by the state, comprised 20.1 per cent; fields, 22.9; meadows, 24.5; pastures, 17.5; untillable land, 15. The acreage under various crops and the harvests of 1922 and 1923, compared with the average for five pre-war years, 1910-14, are given as follows:

Crops	PRINCIPAL CROPS				
	Area in acres		Production in thousands of bushels		
	1922	1923	1910-14 (average)	1922	1923
Rye	392,000	426,100	6,702	5,079	6,808
Oats ...	395,700	377,500	7,531	9,901	7,820
Barley ..	331,100	311,900	5,269	6,564	4,030
Wheat ..	52,200	36,100	257	748	397
Potatoes .	186,600	178,600	27,701	25,932	24,659
Flax and flaxseed	59,200	75,600	25,400	17,400	18,300
* Metric tons.					

Live stock in the country in 1922 numbered 192,200 horses, 505,810 heads of cattle, 261,040 swine, and 530,290 sheep and goats. There were textile, hemp and rope, paper, metal, and shipbuilding works, but up to 1923 these were languishing because of deterioration and lack of capital.

Trade. The following table shows that trade was improving. In 1920, exports were valued at \$17,544,278 and imports at \$19,931,218. The figures for 1922 and 1923 in detail were:

IMPORTS AND EXPORTS (Thousands of dollars)					
Imports			Exports		
	1922	1923		1922	1923
Foodstuffs	4,509	6,576	Foodstuffs	3,822	3,008
Textiles	2,004	6,933	Flax and cotton	4,589	6,438
Machinery and metals	1,467	6,639	Wood goods	2,549	4,049
Coal, ore, grasses	1,182	2,252	Paper industry	1,169	1,711
Chemicals and drugs	382	1,931	Stone, earth	290	281
All others	6,834	2,369	All others	1,698	653
Total	16,438	26,700	Total	14,117	16,140

Principal countries of origin of imports (1923): Germany, 51.0 per cent; Great Britain, 19.7; Russia, 4.1; United States, 3.7; Sweden, 3.2. Principal countries of destination of exports (1923): Great Britain, 34.1 per cent; Germany, 10.7; Sweden, 10.0; Latvia, 8.1; Russia, 6.7; United States, 1.3.

By the Russo-Esthonian treaty, goods in transit for Russia were to be admitted unhampered by an import or transit duty. That this trade was

considerable may be adduced from the importation in 1920 of 24,012 long tons, through Reval and Narva, for Russia; 1921, 189,900 long tons; and 1922, 55,271 tons. These importations included salt, leather, paper, ironware, lead and copper goods, coal, and chemicals and drugs, mainly from Germany and Sweden. During 1922, 3172 vessels of 223,114 tons entered the Esthonian ports of Reval, Narva, Pernau, Port Baltic, Hapsal, Kunda, Arensburg, Loksa, and Rohukala. The total length of railways in 1922 was 971 miles, including 605 miles of Russian broad gauge and 366 miles of narrow gauge.

Education. Elementary education was free. In 1922 there were 1221 elementary schools, 221 higher schools, 70 gymnasia, several normal schools, a technical school at Reval, and a state university at Dorpat. The last, reopened in 1919, had, in 1921, 2775 students. The minority nationals, Germans, Russians, Swedes, and Letts, were guaranteed instruction in their mother tongues.

Finances. In 1922, expenditures were 5,510,300,000 Esthonian marks and the revenues 5,065,300,000 Esthonian marks. In 1923 the budget deficit was estimated at 700,000,000 Esthonian marks or about 10 per cent of the total expenditures of 6,775,000,000 marks; for 1924 it was estimated at 423,000,000 marks or 6 per cent of expenditures, which included 435,000,000 marks, about \$1,250,000 for payment of foreign debts. The Esthonian mark was worth 371 to the dollar in December, 1923. The foreign debt was about \$19,600,000, end of 1923, the United States holding \$13,800,000 of Esthonia's bonds, France 10,000,000 francs, and Great Britain £251,000. The internal debt was \$300,000.

History. The Russian Revolution brought with it a state of uncertainty in Esthonia which was not dispelled until late in 1920. Some sentiment inclined toward the Allies; the Baltic lords were openly friendly to Germany. A republican government, proclaimed on Feb. 24, 1918, enjoyed but a brief career before it was put to flight by the German troops who entered the country as a result of the Brest-Litovsk Peace Treaty, captured Reval from the Bolsheviks, and restored the Baltic land barons under German protection. A provisional government, set up by the native moderate elements, was disregarded, and German occupation continued until the end of the year. During May, 1918, the Esthonian National Council was accorded provisional *de facto* recognition by Great Britain, France, and Italy. By the Russo-German treaty of August, 1918, Esthonia's independence was

recognized, but when the Germans withdrew their troops after the Armistice of November, 1918, Soviet forces once more poured in, to be

driven out by local troops with Finnish and British aid. The exiled Estonian leaders returned to their war-ridden country, and on May 19, 1919, the National Assembly declared Estonia a sovereign and independent nation. Hostilities with Russia continued until Dec. 31, 1919. Affairs were complicated by the threat of a German movement on the Baltic states and by the intervention of Allied armies on the northwest coast of Russia in the autumn of 1919. The United States, in an endeavor to gain Estonia's support against the Bolsheviks, offered the country a loan of \$50,000,000, a considerable portion of which was taken. The Russian succession states, Finland, Lithuania, Latvia, and Estonia, wearied of the conflict, and an armistice was signed at Dorpat on Dec. 31, 1919. The Russo-Estonian treaty of Feb. 2, 1920, put an end to hostilities. The terms were remarkably favorable to Estonia. The country's independence was unreservedly recognized and guaranteed by Russia; Estonia received 15,000,000 gold rubles, all Russian public property in Estonia, and exemption from any share in Russian debts. A Constituent Assembly on June 15, 1920, prepared the country's new constitution. A single house, popularly elected on the basis of proportional representation and controlled by the initiative and referendum, was set up. The cabinet, whose premier was designated the State Head, was to be elected by and responsible to the Assembly. The State Court of Justice was to be elected by the Assembly too. The Assembly, in 1921, had 22 representatives of the Labor party, 29 of Socialist parties, and 5 Communists, together constituting the majority bloc; 21 Agrarians, and the rest Populists, Christians, Balts, and Russians. By the Land Act, the church was separated from the state and its extensive holdings confiscated. On June 26, 1921, the Supreme Council of the League of Nations accorded the country *de jure* recognition; shortly afterward, on September 22, it was admitted to the League; recognition by the United States was delayed until July 27, 1922. In May, 1923, the election of the second parliament returned a majority bloc of the bourgeois and peasant parties with the result that M. Paetz, leader of the Peasants' League, was entrusted with the formation of a government.

Russia's consistently friendly policy toward her succession states was further evinced by the series of discussions among the Baltic States, including Estonia, in October and November, 1921, and March and December, 1922. These meetings agreed on arbitration of disputes, confirmation of existing frontiers, agreement on customs, consular, and economic matters; a common economic policy toward Russia, and radical disarmament plans involving the cutting of the Russian Red army to 200,000. In 1923, it appeared for a time that Estonia was prepared to join with Finland and Poland in an alliance aimed at Russia. But peace was maintained, so that all energies, in 1923 and 1924, were devoted to the solution of domestic problems. An indication of stability was the nearly balanced budget of 1924 and the payment of an interest charge of 262,538,500 marks on the United States debt.

ETHICS. From many sources we are persuaded that the story of the ten years 1914-1924 will be incorporated in history as the crisis of the industrial revolution. This means

that it was a time of great moral struggle for those who were alive to the issues. It is not surprising then that ethical theory was in confusion, and further that genuine insights were awaiting intellectual formulation. The present writing can only be an inventory of these insights with as much clarification as "leaps to the eye."

The moral struggle was a continuation and interpretation of the efforts of human minds to bring intellectual clarity to focus on the two ever-present aspects of the ethical problem, the theoretical and the practical. The theoretical problem had arisen from the conflict of science and the cultural tradition, first evidenced in the controversy between religion and science which continued throughout the last century. These ten years showed a decisive reformulation of the problem. Dogmatic religion had split into two parties, one of which had fraternized with science and the other of which had found its place in the subject matters of scientific disciplines such as psychology and anthropology. Free religion, the engendering faith and guardian of human culture still faced the old problem. Partly artist, partly prophet, and partly saint of an intelligent mysticism, it still demanded credentials of the invading scientist. A new religion, if it came, as some claimed it would, must announce doctrines which could stand independent but tolerant of the scientific spirit.

This pointed out the station and duty of ethics: To abstract and judge the issue between these two. Very little that was new could be pointed out as the product of any such activity, but there were beginnings in the shape of demands for a formal ethics at once rigorous and comprehensive enough to command the respect of the parties to the dispute. Perhaps the best evidence of such a demand was the body of writings on the theory of value or *Werttheorie* in America and in Germany. Value was a new term in philosophic literature. It was indicative of two movements not wholly unrelated to the crisis of the industrial revolution. One was a tendency away from the older moralistic tradition which used the term "good." This was seen to carry with it too much outworn and inapplicable connotation. It was practically abandoned. The new term came, significantly enough, from economics. It was generalized and combined with a concept, "worth," which still retained respect because or in spite of its moral significance. The felicity of the combination of "value" and "worth" was largely due to its fitness to symbolize objective rigor and concrete immediacy. Austrian and German writers like Meinong, Rickert and Husserl emphasized its objective aspect; hence their label *Werttheorie*, while American writers such as Urban, Perry, Picard and Prall, stressed the aspect of concreteness and variety so well symbolized in the term "value." There was something of the speculative and critical in the temper of this sort of endeavor, and aesthetics, social science, and ethics might hope for clarification and consequent advantage from this source. However, the formulations were more promising than productive of understanding.

The body of theory arising from the practical problem set by the industrial revolution was voluminous and varied. It was concerned with political, economic, and social programmes. Owing to the work of social and artistic move-

ments such as the pre-Raphaelites, industry had been recognized as something like a cancerous growth in the body politic, and the search for an attitude with which to confront it had led to practical plans on a small scale like the prescriptions of a physician. A peculiar form of social service had been named the case method; social diagnosis and therapeutics were applied. But the malignant growth assumed larger proportions and the plans became the programmes of the social engineer. Physicians' prescriptions gave way to blue prints of society, theories like Graham Wallas' *The Great Society*. Now this sort of attitude and thought is what an older generation called material ethics. In so far as it is ethics, it is the conversion of scientific law into hypothetical commands, or the use of "natural and social conditions" as means to a human end, the good life. Its aim is the prudential control of affairs. As is apparent, it draws on science. Especially it demands and encourages work in the humanistic sciences, anthropology, psychology, social geography, economics, and political science, and these are not lacking, at least nominally. They may be lumped together as sociology or theories of human nature. Their technique was copied from the older physics with entities selected from the flux of human experience and projected on a vast canvas, which had been prepared by Hobbes, Locke, and Rousseau, the panorama of Man in a State of Nature. The economic man and the noble savage of the seventeenth and eighteenth century literature were the points of reference. Impulses, instincts, unit characters, institutions, nations and races were entitized as individuals with purposive drives needing organization, authority and sovereign governments to make them civilized. These elaborations had reached their maximum in these ten years and were the stage scenery of our drama of social life.

Some of these sources of the structural element and the uses to which they were put are interesting. Freud's suppressed ideas, atoms of human nature in the psychic vortex, were renovated and transposed to physiological systems, and we thus had theories of sublimation in aesthetics, in penology, and in the analysis of social revolutions. It was then claimed that a behavioristic ethics was complete, the Ethics of Hercules. Then we had another section of social background coming from anthropology; Levy-Bruhl, Hobbhouse, and Westermarck itemized the mores and customs of primitive societies and by analogy found the right and wrong of conduct formulable in terms of conformity or non-conformity with contemporary accepted taboos and restrictions. Marxian doctrines, the economic interpretation of history in particular, had led to both a new evaluation of history and the promulgation of utopian schemes for the reorganization of society. A reaction to this last had combined a great many other fragmentary intuitions of human progress derived from Darwinian and Bergsonian evolutionary theories into a far-reaching ethics of development closely allied to the traditional self-realization ethics of fifty years ago.

All these, as was pointed out above, were blue prints for social engineers. Perhaps the hardest approach to an intellectual vantage point from which to envisage them was made by the pragmatists who were frankly preaching an ethics of expediency. Blue prints for them were

modes of analysis to be referred to in concrete situations as aids in organizing and finding a way through the practical problems of an industrial society. None of them were absolute but relative to the particular end which an individual or community took seriously. If one asked what was the criterion of end, how one could choose between rival purposes, the pragmatists answered with Aristotle that a good man would know; though in other connections a biologico-psychological doctrine of survival and sublimation of complexes was the answer to the query. The pragmatic ethics influenced the theory of law more perhaps than any other field—social expediency would be the apology of the prince for the laws which he sanctioned, and the professor of jurisprudence would criticize existing laws from that basis. One can see how this conclusion would not be satisfactory as a solution of the problem. It was leading to the restating of the question which only a formal ethics could answer. A definite word on the theory of value was awaited to crystallize opinion regarding the good of society. But then, others were skeptical and put the question whether ethics was a science of value or the art of living. An observation from this point of view is significant. Social engineers, when they are men, seek a prophet. Souls as well as society need salvation. See also SOCIAL PSYCHOLOGY.

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ETHNOGRAPHY. The War naturally had a profound effect on the prosecution of European field studies and publications, and this accounts for the disproportionately greater amount of American work during the period 1914-24 which demands notice. The most useful general work, however, is of German origin, Buschan's *Illustrierte Völkerkunde* in its revised and greatly augmented third edition (1922), the work of a whole group of collaborators under Buschan's editorship.

North America. The advance made by Americanist studies can be roughly gauged by comparing Clark Wissler's *The American Indian* (2d ed., 1922) and L. Farrand's earlier *Basis of American History*. Precisely because of the general sanity of Farrand's outlook and the essential agreement of these authors as to the independent development of the American Indian and his racial homogeneity, the great gaps in knowledge that Wissler's predecessor had to contend with stand out in sharp relief. In spite

of much good pioneer work elsewhere, the Eskimo and the Northwest Coast Indians were practically the only subdivisions thoroughly known in North America at the beginning of the twentieth century. Since then intensive field work has made California, the Plains region, and the Southwest equally well known and added materially to information on the remainder of the continent.

A novel departure consists in the ever-increasing linguistic syntheses of the last decade, which are of more than philological interest since they suggest hitherto unsuspected affiliations or migrations. R. B. Dixon and A. L. Kroeber may be said to have led the way by reducing the number of Californian stocks, which hitherto had been set at over twenty. Their basic communication (*American Anthropologist*, vol. xvi, pp. 647-655) united Wintun, Maidu, Yokuts, Miwok and Costanoan in a larger Penutian family, while Shasta, Karok, Pomo and Yuma were put into another major Hokan family. A subsequent monograph by the same authors on *Linguistic Families of California* (1919) recognized but a solitary isolated tongue, Yuki, all others falling into the Penutian, Hokan, Shoshonean, or Algonkian stock.

This radical result was obtained by accepting E. Sapir's proof of the Algonkian relationship of Wiyot and Yurok, and of the Hokan affiliations of Yana (*American Anthropologist*, vol. xv, pp. 617-646; *University of California Publications in American Archaeology and Ethnology*, vol. xii, No. 1). Sapir, by virtue of his philological training, stood as the leader of the synthesizers. He revived Brinton's theory of a Uto-Aztecan stock uniting the Shoshonean and Nahua languages (*Journal de la Société des Américains de Paris*, 1914, pp. 379-425) and combined the Athabaskan, Tlingit, and Haida into one Nadene family. In short, he broke definitely with the traditional classification current since Powell and aimed at a grouping as comprehensive as possible. On the other hand, he did not go to the extremes of P. Radin, who in *The Genetic Relationship of the North American Indian Languages* (*University of California Publications*, vol. xiv, pp. 489-502) affirms that all of these form one grand stock.

It should be noted that protests against Sapir's Algonkian conclusions were made by T. Michelson, while Boas voiced doubts as to the legitimacy of synthesizing languages in the manner characteristic of the new school. Without denying the occurrence of historical connection between such groups as Tlingit and Athabaskan, Boas insists that we are dealing not with divergence from a common ancestral tongue but with a development comparable to acculturation. He admits that in the absence of historical knowledge it might be very hard to establish the connection between Armenian and English, but holds that where such information is lacking no sound inferences as to genetic unity can be drawn (*American Anthropologist*, vol. xxii, 1920, pp. 367 et seq.).

The *International Journal of American Linguistics*, founded by F. Boas, P. E. Goddard, W. Thalbitzer, and C. Uhlenbeck, continued publication of both concrete and theoretical studies.

Southwestern United States. Archaeologically, the outstanding achievement lay in the rigorous application of stratigraphic methods, which were used most extensively in the Southwest. The

leaders in this field were N. C. Nelson (*Pueblo Ruins of the Galisteo Basin*, 1915) and A. V. Kidder (*Pottery of the Pajarito Plateau*, 1915, and "Notes on the Pottery of Pecos," in *American Anthropologist*, 1917, pp. 325-360), who have independently established a relative chronology mutually corroborative in its main outlines. Thus, the black and white earthenware is now recognized as the oldest pottery of the area, and the introduction and decay of a glazed decoration have been fixed in the series of stages and the art traced to the Little Colorado as its centre. A. V. Kidder's and S. J. Guernsey's joint paper on *Archaeological Explorations in Northeastern Arizona* (1919) was especially noteworthy as determining a basket-making culture akin to that of Grand Gulch, Utah, antecedent to the Pueblo culture, and representing the first steps in that direction. While the sites investigated displayed coiled basketry, pottery was rare or lacking, cultivation was limited to a single variety of maize and failed to include beans, the turkey was not yet domesticated, cloth was absent, and there were no substantial habitations. The spear-thrower occurred, but no bow had been discovered. Abalone shells point to a trade connection with California. Other interesting studies on this region are *The Aztec Ruin* (1919) by E. H. Morris, who suggests the cañons north of the San Juan River as the locality of the nascent Pueblo culture; and W. Hough's *Exploration of a Pit House Village* (*Proceedings of the United States Museum of Natural History*, vol. lv, 1919).

Besides these systematic researches in the Southwest there was much local excavation that may ultimately lead to broader conclusions. L. Spier's *The Trenton Argillite Culture* (1919) may be singled out for the careful examination of a much disputed site; Spier did not deal either with the uppermost layer connecting with the historical tribes of the region nor with the lowest, relatively ancient stratum; but he described the intermediate deposits, which are lacking in pottery and altogether reveal no affinities with any known culture. In his *Handbook of Aboriginal American Antiquities* (1919) William H. Holmes, the dean of American archaeologists, summarizes the results of his life-long studies, presenting the accepted view of American scholarship as to such basic problems as the supposedly palaeolithic remains found in the New World.

Northern Peoples. Turning to studies of peoples still extant, D. Jenness, a member of Stefansson's expedition, has published a scientific study of *The Life of the Copper Eskimo*, a hitherto little-known group, while Thalbitzer's *The Ammassalik Eskimo* (1914) deals with a subdivision of the Greenlanders. Thalbitzer derived the Greenlanders from the northern and western parts of Hudson's Bay but sought the American home of all the Eskimo rather in Alaska than in the central region of their habitat. The tribes of coastal British Columbia, while looming less prominently in the literature than in the decade preceding, were represented by several notable works, such as F. Boas's *Tsimshian Mythology and Ethnology of the Kwakiutl* (31st and 35th Annual Report of the Bureau of Ethnology). The former contains a suggestive inquiry into the extent to which native custom is reflected in tradition. For a rapid survey of the Northwest Coast culture, with special emphasis on the southern tribes,

two short papers of E. Sapir may be specially recommended. *The Social Organization of the West Coast Tribes* (*Transactions of the Royal Society of Canada*, 1915, pp. 355-374) and *Vancouver Island Indians* (Hastings's *Encyclopædia of Religion and Ethics*).

Passing to the Eastern Woodland area, F. G. Speck's papers on *Family Hunting Territories* (1915) and *The Family Hunting Band as the Basis of Algonkian Social Organization* (*American Anthropologist*, 1915, p. 289 et seq.) definitely established the prevalence of individual land ownership among hunting tribes, a conclusion he later corroborated by other studies in the same general area. A. B. Skinner published a full volume of *Folklore of the Menomini Indians* and a paper on the *Associations and Ceremonies of the Menomini Indians* (1915), to which might be added another on *Medicine Ceremony of the Menomini, Iowa and Wahpeton Dakota* (1920), since the two last-named tribes have culturally as much affinity with the Central Algonkians as with the Prairie aborigines. P. Radin's *The Winnebago Indians* (39th *Annual Report of the Bureau of Ethnology*, 1923) is one of the most complete monographs of any tribe extant, especially along the lines of religious usage; and *The Autobiography of a Winnebago Indian* (1920, edited by him, is an interesting human document presenting native culture from the native point of view.

Plains Indians. Thanks to the intensive researches prosecuted during 1914-24, the Plains area became one of the best known in the world. It is now fairly clear that the southern tribes have very intimate relations with the Central Algonkian Woodlanders, while the northern tribes represent more definitely the popular concept of the Plains Indian. To our knowledge of material culture within the area Wissler has made by far the most striking contributions, which are in part embodied in his two general books on *The American Indian and Man and Culture*; of his special papers may be cited *Riding Gear of the North American Indians* and *Costumes of the Plains Indians* (both in the *Anthropological Papers of the American Museum of Natural History*, 1915). Under the auspices of the American Museum of Natural History two protracted series of investigations were undertaken on the ceremonial activities comprehended under the heads of Sun Dance and Age Societies; the results are summarized in R. H. Lowie's *Plains Indian Age Societies: Historical and Comparative Summary* (1916) and L. Spier's *The Sun Dance of the Plains Indians: its Development and Diffusion* (1921). Both discussions demonstrate the complexity of primitive ritual and illustrate the processes of ceremonial accretion.

Several Plains tribes hitherto inadequately described were thoroughly studied, at least in part of their cultural manifestations. Thus G. B. Grinnell published a two-volume work on *The Cheyenne Indians* (1923). G. L. Wilson's *Agriculture of the Hidatsa Indians* (1917) offered one of the most detailed economic studies of a primitive people, while R. H. Lowie's studies on the social life, societies, religion, art, and material culture of the Crow Indians (*Anthropological Papers, American Museum of Natural History*, 1912-23) constitute an approximately complete survey of Crow culture. Considerable light was shed on the Pawnee, Mandan, Hidatsa and Kiowa by the ceremonial studies

mentioned above, and additional information was contributed on such relatively familiar tribes as the Blackfoot and Dakota. Much valuable information was added to our knowledge of the last-mentioned people in F. Densmore's *Teton Sioux Music* (1918). F. LaFlesche's *The Osage Tribe* (1922) constitutes the first installment of a scientific account of a virtually unknown people. A remarkable comparative study by R. F. Benedict on *The Vision in Plains Culture* (*American Anthropologist*, 1922, pp. 1-23) traced the variations of the visionary experience as a cultural phenomenon within this area and proved among other things that the vision-quest is by no means predominantly a feature associated with puberty.

Another region that became incomparably better known is the Southwest. This was due largely to the enthusiasm of Elsie Clews Parsons, who was rapidly working toward a synthesis of the sociological and religious culture of all the Pueblo peoples. Some of her numerous papers, published in the *American Anthropologist*, the *Memoirs of the American Anthropological Association*, and the *Anthropological Papers of the American Museum of Natural History*, are *Notes on Zuñi*, *Notes on Acoma and Zuñi* (1918), and *Laguna Genealogies* (1923). She also edited (1920) the earlier *Notes on Cochiti* by Father N. Dumarest, perhaps the clearest and most concise trustworthy account of any Pueblo tribe, exhibiting the characteristic matrilineal descent, the tribal men's society of rain-producers impersonating gods, the curing fraternities admitting women to membership.

A. L. Kroeber's *Zuñi Kin and Clan* (1918) is remarkable for the detailed, genealogically documented investigation of relationship terms and the heterodox views advanced on the clan organization, which is said to be of subordinate importance, while the matriarchate is reduced to female house ownership. A posthumous paper by H. Haerberlin (*Baessler-Archiv*, vol. vi, 1921, pp. 1-35) showed that Pueblo pottery designs are simply plaitwork patterns transferred to earthenware without a realization of the greater freedom possible with the new material. The nomadic Southwesterners have not been wholly neglected, as is shown by P. E. Goddard's *Myths and Tales from the San Carlos Apache*, 1918.

California. A third region that has been intensively investigated is California, the results being virtually all recorded in the *University of California Publications in American Archaeology and Ethnology*. A. L. Kroeber, assisted by E. W. Gifford, T. T. Waterman and others, has been the organizer of this survey, and his more general conclusions may be gleaned from his essays on *Californian Culture Provinces* (1920) and *Elements of Culture in Native California* (1922). A series of papers partly of comparative character are united in the *Mrs. Hearst Memorial Volume* (1923) issued by the same institution. Gifford's work was mainly along the lines of social organization, his paper on *Clans and Moieties in Southern California* (1918) definitely demonstrating the occurrence of these units, while various of his studies on kinship terms were among the most detailed available. T. T. Waterman's *Yurok Geography* (1920), though primarily devoted to place names, contained much other information, especially on property rights.

Among the general comparative investigations covering the continent none probably rivaled R. F. Benedict's *The Concept of the Guardian Spirit in North America* (1923). Extending the Plains researches already noted, the author showed that throughout North America the vision was the dominant religious fact. In addition she indicated the varying combinations into which this phenomenon entered and characterized the several geographical provinces. Finally must be mentioned *American Indian Life* (1922), the joint labor of twenty scholars rallied under the editorship of Mrs. Parsons. This is a unique attempt to delineate in short-story form but with complete fidelity to truth the life of a large number of distinct tribes. See also INDIANS, *United States*.

Central and South America. In Mexico, between 1914 and 1924, there was considerable activity, thanks to the energy of Dr. M. Gamio and his associates, who had concentrated on both archaeological excavation and a high linguistic reconnaissance. The Maya cultures were studied most intensively by H. J. Spinden and S. G. Morley, who arrived at concordant conclusions as to the chronology of the area, which seems to have displayed a considerable advancement about the beginning of our era. Spinden summarized the information concerning this region in a concise handbook on *Ancient Civilizations of Mexico and Central America* (1917), and Morley provided an *Introduction to the Study of the Maya Hieroglyphs* (1915), in which the principles of Maya arithmetical notation were set forth in an elementary way. The same author's book on *The Inscriptions at Copan* (1920) was of a more technical character.

Among the most significant contributions to culture-history were P. Rivet's studies of New World metallurgy, especially the two papers published with the collaboration of H. Arsan-deaux, *Contribution à l'Etude de la Métallurgie Méxicaine* (*Journal de la Société des Américanistes de Paris*, vol. xiii, pp. 261-280 et seq., 1922) and their *Nouvelle Note sur la Métallurgie Méxicaine* (*L'Anthropologie*, 1923, pp. 63-83). Aboriginal Mexico had formerly been credited with the knowledge of smelting copper but not with that of deliberately alloying it with tin to make bronze. The production of bronze in Peru was established in 1915 by C. W. Mead's *Prehistoric Bronze in South America*, which demonstrated both by documentary Spanish records and by a review of archaeological finds that bronze was made intentionally within the ancient Inca empire. However, it was supposed that this development was restricted to Peru and its immediate neighbors. Rivet's work proved by chemical analysis that bronze was also, though to a lesser extent, intentionally produced by the ancient Mexicans, while its complete absence in Colombia indicated that there an independent centre of metallurgy evolved and that Mexico was influenced by Peru via maritime connection. The reactions of a modern textile expert to the products of ancient Peruvian loom-work were recorded in detail in M. D. C. Crawford's *Peruvian Textiles* (1915) and *Peruvian Fabrics* (1916).

A summary of the mythologies of this entire region was provided by H. B. Alexander in *The Mythology of all Races: Latin-American* (1920). Theodor Koch-Grünberg in his *Indianermärchen aus Südamerika* attempted to trace connections between the tales of the two major subdivisions

of the western hemisphere (*Journal of American Folk-Lore*, 1922, p. 329 et seq.). Most valuable *Comparative Ethnological Studies* in several volumes have been published since 1918 by Baron Erland Nordenskiöld of the Göteborg Museum, on data supplied partly by his own observations in Bolivia and the Gran Chaco, and partly by the utilization of the extant literature.

Asia. A notable event was the founding of a new quarterly, *Man in India* (1921), edited by Sarat Chandra Roy, with the collaboration of many scholars within and outside of India. A noteworthy ethnographic work was A. R. Brown's *The Andaman Islanders* (1922). These natives appear far more diversified than had been realized. Those of Great Andaman and of Little Andaman speak quite unintelligible, though structurally related, tongues, and there are subdivisions characterized by appreciable distinctions in both speech and custom. Brown definitely corroborated Man's statements as to the lack of the clan, totemism, and a classificatory kinship system. Comparison with other Negrito peoples indicated that the primeval Negritos were hunters conversant with the use of the bow but more familiar with work in bone, wood, and shell than with stone techniques. Pottery and the outrigger canoe are probably later acquisitions of the Andamanese but antedated the segregation of their two major subdivisions. Since their settlement in the Andamans there is practically no evidence of alien influence.

Assamese officials continued the valuable series of books on their native wards, those by J. R. Hutton on *The Sema Nagas* (1922) and by J. P. Mills on *The Lhota Nagas* (1923), meriting special consideration. Much new work was done in the Philippines. An exceedingly thoroughgoing *Study of Bagobo Ceremonial, Magic and Myth* (1917) by L. W. Benedict not only gave a detailed descriptive account but also established interesting historical connections between the culture of the Indo-Iranians and Mindanao, while the influences of China and of Islam were appraised as relatively slight. R. F. Barton's *Ifugao Law* (1919) gave a vivid and circumstantial account of the definite juridical code in vogue among an all but anarchistic tribe in Luzon. The mythology of a Philippine people was discussed from a comparative angle in Fay Cooper Cole's *Traditions of the Tinguian*. In earnest of a fuller description Mrs. J. B. M. McGovern offered a popular report of life *Among the Head-hunters of Formosa* (1922), where women cultivate the soil and enjoy unusual prestige, acting as both priests and chiefs.

Except in so far as Russian sources hitherto inaccessible may be concerned, the Siberian literature remained somewhat weak in monographic contributions as compared with the classical works of W. Bogoras and W. Jochelson early in the century. Bogoras's *Tales of Yukaghir*, *Lamut and Russianized Natives* (1918) appeared in English, and several good articles on the aborigines were included in Hastings's *Encyclopædia of Religion and Ethics*. A most useful handbook of the social and religious customs was issued by M. A. Czaplicka under the caption *Aboriginal Siberia*. The same author also produced a work on *The Turks of Central Asia*, in which the South Siberians of the Bronze and early Iron Age were identified with Turks, a conclusion adopted by B. Laufer. The home of the Turks seems to have lain in southern

Mongolia, while the country now called Turkistan was peopled by Iranians.

For a number of classical studies in Asiatic culture-history we are indebted to B. Laufer. His work on *The Beginnings of Porcelain in China* (1917) is one of the most illuminating contributions to our knowledge of cultural dynamics. In it the Chinese are shown as ancient potters but originally ignorant of glass; as borrowing the glazing technique from the West, but then developing it independently in conjunction with pottery, and finally as a result of centuries of experimentation producing porcelain. Laufer's *Sino-Iranica* (1919) traces the cultural connections between China and western Asia and establishes the definite borrowings made by and from the supposedly isolated Chinese. In a brief paper on *The Language of the Yüehi or Indo-Scythians*, Laufer argued that these must be classed as of Indo-Germanic stock.

Africa. C. Meinhof's and D. Westermann's linguistic investigations were followed by others, of which Sir Harry Johnston's *Comparative Study of the Bantu and Semi-Bantu Languages* gave a survey of not less than 274 distinct languages. A. Drexel advanced some radical hypotheses, notably the genetic affinity of Bornu with Sumerian (*Anthropos*, vol. xiv-xv, pp. 215-274; vol. xvi-xvii, pp. 73-108); but these awaited confirmation. A useful distribution map was given by H. Haberlandt in the second edition of Buschan's *Illustrierte Völkerkunde* (1922). A considerable amount of excellent material was brought together in the five volumes of the *Harvard African Studies* founded by Oric Bates and edited by E. A. Hooton. Among the longer papers published may be mentioned H. S. Stannus's description of the Wayao, E. Cerulli's collection of Galla folk-literature, including poetry as well as prose, and C. G. Seligmann's account of the camel-nomad Arabs known as the Kababish.

B. Ankermann's "Verbreitung und Formen des Totemismus in Afrika" (*Zeitschrift für Ethnologie*, 1915, pp. 114-180) was a model study and established some significant conclusions, such as the independence of totemism and exogamy in the area examined, the patrilineal descent of the totem irrespective of other coexisting rules of descent, and the probable lack of genuine totemism in ancient Egypt. L. Frobenius once more appeared with a startling theory in *Das Unbekannte Afrika*. He differentiated an Ethiopic and a Hamitic culture, the former characterized by age-grades, belief in reincarnation, patrilineal descent and agriculture; the latter, by maternal descent and pastoral conditions. F. von Luschan's monumental work on *Die Altertümer von Benin* (1920) pleaded for the virtually independent character of Benin art in some respects, yet suggested an ancient connection between southern Europe and the western Sudan. N. W. Thomas's *Anthropological Report on the Ibo-speaking Peoples* and subject reports on neighboring tribes supplemented our knowledge of the western Sudanese, while *The Lango* by J. H. Driberg provided a study of a Nilotic tribe in Uganda exhibiting the joint influence of Bantu and Sudanese features.

The Bantu also became better known. E. W. Smith and A. M. Dale published a standard work on *The Ha-speaking People of Northern Rhodesia* (1920), who differ in their matrilineal and exogamous customs from their paternally

and rather loosely organized congeners to the southeast. J. Roscoe added to his earlier work on *The Baganda* one on *The Northern Bantu* (1915) and other books. In *The Northern Bantu* he presented a singularly clear picture of the development of definite castes through the conquest of a horticultural people by a numerically weaker but better organized pastoral group. The rise of such an aristocracy was also well brought out in J. Czekanowski's *Forschungen im Nil-Kongo Zwischengebiet*; in this region a third caste is constituted by the under-sized hunting tribe called Batwa, who strangely combine the status of pariahs, potters and rain wizards.

Oceania and Australia. Linguistically the earlier synthesis of W. Schmidt, who connected Malayo-Polynesian with certain languages of India and Farther India was extended by A. Conrady (*Anthropos*, vol. xii-xiii, p. 702 et seq.), who arrived at the conclusion that Schmidt's "Austrie" stock is genetically related to all Farther Indian languages, as well as to Tibetan and Chinese. This finding could not of course be accepted without further inquiry. Australian languages were investigated and classified by W. Schmidt.

Ethnographically a number of significant works were published. B. Spencer in his *Native Tribes of the Northern Territory of Australia* described a very atypical group of natives, especially the Kakadu, and the Melville and Bathurst Islanders. Thus, the rites of subincision and circumcision are lacking, and women are permitted to witness the boys' initiation. Tree-burial is unknown, interment being always practiced. The realistic drawings on bark and on rocks are likewise utterly un-Australian and suggest some foreign influence. West Australia also no longer continued a *terra incognita*, thanks to Prof. A. R. Brown, whose "Notes on the Social Organization of Australian Tribes" (*Journal of the Anthropological Institute*, vol. xlviii, p. 222 et seq.) supplemented his earlier studies among the Kariera and their neighbors.

New Guinea and Melanesia likewise fared well. R. Thurnwald's memoir on *Banaro Society* (1917) gave a detailed account of the intricate social and kinship system of a Papuan people; P. Wirz in *Die Marind-anim von Holländisch-Süd-Neu-Guinea* (1922) described the tribe otherwise known as Tugeri; and the elaborate economic conceptions, marked by ritualistic ramifications, of another New Guinea group were set forth in B. Malinowski's *The Argonauts of the West Pacific* (1922). A preliminary account of Melanesians was published by F. Sarasin under the caption of *Neu-Caledonien und die Loyalty Inseln* (1918). Mr. and Mrs. W. S. Routledge's *The Mystery of Easter Island* (1920), with its authentic account of the famous statues and the elaborate bird-cult of this easternmost Polynesian group, evoked considerable interest, and Rivers interpreted the huge figures described as resting-places for the souls of the dead. "The Hawaiian Romance of Laieikawai" (*Report of the Bureau of American Ethnology*, 1920) was a re-publication of the original text with a translation and numerous explanatory notes by M. W. Beckwith, who thus provided one of the most interesting documents for the study of primitive literature. P. A. Erdland's paper on *Die Marshall-Inulaner* is a valuable monograph on a Micronesian tribe, with exog-

amy, matrilineal descent, cross-cousin marriage, and a kinship system strongly suggestive of the Hawaiian type. Many useful papers also appeared in the technical journals and the publications of the Bishop Museum in Honolulu. The historical interpretation of Oceanian data was powerfully influenced by the two schemes alluded to; that of F. Gräbner's *Methode der Ethnologie*, with the emendations supplied by W. Schmidt, and the system of W. H. R. Rivers's *The History of Melanesian Society* (1914). See ANTHROPOLOGY; ETHNOLOGY.

ETHNOLOGY. Following the publication of F. Gräbner's *Methode der Ethnologie* (1911), theoretical discussion was largely concerned with the interpretation of similarities in culture, and the most notable phenomenon to be recorded was the reaction against the formerly regnant theories of psychic unity, parallelism and unilinear evolution. The catchword opposed to these shibboleths of an earlier day was diffusion, and it was less as to the occurrence of borrowing than as to its extent and the paths of cultural dissemination that scholars remained at loggerheads. For convenience' sake three main anti-evolutionist schools, opposed to unilinear evolution, may be distinguished: the British, the German, and the American.

The British and German schools were at one in emphatically repudiating the likelihood of independent invention for the same cultural feature, but their schemes otherwise differed fundamentally. Characteristic of the British school were certain principles evolved by Dr. W. H. R. Rivers and applied by Prof. G. Elliot Smith and W. E. Perry to the proposition that much, nay, most of the culture hitherto ascribed to primitive peoples is neither primitive nor primeval but represents the debris of archaic Egyptian civilization, as diffused after the Sixth Dynasty. The possibility of such dissemination was considered established by Rivers's paper, *The Contact of Peoples*, in which the suggestion was thrown out that a very small number of immigrants could impress their culture upon a large native population, provided only their superiority in the arts of life were manifest. Further, the criterion formerly required as evidence of diffusion, to wit, continuous distribution, was rejected as a result of Rivers's proof that in several instances even useful arts have fallen into desuetude.

It was argued, then, that from Egypt as a centre such crafts as stone-work and pottery, such beliefs as the sun-cult and animism, and a series of other traits grouped together as "the archaic civilization," were diffused to the four corners of the globe; and that the geographical *lacunæ* in the distribution were the result of degeneration. The consistent application of these ideas led not only to such conclusions as that American Indian civilization in its higher forms was wholly an alien product engrafted upon an extremely slender stock of indigenous customs and modes of life; but even to the assertion that the totemism and magic of the Australians represented deteriorated elements of the old Egyptian complex. Rivers contented himself with laying the theoretical base for this structure and applying the principles to Oceanian developments in *The History of Melanesian Society* (1914). The emphasis upon Egypt was due to G. Elliot Smith, whose *Primitive Man* (1916), *The Evolution of the Dragon* (1919), and other essays, discussed both the psycho-

logical and the historical aspects of the problem. A complete exposition of the scheme, with special attention to America, was offered by W. E. Perry in *The Children of the Sun* (1923).

The German point of view, originally set forth in two lectures by F. Gräbner and B. Anker-mann (*Zeitschrift für Ethnologie*, 1905), and later codified in Gräbner's *Methode*, did not ascribe to Egypt nor to any other single area an absolute hegemony in cultural development. In both its original and its amended forms this theory postulated a primeval culture best represented in recent times by the Tasmanians and Pygmies. From this common starting-point evolved two (Gräbner) or three (W. Schmidt) divergent primary cultures, each displaying a characteristic combination of traits. Thus, in Father Schmidt's amended scheme as expounded by himself and his disciple, Father Koppers, in various articles of their journal *Anthropos*, and by Koppers in a book on *Die Anfänge des Menschlichen Gemeinschaftslebens* (1921), were three distinct cultural spheres (*Kulturkreise*): a horticultural one with matrilineal descent and exogamy; an industrial hunting culture with patrilineal descent, totemism, and exogamy; and a pastoral non-exogamous culture with paternal descent. All other cultures were the result of blendings of these primary cultures, and the final product of such amalgamation was the germ of higher Mediterranean civilizations. The traces of these primary cultures were diligently sought in all continents, including America, and the New World culture was traced, not indeed to Egypt, as by the British diffusionists, but to southeastern Asia.

In striking contrast to the world-spanning schemes of both the British and the Germans stood the American diffusionists. Their position was outlined in F. Boas's "The Methods of Ethnology" (*American Anthropologist*, 1920, pp. 311-320), where the work of Kroeber, Parsons and Spier in the Southwest and of Lowie on the Plains Indian age-societies was cited as representative. Contrary to the allegation of the European diffusionists, this school did not set up a Monroe Doctrine barring the occurrence of extraneous influences on the New World aborigines. On the contrary, these influences were explicitly admitted, with references to such elements as the composite bow and various mythological tales; what was denied was the necessity for evoking foreign contact to account for the development of the more complex civilizations of Peru and Mexico. Altogether, less emphasis was placed on the tracing of historical connections between remote areas, though as shown in Kroeber's *Anthropology* their demonstration was by no means eschewed on principle. The essential thing, however, was on the one hand to reconstruct the actual culture-history of a limited area by an intensive study, with a minimum of pure speculation; and, above all, the mere establishment of historical relations was considered not the be-all and end-all of research but rather a starting-point for the investigation of the psychology of diffusion, the reasons for the selection of some elements while others were spurned; in short, the dynamics of cultural change. To this important subject several interesting contributions were made. Noteworthy among them was P. Radin's essay on the spread and growth of the Peyote cult in his monograph on *The Winnebago Indians* (37th

Annual Report of the Bureau of American Ethnology).

While the stressing of this aspect of the problem was undoubtedly a striking characteristic of the American school, it would be unfair to deny that similar tendencies were discernible elsewhere. Dr. R. R. Marett, independently of any school, suggested, if he did not himself cultivate, similar lines of research in his *Psychology and Folk-Lore* (1921). Rivers, a psychologist and physiologist by early training, devoted some papers to this subject, though almost uniformly with a definite bias, i.e. in the interests of his special scheme rather than of cultural dynamics generally. F. C. Bartlett, a British psychologist, offered a book on *Psychology and Primitive Culture* (1923), in which he not only concentrated attention on the processes incident to cultural borrowing but presented for the first time the spectacle of a European writer taking adequate cognizance of American theories and facts. The logic of historical reconstruction was suggestively discussed in E. Sapir's *Time Perspective in Aboriginal American Culture* (1916) which was also noteworthy for the utilization of linguistic evidence.

One of the fields jointly cultivated by psychology and anthropology was that of racial differences. With the emphasis on the study of individual mental variability it was inevitable that the tests applied in psychological laboratories should be extended to other than Caucasian stocks for the purpose of ascertaining possible group differences. The earlier work of Rivers on Torres Straits Islanders and of Woodworth on the several distinct stocks exhibited at the St. Louis Fair failed to reveal far-reaching differences but within the decade 1914-24 the subject was vigorously attacked anew. In the United States especially the presence of a large Negro group and the influx of a new type of immigrants stimulated a scrutiny of the constituents entering into the general population, and the tests on army recruits of different extraction as reported in the *Memoirs of the National Academy of Sciences*, vol. xv (1921), were widely quoted and popularized. Characteristic of some of the work attempted was T. R. Garth's "Comparison of the Intelligence of Mexican and Mixed and Full Blood Indian Children" (*Psychological Review*, 1923, p. 388 et seq.). The author found positive differences, the mixed-bloods ranking highest, the Mexicans next, and various Indian groups following in definite tribal sequence; but he admitted his inability to control the environmental factor. Some writers, however, who did not make such reservations, sank to the level of propagandists of the lowest type, rationalizing or even glorifying their traditional prejudices. Such charlatanry is unfortunately bound to throw discredit on a perfectly legitimate branch of inquiry.

Of the sincere investigators some were predisposed to assume mental differences because the observed biological differences seemed to them necessarily correlated with those of mentality; in a very moderate form this is likewise the position of F. Boas with reference to Negroes and Caucasians. Cultural anthropologists generally did not maintain the existence of racial differences in the extreme form popular with their biologically oriented colleagues. Two positions were held. Some were impressed with the very great differences observable in grade of culture and explained them by inborn mental dif-

ferences between the bearers of these cultures; others denied that cultural differences constituted a cogent argument, since the history of the Caucasians or Nordics exhibits enormous cultural differences within a period so brief that innate variation is excluded so that environmental factors must be taken into account. The former point of view was that of C. Wissler's *Man and Culture* and R. B. Dixon's *The Racial History of Man*; the latter was advocated in A. L. Kroeber's *Anthropology* and R. H. Lowie's article on "Psychology, Anthropology and Race" (*American Anthropologist*, 1923, pp. 291-303). Kroeber and Lowie, it should be noted, did not deny racial differences but rejected the evidence formerly advanced as lacking in cogency. Lowie proposed a programme by which relatively pure anthropological groups could be isolated and studied comparatively.

In the earlier years of the decade 1914-24 anthropologists were particularly eager to assert their complete independence of psychology and to explain culture exclusively in cultural terms, while latterly more cordial relations were assumed toward the sister science by the very men who formerly spurned her services. Thus, Kroeber, who in his article on *The Super-organic* (*American Anthropologist*, 1917, pp. 163-213) tended to divorce historical from psychological inquiry, came to look toward psychology for an ultimate explanation; and a similar shifting might be demonstrated in the case of Wissler, Rivers, and Lowie. A first tentative essay toward a synthesis of psychological principles as displayed in the ethnographic field was presented by R. Thurnwald in his *Psychologie des Primitiven Menschen* (1922). In part the rapprochement was due to the influence of Freudian theories, though ethnologists generally repudiated the incursions of psychoanalysts into their own domain. Freud himself attempted to apply the principles of psychoanalysis to an interpretation of *Totem and Taboo* (1918), while his followers traced connections between primitive myth and the ideation of their mentally deranged patients. W. H. R. Rivers, himself a psychoanalytic practitioner, offered several suggestions for the elucidation of ethnological problems, as in his presidential address on *Conservatism and Plasticity* (*Folk-Lore*, 1921, pp. 10-27). Here the attitude of the individual Melanesian towards the council of elders was brought under the concept of the father-complex, which was thus made to account for the primitive tendency to conservatism, while the possibility of a change was ascribed to a transfer of regard to the representatives of an alien culture. W. Wundt's monumental *Völkerpsychologie*, while psychological in orientation, contained much of interest to anthropologists.

Anthropological research into philology was outlined in its broader psychological as well as historical aspects in E. Sapir's *Language* (1922), one of the outstanding synthetic works of the period. It presented a wholly novel scheme of classification. Primitive music was systematically studied in Germany and America. In the former country E. von Hornbostel examined the records brought by explorers from different parts of the world and was at work on a scientific method of transcription. In America, Frances Densmore published a series of tribal studies on the Ojibwa, Sioux, Shoshoneans, Mandan and Hidatsa in the *Bulletins of the Bureau of American Ethnology*, while Helen H.

Roberts advanced the subject by reviews and articles in the *Journal of American Folk-Lore* and the *American Anthropologist*. The application of exact measurements to the study of primitive art along the lines of G. T. Fechner was advocated in Lowie's *A Note on Aesthetics* (*American Anthropologist*, 1921, p. 170 et seq.); and following suggestions of F. Boas, G. A. Reichard published an essay on *The Complexity of Rhythm in Decorative Art* (*American Anthropologist*, 1922, p. 183 et seq.). P. Radin's *Literary Aspects of North American Mythology* (1915) directed attention to the purely stylistic element often neglected in the study of primitive prose literature.

The traditional views on social organization popularized by L. H. Morgan, especially regarding the question of descent, were expounded in E. S. Hartland's *Matrilineal Kinship and the Question of its Priority* (1917) and his *Primitive Society* (1921). A brief outline of the development of social life as conceived by Father Schmidt was presented in the book by Koppers cited above. A significant point of difference from the older theory lay in the idea that maternal and paternal descent belong to different lines of evolution, so that the question of their respective priority is made futile. R. H. Lowie's *Primitive Society* (1920) likewise denied the necessary priority of either maternal or paternal descent: either method was represented as growing naturally from a loose organization through the stressing of either the father's or the mother's kin as a consequence of modes of residence or of transmitting property. Another integral part of the classical doctrine attacked by Lowie related to the absence of individual property, which in one form or another was shown to exist even on the plane of the simplest peoples. Again, this author maintained against Maine and Morgan that germs of political organization appear even in very rude tribes, the blood-bond between kinsmen being supplemented by a territorial bond partly established by the clubs, fraternities, and other associations so frequently found among illiterate peoples.

Rivers's booklet on *Kinship and Social Organization* (1914), vindicated the correlation between social usage, especially marriage customs, and relationship terms. More particularly, he contended for a connection between exogamy and the classificatory system of relationship. This publication proved highly stimulating to American scholars. Lowie established the general validity of this correlation for the region north of Mexico and summarized the results in *Primitive Society*; Kroeber, E. C. Parsons, and Lowie systematically collected Southwestern kinship systems, some of which were published in Kroeber's *Zuni Kin and Clan* and several minor communications to the *American Anthropologist* by E. C. Parsons; and E. W. Gifford amassed a wealth of relevant information in California (*Californian Kinship Systems*, University of California Publications, 1922).

Totemism continued to arouse interest, and for several years Father Schmidt issued an international symposium on the subject in his journal *Anthropos*. A model study of the data within a circumscribed area was furnished by B. Ankermann in his *Verbreitung und Formen des Totemismus in Afrika* (*Zeitschrift für Ethnologie*, 1915). This work proved that in Africa the totem, irrespective of other rules of descent, is transmitted from father to child. Anker-

mann is not convinced that genuine totemism occurred in ancient Egypt. This is a conclusion of some importance, since G. Elliot Smith and Perry traced even Australian totemism to an Egyptian source. A. A. Goldenweiser did not consistently adhere to the negative attitude of his *Totemism: an Analytical Study* (1910), but later argued in several essays and in his book on *Early Civilization* (1922) for an organic union of totems and exogamy.

In the field of religion attention should be called to Hastings's completed *Encyclopædia of Religion and Ethics*. Though including much other material as well, it was of great importance in the present connection, since many articles were written by anthropologists and in some instances presented not only brief summaries by experts but even information otherwise quite inaccessible. W. D. Wallis's *Mesiasms: Christian and Pagan* (1919) contained much valuable description and duly emphasized the problem of the individual's relation to society in the religious domain. The one-volume edition of J. G. Frazer's *The Golden Bough* (1923) offered a mass of interesting raw material and also the historically important discussion of the relations between religion and magic. A general survey of modern theories of religion was presented in Goldenweiser's *Early Civilization* (1922) where such closely associated topics as primitive mentality were likewise considered. Summarizing some of the points of general interest on this subject, it may be said that G. Elliot Smith's school stood alone in tracing all religious customs and beliefs of primitive peoples, even animism, to ancient Egypt. Father Schmidt, from a comparison of the rudest tribes, inferred that Lang was right in crediting to an archaic stage a relatively pure monotheism, a theory set forth in the reviews of *Anthropos* and in Kopper's above-mentioned book.

Archbishop N. Söderblom in *Das Werden des Gottesglaubens* (1916) accepted belief in the existence of a creator on the most primitive levels, but regarded Schmidt's and Lang's description of his ethical perfection as exaggerated. He furthermore advanced the interesting theory that even more basic in religion than the idea of divinity or spirit is that of holiness, a view adopted in R. Thurnwald's *Psychologie des Primitiven Menschen*. Somewhat comparable views had been voiced by R. R. Marett in *The Threshold of Religion*. American scholars for the most part were content to give theoretical interpretations of specific aspects of religion. Thus, F. Boas in *Mythology and Folk Tales of North American Indians* (*Journal of American Folk-Lore*, 1914) discussed the relations of myth and tale; P. Radin (*ibid.*) surveyed the *Religion of the North American Indian* on its subjective side; and R. H. Lowie's *Ceremonialism in North America* (*American Anthropologist*, 1914) considered the objective side of religion and connected it with aesthetic impulses.

In the general subject of culture-history no comprehensive work appeared, but two special studies merited attention. W. Koppers gave a convenient survey of the investigations hitherto made of the economic life of savages (*Die Ethnologische Wirtschaftsforschung*, *Anthropos*, vol. x-xi, pp. 611-651 and 971-1079). In B. Laufer's *The Reindeer and its Domestication* sinological and ethnographic research were combined to determine time and place of the first

domestication of this species, which seemed to have occurred about the beginning of our era in the vicinity of Lake Baikal. For notices of other papers by Laufer of a culture-historical nature, see ETHNOGRAPHY, section Asia; also ANTHROPOLOGY.

ETTLINGER, KARL (1882-). One of the foremost humorists of Germany, born in Frankfurt. On leaving college he was successively engaged in banking and printing, and finally became editor of the magazine founded by the late Georg Hirth, *Jugend*. Among his numerous works are: *Der neue Martial* (1905); *Ovids Liebeskunst* (1905); *Das Tagebuch eines glücklich Verheirateten* (1906); *Unsere Donna* (1907); *Der neue Juvenal* (1907); *In Freiheit dressirt* (1908); *Streifzüge eines Kreuzvergnügten* (1910); *Die Hydra*, a comedy (1911); *Scherzo*, a one-act play (1913); *Mister Galgenstrick* (1915); *Aus frohem Herzen* (1915); *Benno Stehkragen* (1917); a volume of war verse, *Lieder eines Landsturmmannes* (1919); *Das Verhältniss* (1920); *Die duldsame Eva* (1921).

EUCKEN, RUDOLF CHRISTOPH (1846-). A German philosopher (see Vol. VIII). After 1914, he published *Geistige Forderungen der Gegenwart* (1918). *Der Sozialismus und seine Lebensgestaltung* (1920), and his autobiography, *Lebenserinnerungen, ein Stück deutschen Lebens* (1921). All three works were translated into English.

EUGENE, ARCHDUKE (1863-). An Austrian soldier, born in Moravia. In his earlier years he served in the army, but retired on account of ill health. At the outbreak of the War he again entered the service, and after the Austrian retreat in Serbia in 1914, was given command of a portion of the Austrian troops. After the entrance of Italy in the War, he commanded the southwestern front, and achieved great success at Isonzo and elsewhere. He retired from active service in January, 1918.

EUGENICS. The term eugenics has come into common usage and as usually understood means applied human genetics. Genetics (see HEREDITY and ZOÖLOGY) is primarily concerned with heredity as a biological phenomenon and is a true experimental science, but, since for obvious social reasons experiments in human breeding are impossible, geneticists give the problems of human heredity little attention. Several organizations and a few institutions have devoted themselves to the consideration of the results obtained by the study of heredity in general, in the effort to apply them to man, or at least to point the way to the betterment of human stock. This conception constitutes the eugenic ideal, which in its modern scientific form arose in England where Francis Galton did more than any one else to crystallize it. Himself a great student of heredity and a firm believer in man's ability to improve his own stock, he left a bequest to the University of London in 1910 for the support of a eugenics laboratory, with the objective of "a study of the agencies under human control which may improve or impair the racial faculties of future generations physically and mentally."

About the same time the Eugenics Record Office was established at Cold Spring Harbor, N. Y., and the Eugenics Education Society of England was founded under the leadership of Leonard Darwin. These initial movements led to the successive organization of societies and in-

stitutions in all English-speaking countries, as well as among the nations of western Europe. Following the War, interest was renewed in the eugenic question. The movement spread to China, Japan, and Latin America. Thus the eugenic movement became international, but even as early as 1912 an International Eugenics Congress was held in London. The War prevented a reconvening of this congress until 1921, when it assembled in New York. For this occasion many of the world's foremost biologists gathered. The scientific contributions to this congress were published in two large volumes under the title of *Eugenics in Race and State*. The congress also presented an exhibition of materials, methods, and results of research in heredity in general and the human problem in particular.

To understand the eugenic movement fully one should note the large part medicine, criminology, and education have taken in preparing its background. Medical and social students have long realized that while environment is a large factor in determining the fate of the individual, it could not do everything for him. He must bring with him a normal and efficient organism. Long ago the hereditary nature of a few types of mental and bodily inadequacy were recognized and measures taken to prevent the propagation of these abnormalities. Criminologists, running down the family histories of delinquents, revealed a greater tendency for a repetition of these offenses in their offspring than among the offspring of non-offenders. Consequently, in the United States, health boards and charity commissions began to advocate legislation for the segregation and also the sterilization of the incompetent and the delinquent. Laws were passed in 1913 authorizing the sterilization of the unfit in North Dakota, Michigan, Kansas, Oregon, Wisconsin, California, and Iowa. During the same year legislation restricting marriages was enacted in England, Spain, New Zealand, and elsewhere. In the United States, fifteen states had passed such laws by 1924, though much of this legislation was inoperative.

The greatest stimulus to the general consideration of eugenics was the Wisconsin marriage law of 1913, which required medical certification for all who applied for licenses. This brought on a nation-wide discussion and attempts at similar legislation in other States.

In the United States there are two active organizations, the Eugenics Research Association and the Eugenics Society of the United States of America. The effort of these organizations is, in the main, to stimulate research in human heredity and the effects of early surroundings. Although, as already stated, the basic conception of eugenics is the improvement of the human stock, these organizations have not only stimulated scientific research in the laws of heredity, but have taken a hand in problems of social delinquency. All organized charitable and corrective agencies now critically study their cases and are using the technique developed by the eugenicists for gathering family histories and other data bearing upon the cases of inadequacy and delinquency with which they have to deal. In this way were brought about such studies as that of the Tribe of Ishmael in Indiana, for example. The eugenicists have also stimulated the scientific study of families in the United States.

At the meeting of the International Commission in Sweden in September, 1923, representatives of England, Denmark, Norway, Sweden, Holland, Switzerland, and the United States were present. In all these countries provision was made for searching studies of the population. An understanding of the biological elements entering into national heritages was sought as a basis for a sound policy of conserving and strengthening the quality of their respective citizenries.

Sweden was the first nation to set up an institute for the study of race-biology. In 1918 the University of Upsala subsidized the research of Professor Lundborg into the lineage of peasant families, and he also received small grants from the government. Professor Lundborg's researches were so promising that the Swedish Parliament appointed a commission in 1920 to consider the needs of a national institute for the study of race-biology, which reported favorably. Consequently such an institute was founded and located at Upsala. Professor Lundborg was its director. This institute inaugurated an intensive study of the nation's population, province by province. See ABORTION.

EULENBERG, FRANZ (1867-). A German economist, born and educated in Berlin. He began teaching in Leipzig in 1899. From there he went to Aachen, and in 1919 became professor of political economy and statistics in the University of Kiel. His works include: *The Possibility and Results of a Social Psychology* (1900); *Society and Nature* (1905); *The Modern Philosophy of History* (1907); *The International Money Market* (1908); *The Rise in Prices during the Last Ten Years* (1912); *Money in War* (1915); *The New Industry* (1919), and numerous magazine articles.

EUPEN, MALMÉDY, and MORESNET. To satisfy Belgian demands for protection and for reparations, Articles 34-39 of the Treaty of Versailles provided for the cession to Belgium by Germany of the frontier districts of Eupen (area 68 square miles; population, 26,156), Malmédy (area 314 square miles, population 34,768), and the disputed neutral district of Moresnet (area 2 square miles; population, 3038), together with a small portion of Prussian Moresnet. The regions in question had undergone steady Germanization since their acquisition by Prussia in 1815, so that the end of the War saw the original Walloon population so reduced that only one-sixth of the population could speak French. In fact, in Eupen the French-speakers were insignificant, though in the town of Malmédy 94 per cent spoke French. Likewise, in Moresnet, 48 per cent of the inhabitants were French-speakers, but it is to be noted that only 2 per cent spoke French exclusively. To the Peace Commissioners, other considerations were weightier than the question of language, which made the transfer of territory justifiable. Aside from the strategic argument, it was maintained that the orientation of the districts was toward Belgium, that there were profound historical ties, and that the necessity for compensating Belgium for the forests destroyed during the War favored the decision. For this last reason, too, Germany was compelled to turn over to Belgium the domainial and communal woods of Prussian Moresnet. Germany protested that the wishes of the population had not been consulted and that the

method provided by the Treaty for ascertaining the popular will with regard to the maintenance of German sovereignty, i.e. through the signing of open registers under the surveillance of the Belgian authorities, implied a bald negation of the principle of self-determination. Subsequent events lent some color of truth to this contention, for in the six months allowed by the Treaty only a few hundred persons dared to register openly their belief that the districts ought to be returned to Germany. Belgium, therefore, took final possession, despite plainly expressed German disapproval.

EUROPE. The Great War (1914-1918) and the revolutions in Russia, Austria-Hungary, and Germany which attended it led to a profound metamorphosis in European political geography. The cataclysmic changes registered in the peace settlement of Paris (1919-1920) with subsequent modifications and supplementary arrangements, surpassed in scope and significance such stages in the evolution of the modern state-system as were signalized by the Treaties of Westphalia (1648), the Peace of Utrecht (1713-1714), and the Congress of Vienna (1814-1815). The territorial readjustments consummated during the period 1918-1924 involved directly or indirectly every state in Europe except Portugal, Spain, and Switzerland. Western Europe, where the first truly national states had emerged centuries before, where political democracy had early achieved conspicuous successes, where the main bloc of the victorious Entente Powers was situated and where political revolutions did not sweep away long established institutions, was little transformed, the most notable exceptions being Alsace-Lorraine and Ireland (q.v.). Central and Eastern Europe, on the other hand, were almost completely reorganized on a national basis and to a large extent republicanized and democratized. The three great non-nationalistic empires of Austria-Hungary, Russia, and Germany (qq.v.) were dismembered and the diminutive state of Montenegro disappeared. A solid belt of eight new national states emerged in Central Europe, viz:—Austria, Hungary, Czecho-Slovakia, Poland, Lithuania, Latvia, Estonia and Finland (qq.v.), while contemporaneously the respective national unifications of Italy, of Serbia, of Rumania, and of Greece were virtually completed and the nationalistic grievances of France and Denmark adequately redressed through the restitution of Alsace-Lorraine and Northern Schleswig (qq.v.). Such in broad outlines, was the territorial resettlement of Europe.

The age-long movement for home-rule for Ireland eventuated (1921-1922) in the establishment of a new self-governing, democratic British dominion—the Irish Free State—with a special status for six Protestant counties of Ulster under the Act of 1920. On the continent of Europe the abasement of Germany's power and prestige correspondingly exalted the democratic republic of France to a position as foremost military state. Her eastern boundary was definitely rectified through the retrocession of Alsace-Lorraine. In addition the French exercised virtual control over the inter-Allied civil commission supervising the occupation of the Left Bank of the Rhine, enjoyed a special economic status in the Saar Valley (q.v.) which was politically separated from Germany for 15 years and placed under a League of Nations Commission dominated by the French, and finally,

through the forcible seizure of the Ruhr (January, 1923), greatly though temporarily augmented the area of German territory actually controlled by France. The kingdom of Belgium was liberated from the permanent and international guaranteed neutralized status imposed upon her by the settlement of 1839. She also acquired from Germany the diminutive districts of Eupen, Malmédy and Moresnet (q.v.). An attempt to secure the annexation of the Left Bank of the Scheldt from neutral Holland failed, but in 1920 a special convention freed Belgian navigation on that waterway from onerous Dutch restrictions. By a subsequent arrangement (May, 1921) the Grand Duchy of Luxemburg though retaining political independence promised henceforth to conform its tariff, coinage, and railways to those of Belgium.

Germany emerged from the Great War and from her political revolution a democratic republican national state somewhat diminished in size and subjected to burdensome penalties by the Treaty of Versailles, but nevertheless populous and potentially strong. In addition to her loss of territory in the west to Belgium and to France, and in the north to Denmark, she was obliged to cede the greater part of Posen, West Prussia and Upper Silesia (q.v.) to Poland, to relinquish the Baltic port of Memel (q.v.) for eventual assignment to Lithuania (1923) and to consent to the internationalization of the port of Danzig (q.v.) under League of Nations auspices and the accordence of a specially privileged status therein to Poland.

Even more striking than the partial dismemberment and political regeneration of Germany was the complete disintegration of the great Dual-Monarchy of Austria-Hungary. After the revolution of 1918 and the Treaty of St. Germain of 1919 Austria constituted but a small land-locked German state on the Danube with an area of less than 33,000 square miles, whereas Hungary, by a similar process of revolution and the Treaty of Trianon of 1920, shrank to be a minor Magyar realm of some 36,000 square miles immediately to the east. The other regions in erstwhile subjection to the Habsburg sceptre were either assigned to victorious neighbors—Italy, Serbia, and Rumania—or incorporated in the newly recreated states of Poland and Czecho-Slovakia. Italy acquired Trentino, Trieste, part of Austrian Tirol (q.v.), Gorizia and Gradisca, Istria, Fiume (q.v.), Zara and certain Dalmatian Islands. Slovenia, Croatia-Slavonia, Dalmatia, Bosnia-Herzegovina, and the western Banat (q.v.), together with certain small Bulgarian districts, were united with Serbia and Montenegro under the Serbian monarch to form the unitary kingdom of Serbs, Croats, and Slovenes (Jugo-Slavia). The principality of Albania successfully asserted and maintained its independence against both Jugo-Slav and Italian encroachments, but its exact boundaries long remained undefined. In addition to slight rectifications of her boundary with Jugo-Slavia on the west, prescribed by the Treaty of Neuilly (1919), the kingdom of Bulgaria was obliged to cede a substantial portion of Thrace (q.v.) to Greece, being thereby rendered non-contiguous with the Aegean Sea. Greece not only gained Bulgarian Thrace, but also part of Turkish Thrace, Smyrna, Gallipoli, and the Dodecanese by the Sèvres settlement of 1920 only to be forced to relinquish these latter regions as a result of her military *débâcle* in the war with Tur-

key and the humiliating Treaty of Lausanne (1923) which was in no small degree responsible for her republicanization in 1924. The Turkish Empire was definitely debarred from Europe by the Treaty of Sèvres only to be nationalized, republicanized, and democratized by the regenerative movement under Mustapha Kemal Pasha and make a triumphal reëntury into the European family of nations through the reacquisition of Adrianople and Thrace by the Treaty of Lausanne (1923). To the kingdom of Rumania were annexed the eastern Banat, the whole of Transylvania and the Russian province of Besarabia (qq.v.). The ancient kingdom of Bohemia reappeared in the form of the Republic of Czecho-Slovakia in which were embraced not only Bohemia, Moravia and part of Austrian Silesia, but also the region of Slovakia and Carpathian Ruthenia long merged in the kingdom of Hungary, part of German Upper Silesia and parts of Teschen, Zips and Orava (q.v.) as shared with Poland.

Poland, grievously partitioned by powerful neighbors in the late eighteenth century, was reborn under a republican régime at the end of the Great War, thanks to the Russian Revolution and the defeat of the Central Powers. To her territorial resurrection, Germany, Austria-Hungary and Russia all made substantial contributions. The Russo-Polish frontier remained uncertain during several years of hostilities (1919-1920) but was definitely demarcated by the Treaty of Riga (1921). To the north of Poland had been established (1918-1920) a fringe of small states on Russia's western border, namely the republics of Lithuania, Latvia, Esthonia, and Finland (qq.v.). With Lithuania, Poland had a protracted dispute over the city of Vilna (q.v.) and vicinity which finally terminated in Poland's favor with the annexation of the whole southwestern half of Lithuania. Lithuania, however, successfully thwarted (1923) the Franco-Polish attempt to forestall her acquisition of the Baltic port of Memel as contemplated in the Versailles settlement with Germany. Finland, emancipated from Russia after a long struggle for autonomy and independence, was temporarily embroiled in a dispute with Sweden over the possession of the Åland islands (q.v.) in the Baltic Sea. Norway, granting independence to Iceland (q.v.) in 1918, which nevertheless retained the Norwegian king as its monarch, was compensated for this diminution of area by a treaty signed at Paris in 1920 assigning her the Arctic archipelago of Spitzbergen (q.v.), comprising some 25,000 square miles.

Russia, losing territory all along her western border, and renouncing imperialistic ambitions in Turkey, Persia, Afghanistan, and China, was gradually reconstructed by the Soviet government on the basis of a federation of autonomous Socialist republics—Ukraine, Transcaucasia, White Russia and Great Russia. See WAR IN EUROPE.

EUROPEAN CORN BORER. See ENTOMOLOGY, ECONOMIC.

EUROPEAN WAR, 1914-1918. See WAR IN EUROPE.

EVANGELICAL ASSOCIATION. See EVANGELICAL CHURCH.

EVANGELICAL CHURCH. Established Oct. 14, 1922, by union of the Evangelical Association and the United Evangelical Church. The Evangelical Association was the outgrowth

of a religious movement started in Pennsylvania in 1800 by the followers of Jacob Albright. After many years, differences arose in the church which culminated in 1891 in a division, a considerable number of ministers and members organizing themselves in 1892 into the denomination known as the United Evangelical Church. At the end of the second decade of separation the growing conviction that the two churches should be reunited began to find articulate expression. The act of merger was the consummation of 12 years of negotiation.

The Evangelical Association increased in number of communicants from 150,380 in 1914 to 167,416 at the time of merging, in number of pupils in the Sunday schools from 227,820 to 271,758, and in the valuation of its churches and parsonages from \$11,699,452 to \$16,281,011. Similarly, the membership of the United Evangelical Church was increased from 79,292 in 1914 to 92,001 at the time of merging, and the total value of church property from \$5,476,602 to \$9,515,328. In 1923 the Evangelical Church had 244,072 church members and 391,207 pupils in the Sunday schools, 2663 churches, 1878 itinerant ministers, and 562 local ministers; and church property in the United States and Canada valued at \$23,917,585. It carried on mission work in 31 States, Canada, Germany, Switzerland, Latvia, France, China, Japan, and Africa.

EVANGELICAL CHURCH, UNITED. See EVANGELICAL CHURCH.

EVANS, EDWARD RADCLIFFE GARTH RUSSELL (1881-). A British explorer (see VOL. VIII). In 1914, he commanded the *Mohawk* in the bombardment of the right wing of the German army on the Belgian coast and in 1917 took command of the *Broke*. He was awarded the Royal Humane Society's silver medal in 1921, and has been honored and decorated by many other societies. He published *Keeping the Seas Down* (1920), *South with Scott* (1921), and others.

EVANS, RUDOLPH (1878-). An American sculptor born at Washington, D. C. He studied at the Corcoran Art School, Washington, the Art Students' League, New York, Julien's Academy and the Ecole des Beaux Arts, Paris. He was a pupil of Falguière and Rodin and was elected Associate of the National Academy in 1919, when he won the Watrous gold medal. His best known sculpture is the "Golden Hour," the original of which is in F. A. Vanderlip's garden at Scarborough, N. Y., a copy in the Luxembourg Museum, and a marble replica in the Metropolitan Museum, New York. Mr. Evans has the capacity to catch in his portraits the aloofness of childhood. Besides portraits of young people, he has made monuments and portrait busts of financiers, including Frank A. Vanderlip, John D. Rockefeller, Jr., and Thomas F. Ryan. His superb "Boy and Panther" was exhibited in 1923.

EVANS, WILLIAM (1870-). An American theologian, born at Liverpool, England, and educated in private schools in England and at the Moody Bible Institute (Chicago), the Chicago Lutheran Theological Seminary, and the Theological Seminary of the University of Chicago. He was ordained in the Congregational ministry in 1894, and was appointed to his first pastorate in the following year. In 1901, he became director of the Bible course at the Moody Bible Institute, where he remained until he was

appointed associate dean (1915) of the Bible Institute in Los Angeles. He resigned this position in 1918, becoming director of Bible conferences for the United States and Canada. He is the author of: *The Book of Books* (1902); *How to Memorize* (1909); *Outline Studies in Bible Books* (1909); *Personal Soul-Winning* (1910); *Studies in the Life of the Christian* (1911); *The Great Doctrines of the Bible* (1912, 1920); *How to Prepare Sermons* (1913); *Through the Bible—Series of 10 Volumes on Bible Exposition* (1916-18; incomplete); *The Book Method of Bible Study* (1915); *Epochs in the Life of Christ* (1916); *The Shepherd's Psalm: a Meditation* (1921); *The Coming King: the World's Next Great Crisis* (1923).

EVARTS, HAL G. (1887-). An American author born at Topeka, Kan. After a varied career as rancher, trapper and licensed guide, he turned to writing. He published: *The Cross Bull* (1920); *The Bald Face* (1921); *Passing of the Old West* (1921); *The Yellow Horde* (1921); *Tumbleweeds* (1922); *Fur Sign* (1923).

EVE, ARTHUR STEWART (1862-). A Canadian physicist, born at Silsoe, Bedfordshire, England. He was educated at Cambridge, and in 1903 became Macdonald professor of physics, McGill University, Montreal, Canada. He commanded the 148th Overseas Battalion in the War, and was director of research, Admiralty Experimental Station, Harwich, 1917-18. In 1919, he became director of physics at McGill University. He has published various papers on radioactivity and ionization.

EVERWIJN, JAN CHARLES AUGUST (1873-). A Dutch diplomat born at Noorwijk, Holland. He studied law at Leiden University, and was a lawyer at The Hague (1897). Among his government posts have been: vice-president of the commission of the Netherlands, participation at the Panama-Pacific Exposition in San Francisco (1913); various economic negotiations (1914-19); president of the Netherlands Organization for the International Chamber of Commerce (1920); delegate at the Paris Conference (1920); envoy extraordinary and minister plenipotentiary from the Netherlands to the United States (1921-).

EVJEN, JOHN OLUF (1874-). An American educator, born at Ishpeming, Mich., and educated at Augsburg Seminary (Minneapolis), the University of Minnesota and the University of Leipzig. In 1903, he was ordained in the Lutheran ministry. From 1909 to 1919, he held the position of professor of theology at Augsburg Seminary and in the latter year became president of the State Normal School at Mayville, N. D. Besides contributing to periodicals and encyclopedias, both German and American, he is author of the following: *Die Staatsumwälzung in Dänemark im Jahre 1660* (1903); *Scandinavia and the Book of Concord* (1905); *En Boganmeldelse* (1910); *Et Kapitel fra Symbolforpligtelsens Historie* (1911); *Lutheran Germany and the Book of Concord* (1911); *Scandinavian Immigrants in New York, 1630-1674* (1916); *Naadegaverne og Embedet* (1920); *The Teachers' College—Its Place in the Educational System* (1920).

EVOLUTION. See ANTHROPOLOGY; BOTANY; HEREDITY; ZOÖLOGY.

EWART, JAMES COSSAR (1851-). A Scottish naturalist (see VOL. VIII). His later books include: *Domestic Sheep and Their Wild*

Ancestors (1913); *Development of the Horse* (1915); *Mounting of the King Penguin*; *Nesting Feathers of the Mallard* (1921).

EWELL, ARTHUR WOOLSEY (1873-). An American physicist (see VOL. VIII). He was appointed commanding captain of the United States Reserves on Dec. 15, 1917, and head of the bomb unit of the Air Service of the American Expeditionary Forces. After the Armistice, he was placed in charge of the experimental development and tests of bombs.

EWING, JAMES (1866-). An American pathologist (see VOL. VIII). In 1919 Dr. Ewing brought out his monumental work on tumors, entitled *Neoplastic Diseases*.

EXCESS PROFITS TAX. See **TAXATION IN THE UNITED STATES**.

EXCHANGE, FOREIGN. See **FINANCE AND BANKING**.

EXPERIMENT STATIONS, AGRICULTURAL. See **AGRICULTURAL EXPERIMENT STATIONS**.

EXPERIMENTAL PSYCHOLOGY. See **CONSCIOUSNESS AND THE UNCONSCIOUS**.

EXPLORATION. With the changed conditions which arose among the nations in 1914-24 came new methods and special aims in exploration. Apart from the enormous unvisited areas of glacier-covered Antarctica and the unknown regions of the Arctic Ocean, no lands of extent remained in 1924, and such as there were could be easily reached by airplane. Except by Americans, new exploration ceased during the War, but later it revived. With the accession of new territories by mandate, the victorious nations diligently applied themselves to ascertaining the extent and variety of natural resources suitable for exploitation. Climate, fauna, flora, minerals, and soil conditions, needed study in order to foster emigration or to increase essential raw materials. Such considerations largely controlled explorations by Europeans. American expeditions were sent forth for the increase of knowledge and the advancement of science. Institutions of learning and progressive museums applied their energies to researches to enlarge their representative exhibits and so make them more useful for scientific study and public edification. American research, especially in the later years, was engaged in the accumulation of data, archaeological and geological, which might enable scientists to write the story of prehistoric races definitely and to trace the methods of biological evolution.

Africa. See **AFRICA, Explorations**.

Asia. The most important researches were those in the Mongolian deserts, which were explored geologically, as well as with respect to geography, physiography, and palæontology. Fossil vertebrates were discovered in large numbers and varieties. Berkey stated that the geologic core of Asia is now known, and Osborn looks to the elucidation of man's origin by later research. The Swedish expedition made extensive biological explorations in Kamchatka. Stein's expeditions, 1913-16, covered large interior areas, especially along the Persian-Afghanistan border, a ruined Buddhist monastery furnishing interesting archaeological data. British explorers twice crossed the interior deserts of Arabia, and twice failed to attain the summit of Everest, and also Mt. Raeburn, the third highest peak. On Everest an elevation of 27,300 feet was reached, within 1700 of the summit; this was the highest point ever attained.

The Palestine Exploration Fund, under Macalister, continued excavation of the City of David, whose history extends back more than 2000 years. The British Archæological School excavated a Phœnician City. Italians made anthropological researches in Eritrea and among the Buddhist antiquities of Afghanistan.

Arabia. See **ARABIA, Explorations**.

Australia. Extended explorations in Western Australia threw new light on the vast areas of thousands of square miles hitherto classed as deserts incapable of economic utilization. Much of the region was said to have a fertile soil, watered by a scanty rainfall. Irrigation, conserving the rain by reservoirs, should make it a region fit for agriculture. Oil resources were indicated.

Europe. Excavations in France and Italy disclosed ancient ruins of unknown periods. Ethnographic researches were made in southern France and northern Spain. The construction of a war railway to the Murman Coast brought scientific knowledge of the hitherto unknown region of the Kola Peninsula.

North America. **Canada.** The Ministry of the Interior continued its researches into the resources of the Dominion. A water power inventory placed the resources at 32,000,000 horse power. The Arctic archipelago was explored and police, customs, and postal service established. In the Mackenzie district, bitumen, coal, copper, gold, and oil were located and exploited. National parks (one for bison) were surveyed; their total area was over 6,000,000 acres. Forest reserves cover 36,000 square miles. The movements of the magnetic north pole and correlated phenomena were scientifically determined. At the University of Toronto extended researches were carried on with the helium gas of western Alberta. See also **POLAR RESEARCH**.

United States. Scientific field research was annually pursued by scores of American universities and scientific societies. Space does not permit even brief allusion to their extensive additions to human knowledge. A few may be mentioned whose work was of international interest.

Chicago Field Museum. Under Director Davies about 30 field parties were sent forth, covering all continents except Europe. The home work in 10 States was principally botanical and zoological. Researches were made in the fauna and flora of 10 of the countries of South America, birds and mammals were particularly studied. In China and India the work covered ethnology, in Mesopotamia archæology, and in Canada and Argentina palæontology.

American Indian Heye Foundation. Its unearthing of two of the fabled Seven Cities of Cibola yielded information on prehistoric Indian life, which, preceding the Zuñi period, was thought to extend backward 1000 years.

American Museum of Natural History. Dr. Osborn continued the supervision of its research work covering most regions of the northern hemisphere. Most important were the biological surveys of eastern Asia (Burma, China, and Mongolia), and northern South America (Brazil, Chile, and Ecuador). In this work Andrews, Anthony, Chapman, Cherrie, Faunthorpe, Miller, Tate, and Vernay won distinction. Very notable and promising in its results was the discovery and exploitation of the wonderful fossil

fields of Mongolia, with their rich yield of mammals, cretaceous and tertiary fossils, etc. Akeley and Lang's African mammals were also important.

Pennsylvania University Museum. Under Gordon, its field work largely consisted of archaeological researches which met with marked success. In Egypt Fisher's excavations at Giza, Memphis, and Thebes revealed papyri and other articles of historic value. Woolley, co-operating with the British Museum in Mesopotamia, at and near Ur explored ruins extending back 6400 years; they added 1000 years to Babylonian history. Fisher's excavations at Beth Shean in Palestine disclosed eight superimposed cities, Arabic, Byzantine, Crusader, Egyptian, Grecian, Roman, and Scythian. These periods cover about 4000 years of history. Farabee's years of research in the watershed of the upper Amazon made valuable ethnological and archaeological contributions. Especially important were those relating to the Carib and other tribes along the borderland of Guiana and in Chile and southern Peru.

Carnegie Institute. This organization maintained its research activities in astronomy, chemistry, embryology, genetics, geophysics, history, and magnetism. Notable were the study of the Maya civilization and the astronomical work through the 100-inch telescope on Mt. Wilson. Most important were the survey cruises of the *Carnegie*, including coöperative work, which brought the total of magnetic stations to about 10,000 in hitherto unexplored regions. A new analysis of the earth's magnetic field for 1922 disclosed three magnetic systems, internal, external, and non-potential, the first constituting 94 per cent of the total and the last two about 3 per cent each; it also disclosed a decrease of 5 per cent, during the past 80 years, and an annual loss of one part in 1500. Continued investigations of atmospheric electricity on land and sea showed that for a large component of the daily variation the maximum and minimum occur, roughly, simultaneously. Comprehensive programmes were inaugurated for the investigation of correlations between terrestrial magnetism, atmospheric electricity, and earth currents.

National Geographic Society. Researches were extended and successful. In Peru, Bingham unearthed the lost city of Machu Picchu, of the prehistoric period. In Alaska, five expeditions under Griggs surveyed the volcanic Mt. Katmai region, devastated by the most violent eruption in modern times; it has been proclaimed a national monument. In New Mexico, Judd excavated the communal dwelling of the Bouitas, thought to be prehistoric Indian people.

Smithsonian Institution. Organized for the increase and diffusion of knowledge among men, the Institution with its eight bureaus, including the Bureau of Ethnology and the National Museum, uninterruptedly carried on extensive field work and scientific research. The Institution covered by its scientific surveys the less known regions of Africa, Asia, North America, South America, and Oceania, with the adjacent islands. Fauna, flora, archaeology and ethnology were the principal subjects, although astronomy, geology, and other physical sciences were studied. The Bureau of Ethnology largely applied its researches, with marked success, to the ethnology of the American Indian, present and prehistoric.

Oceanography. Besides currents, depths, and deposits, research turned to marine biology, especially to the breeding, growth, and migration of edible fish. The United States thus investigated its coast waters, and European scientists—British, Danish, French and Swedish—explored the North Sea, the Mediterranean, and Atlantic waters from the English Channel to Madeira. Great Britain was studying the biology of the whales, etc., of the waters of the Falkland Island Dependency. After 1914 an American ice patrol located and warned shipping of dangerous ice in the North Atlantic.

Miscellaneous. Under a tropical expert, Beebe, a biological survey was made of the Galapagos Islands.

EXPLOSIVES. Such developments of the War as the tremendous increase in the expenditure of artillery ammunition for preliminary bombardment of objectives, in barrage fire for protection of infantry waves advancing to the attack, in harassing fire directed on enemy back-areas, in counter-battery work, in putting up aerial barrages to fend off enemy airplanes, and the enormous increase in the employment of machine guns in lieu of the slower-firing shoulder rifle, all magnified the rôle of explosives. Progress in their manufacture was mainly toward quicker manufacture, greater safety in handling, storage, and transportation, slower deterioration after manufacture, and substitution of more abundant raw materials for those found to exist in quantities too small for ready conversion on a hitherto unprecedented scale.

Propellants. Smokeless powder in various forms was in universal use prior to the War, and except for the substitution of wood pulp for cotton linters in the manufacture of nitrocellulose and the development of a water-drying process which was much quicker than the former air-drying process, no outstanding improvements in its manufacture were achieved during the War.

Probably the most important development work carried on in 1924 was on a smokeless, flashless, non-hygroscopic powder. Immediately after the Armistice, demands were made for a new type of propellant powder to meet such conditions as those of the War. The particular objection to the service powder of the United States army was that it was hygroscopic and must be kept in waterproof containers up to the time of use. Another very important factor was that it was a solvent powder, requiring considerable time for drying, even making use of the so-called water-drying process developed during the War. Several experimental powders of varying composition and granulation passed satisfactory tests. In order to obtain necessary ballistic properties and yet avoid the use of solvents, nitroglycerine in very small amounts was incorporated with the other ingredients. This powder can be fired within 48 hours after manufacture but greater uniformity is obtained by allowing it to age for several days. It is completely non-hygroscopic; samples have been fired immediately after submersion in water for 24 hours.

Bursting Charges. Just prior to the War, trinitrotoluol (TNT) was considered the most satisfactory bursting charge for mobile artillery shells. Because of the scarcity of TNT during the War, a fairly satisfactory substitute was developed and used, 80% amatol, a mixture of

80 parts of ammonium nitrate and 20 parts of TNT. Small-caliber shells were filled largely with 50% amatol, but at best this was a temporary expedient; the standard practice in 1924 was to use TNT without dilution. The 80% amatol was prepared by crushing and drying ammonium nitrate, melting TNT in steam-jacketed kettles, and mixing the two components in the required proportions in a steam-jacketed mixer. The resulting product resembled soft brown sugar and might be tamped into the shell cavity by hammer and mallet or, as was done during the War, by means of the screw shell-filling machine, which consists of a hopper to hold the amatol in bulk and a sleeve containing a rotating worm. The shell to be filled was mounted horizontally on a wheel carriage placed so that the worm and sleeve entered it within a few inches of the bottom of the shell cavity. The amatol was fed into the shell by the rotating worm until the resistance to the entrance of more amatol caused the carriage and shell to back off from the hopper, when the worm was automatically stopped, since the cavity had been filled to a predetermined point. The remaining cavity left by the sleeve and worm was filled with liquid TNT except for a small cavity to take the booster. See COKE.

Ammonium picrate, called explosive D in the United States Service, is used for bursting charges of armor-piercing projectiles, since TNT is not sufficiently insensitive to shock to withstand passage through armor plate on impact without exploding. Ammonium picrate will do this and still be in condition to give effective fragmentation on perforation of heavy armor plate. In loading ammonium picrate in armor-piercing projectiles, small quantities of the crystalline explosive are given a preliminary amount of tamping in the nose of the shell, followed by hydraulically pressing successive increments as needed to fill the shell cavity completely and with proper density. The bursting charge for shrapnel continued to be black powder, according to standard practice prior to the War. The ammunition used with trench mortars developed during the War was filled with a nitrostarch explosive for the smaller calibers and either 80% or 50% amatol for the larger calibers. Hand grenades were loaded principally with nitrostarch, and rifle grenades with compressed TNT. Aircraft bombs were loaded

with 80% amatol during the War; 1924 practice was to use TNT without dilution.

Booster Charges. During the War attempts were made to load boosters with tetryl around the fuse socket, filling the remainder of the booster with TNT. This was abandoned in favor of completely filling the booster with tetryl. This practice was standard in 1924.

Detonators. In the decade 1914-24, mercury fulminate maintained its position as the premier military detonator. It is manufactured by dissolving mercury in nitric acid, pouring the solution into grain alcohol, and removing and washing the gray crystals of mercury fulminate thus precipitated. Mercury fulminate is the most sensitive, most powerful, and most expensive of military explosives. It costs more than twice as much as tetryl and about five times as much as TNT. The bursting of an artillery shell is in reality a series of explosions. On impact with the ground the firing mechanism of the fuse delivers a minute flash to the mercury fulminate detonator. It detonates and transmits the explosive wave to the tetryl of the booster charge surrounding it. The booster in turn causes the detonation of the TNT in the main bursting charge of the shell. By utilizing this step-up method, small quantities of expensive and highly sensitive explosives are used to set off successively larger quantities of less sensitive explosives. See CHEMISTRY, ORGANIC; also ORDNANCE.

EXTENSION TEACHING IN AGRICULTURE. See AGRICULTURAL EXTENSION WORK.

EYDE, SAMUEL (1866-). A famous Norwegian engineer (see VOL. VIII). He organized, in 1916, a company for the manufacture of fertilizer out of saltpetre and in 1917 founded the *Norsk Sprengstoffindustri*.

EYRE, LAURENCE (?-). An American actor and playwright born in Chester, Pa. He made his debut with the Castle stock company in Boston in 1907, played with Julia Marlowe, and also leading characters with the Ben Greet company. His best known plays include: *The Things That Count* (1914); *Saxus Matasus* (first full length play dealing entirely with Negro life, in which all the characters are colored, to be produced in America) produced at Atlantic City (1916); *Driftwood* (1917); *Mis' Nellie of N'Orleans* (1919); *Martinique* (1920). *Mis' Nelly of N'Orleans* was also produced by Dion Boucicault later in London.

F

FAESI, ROBERT (1873-). A Swiss poet, essayist and dramatist, born in Zurich. He studied at the universities of Zurich and Berlin. After some years of travel in France, Italy, Russia, and England, he returned to Zurich and published *Zürcher Idylle* (1908), *Odysseus und Nausikaa*, a tragedy (1911), and *Die offene Tür*, a comedy (1912). He wrote a volume of verse, *Aus der Brandung: Zeitgedichte aus der Schweiz* (1917), and compiled an anthology of Swiss poetry under the title *Gestalten und Wandlungen* (1920). His most important critical works are *Paul Ernst und die Neueren Bestrebungen im Drama* (1913), *Karl Spitteler* (1917), and *Rainer Maria Rilke* (1919).

FAHEY, JOHN H. (1873-). An American banker and newspaper publisher, born at Manchester, N. H. After receiving a high school education he became a reporter in Manchester. He was editor and publisher of the *Boston Traveler* 1903-10, finally becoming president of the Boston Traveler Company and of the State Publishing Company. He was also president and publisher of the *Worcester Post*. In 1919-20, he was chairman of the organizing committee of the International Chamber of Commerce, and in the following year American director of the same body. In the same period he was a member of the Senior Council of the United States Chamber of Commerce. Other offices held by him include membership in the United States section of the inter-American high commission, member of the American Chamber of Commerce in Paris, and honorary member of the Bolsa de Comercio of Buenos Aires. In 1920 he was made *Chevalier* of the French Legion of Honor and Commander of the Italian Order of the Crown.

FAHRENKROG, LUDWIG (CARL WILHELM) (1867-). A German poet-painter, born in Rendsburg. He studied at the art academies of Hamburg and Berlin and spent some years in Italy. His mural paintings soon attracted attention, among them "Youth as the Golden Age" in the Girls' High School of Barmen, a "Crucifixion" in Mulheim and a "Descent of Christ to Hell" in Kiel. He made a sensation at the Munich Exhibition of 1902 with his "Christ Preaching," in which he presented a beardless Christ, an innovation which he subsequently justified in his writings. He has since become better known as an author. His literary works are *Geschichte Meines Glaubens* (1906); the dramas *Baldur* (1908), *Wöland* (1914), *Nornegast* (1921), and *Die Godentochter* (1921); the poems *Lucifer* (1917) and *Das Goldene Tor* (1921), the latter illustrated by himself; and a history of God-lore, *Gott im Wandel der Zeiten* (1921).

F. A. I. (FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE). See **AÉRONAUTICS**.

FAILURES OF DAMS. See **DAMS**.

FAIRBANKS, CHARLES WARREN (1852-1918). An American politician, Vice President

of the United States, 1904-09 (see Vol. VIII). In 1914 he was chairman of the Indiana Republican State Convention for the third time. In 1916 he was again nominated for the Vice-Presidency by the Republican national convention but was defeated in the campaign. He died in 1918.

FAIRBANKS, DOUGLAS (1883-). An American actor, born in Denver, Colo. He first appeared on the stage in New York in 1901. On the legitimate stage he played in *Hawthorne of the U. S. A.*, *Frenzied Finance*, *All For a Girl*, *A Gentleman of Leisure*, *Henrietta*, *The Show Shop*, and others. After 1916 he headed his own motion picture productions. His chief successes include *His Majesty the American*, *When the Clouds Roll By*, *The Mollycoddle*, *The Mark of Zorro*, *The Nut*, *The Three Musketeers*, *Robin Hood*, and *The Thief of Bagdad*.

FAIRCHILD, BLAIR (1877-). An American composer, born at Belmont, Mass. Simultaneously with his academic studies at Harvard University, he took courses in composition under J. K. Paine and W. R. Spalding; later he studied piano with G. Buonamici in Florence. In deference to his father's wish he returned to America and entered business, but went to Constantinople in 1901 as a member of the American Legation and thence to Persia. Finding that Persian music interested him more than his diplomatic duties, he decided to devote himself entirely to music and went to Paris in 1903 for further study under Widor and Ganaye. His style is a combination of French impressionism and Oriental elements. Among his works are a ballet pantomime, *Dame Libellule* (Paris, 1921); the symphonic poems, *East and West*, *Zöl*, *Shah Feridoun*; a sketch for orchestra, *Tamineh*; *Légende* and *Etude Symphonique* for violin and orchestra; a violin sonata; two piano trios; a string quartet; a piano quintet; six Psalms for soloists and chorus à cappella; two fugues for organ; and many songs, almost all on Oriental themes.

FAISAL (1885-). King of Iraq, third surviving son of Hussein, King of the Hedjaz, born at Taif, Turkey. He received a modern education at Mecca and Constantinople and later took an active part in the Turkish government. On the restoration of his father to the emirate of Mecca in 1908, Faisal commanded the Arab contingent in the operations of the Turks against the Idrisi (1911-13). He was elected deputy for Jidda in the Turkish Parliament (1914), commanded the rebels at Medina in the Arab revolt against Ottoman (1916), commanded the northern forces of the Arabs (1917), and supported the Egyptian Expeditionary Force of the Allies. After the Armistice he set up a temporary government in eastern Syria and represented the Arabian cause at the Paris Peace Conference (1919). In March of the following year, he was proclaimed King of Syria by the Syrian national government, but the plan was overturned by the entry of the French troops into Damascus. The British government recog-

nized him as King of Iraq and head of the new state under its mandate of August, 1921. See MESOPOTAMIA.

FALKENHAYN, ERICH VON (1853-). A Prussian general, born at Burg Belchau, in Thorn. He entered the army in his youth, and became military attaché to the legation at Paris in 1887. In 1889 he acted as military instructor and favorite of the Crown Prince of Germany and Prince Eitel Friedrich. He served in China during the Boxer Rebellion. He was promoted to lieutenant-general and was made Prussian Minister of War in 1913. In 1914 he became chief of the general staff of the army, and later general of the infantry. He upheld the officers whose conduct in Alsace resulted in the Zabern disorders. He received the credit for the breaking through of the Russian lines at Gorlice-Tarnow in 1915, and also planned the successful Russian and Serbian campaigns of the same year. The unsuccessful attack at Verdun of 1916 caused his removal as chief of the general staff, Hindenburg taking his place. He was given the leadership of the Ninth army in its fighting at Hermannstadt, and in 1917 of the Asiatic Corps. In 1918 and 1919 the Tenth army was commanded by him. He wrote: *Die oberste Heeresleitung in ihren wichtigsten Entschliessungen 1914-16* (1919), giving an account of the German conduct of the War.

FALKLAND ISLANDS, DEPENDENCY OF. The creation of this dependency completed, in the western hemisphere, the accession of Antarctic regions initiated by Great Britain a century before. In 1832, she took possession of the Falkland Islands to protect her interests in the southern fisheries. By proclamation of July, 1908, this dependency was created as a distinct entity. It includes all lands and inclosed seas of that region southward from the Falkland Islands to the Antarctic Pole. In its limits are Caird, Coates and Leopold coasts, Graham Land, the Sandwich group, South Georgia, the South Orkneys and the South Shetlands. Argentina occupies its meteorological station on the South Orkneys by British permit, and the use of land stations for fisheries is possible only under licenses. The whale fishery of these seas is the most extensive in the world, and the catch of 1920-21 produced 435,000 barrels of oil, mostly taken by Norwegians. The British government began in 1923 an economic study of the food supply, habits, migration, etc., of the whales, and of other productive marine life in these waters. See ROSS DEPENDENCY.

FALL, ALBERT BACON (1861-). An American public official (see VOL. VIII). He was reelected to the United States Senate for the term 1919-25, but resigned in 1921 to become Secretary of the Interior at the request of President Harding. In June, 1921, the naval oil reserves were transferred to the Department of the Interior, and in 1922 Secretary Fall signed a long pending lease of the Teapot Dome oil district in Wyoming to the Sinclair oil interests, and also a lease of the reserves in California to E. M. Doheny, an oil magnate. Only about one-third of the oil was held for use of the navy. Later Fall resigned his secretaryship. In 1924 an investigation was begun by the Public Lands Committee of the Senate, and Fall appeared before a subcommittee and denied that he had received any money from Sinclair or Doheny, but on January 24, Doheny testified before the Committee that he had "lent" Fall

\$100,000 without security or interest. On July 15 he was indicted on three counts, the first and third relating to the alleged \$100,000 payment, the second charging conspiracy with Harry F. Sinclair in regard to the Wyoming or Teapot Dome leases, and entering into contracts without bids.

FALLA, MANUEL DE (1876-). A Spanish composer, born at Cadiz. He studied at the Madrid Conservatory under Tragó (piano) and Pedrell (composition), and while still a student wrote several zarzuelas which he offered to the managers in vain. Unable to obtain a hearing in his native land, he went to Paris in 1907, where, after some hard years, Debussy and Dukas became interested in him. After his first opera, *La Vida Breve*, written in 1904, had been successful in Nice (1913) and Paris (1914), it was brought out in several cities of Spain and won recognition for the composer. De Falla then settled in Granada. Although not a prolific writer, he is the acknowledged leader of Spanish futurists. His other works are the ballets, *El Amor Brujo* (Madrid, 1915), *El Sombrero de Tres Picos* (London, 1919), and *El Retablo del Maese Pedro* (Madrid, 1923); three pieces for orchestra, *Noches en los Jardines de España*, *En el Generalife*, and *Danza Lejana*; and piano pieces and songs.

FALL RIVER. A port of entry of Massachusetts, and the largest cotton manufacturing centre of the United States. The population rose from 119,295 in 1910 to 120,485 in 1920, to 120,912 by estimate of the Bureau of the Census for 1923, and to 130,800 by local estimate for 1924. The city in 1923 adopted the report of the city-planning board issued on its survey of the city begun in 1920. The number of persons employed in the cotton mills of the city increased from 35,000 in 1914 to approximately 40,000 in 1924, and the investment from \$34,000,000 to \$100,000,000. The largest fuel-oil refinery in New England, of 1,000,000 barrels monthly capacity, was built in 1922; in 1924, the first unit was begun of a power plant that would ultimately produce 275,000 horse power.

FARABEE, WILLIAM CURTIS (1865-). An American anthropologist who was born in Washington, Pa. He was in charge of the de Milhaud Harvard expedition, 1913-16, and curator of the Museum of Philadelphia. Besides his numerous contributions to anthropological and geographical magazines, he published *The Central Arawaks* (1918).

FAR EASTERN REPUBLIC. See SIBERIA AND FAR EASTERN REPUBLIC; RUSSIA; JAPAN.

FARMAN, HENRI (1874-). A French designer of aircraft who was the first man in Europe to accomplish a flight of a mile. He is best known for his inventions based on the Voisin machine from which he evolved the airplane bearing his name. He followed the lines of the Voisin type fairly closely but altered the controls and the design of the undercarriage. He reduced the weight and supporting area. This machine was prominent in the famous London to Manchester flight.

FARM BUREAUS. See AGRICULTURAL EXTENSION WORK.

FARM COÖPERATION. See AGRICULTURAL CREDIT.

FARMING. See AGRICULTURE.

FARM INSTITUTES. See AGRICULTURAL EDUCATION.

FARM TRACTOR. The tractor is a mechanically propelled prime mover having as its source of self-contained power usually either a steam or internal-combustion engine. The significance of the tractor in agriculture is its utility as a source of tractive energy for field and hauling operations and as a source of belt power for stationary mechanical farm operations. The earlier tractors were large, heavy, and powerful machines actuated by steam engines. They were used almost exclusively for heavy hauling, heavy drawbar work such as the pulling of very large gang plows in the breaking of virgin prairie lands on a large scale, and for heavy farm belt work such as the operation of threshers, usually on custom work. Steam tractors are still used in agriculture occasionally for operations requiring higher power. They are also used, particularly in Europe, for the operation of cable-drawn plowing and cultivating outfits. In this the tractor itself is stationary and actuates a drum and cable which draws the plowing and cultivating apparatus back and forth across the field. Such outfits are especially adapted to swampy or other soil conditions which will not permit the operation of a heavy tractor in direct traction and where cultivation is necessary for the production of crops.

The internal-combustion engine tractor is a more recent development and has now largely supplanted the steam tractor for use in agriculture. There are a large number of types and sizes of internal-combustion engine tractors. In a broad general way this variation corresponds to distinct types of agricultural service. For example, the small garden tractor weighing about 500 pounds rated at 1.25-4 horse power, is adapted only to certain light garden drawbar operations and belt operations requiring a low maximum power. On the other hand, the extremely large tractor weighing 30,000 pounds rated at 70-120 horse power, is adapted only to the heaviest of drawbar and belt operations. A great variety of types and sizes of tractors exists between these two extremes. When it is considered that in 1922 there were over 300 different types and sizes on the market, it would seem that the variation is due much more to lack of standardization than to the variation in the requirements of agricultural processes.

As a rule, the general characteristics of a tractor for agricultural use are governed largely by the number and size of plows it can pull through average soil at an average depth and speed. While tractors are designed and built to run at speeds varying up to five miles or more per hour on actual drawbar work, a plowing speed of about $2\frac{1}{2}$ miles per hour for tractors of 15 drawbar horse power or less is generally considered to be the most efficient speed under average conditions. Small plats usually require only a small garden tractor of 1.25-4 horse power which will pull a 12-inch plow. Truck farming will require a tractor capable of pulling one 14-inch plow. Farms up to 160 acres in size will require a tractor capable of pulling at least two plows, while large farms of 300 acres or more will require a tractor capable of pulling three or more plows. As a very general average, and depending upon the soil, about eight drawbar horse power are required to pull two 12-inch plows, 10 horse power for two 14-inch plows, 15 to 20 horse power for three to five 14-inch plows, 22 to 30 horse power for five or six 14-inch plows, and 30 to 45 horse

power for from six to twelve 14-inch plows. It is to be noted that there is a wide variety of tractors to choose from when from 12 to 20 drawbar horse power are required.

The propulsion requirements in drawbar work govern the characteristics of the driving mechanism and ground-gripping devices of tractors. Tractors divide, broadly, into wheel and crawler or self-tracklaying types. In the wheel type tractor, propulsion results from the action of two large drive wheels equipped with ground-gripping lugs and actuated by means of the engine through the medium of gears, clutches, and shafts. The majority of wheel tractors are steered with ordinary steering gear attached to two wheels independent of the drive wheels, although in some special types steering is done with the drive wheels. The majority of tractors are of the wheel type. Experience has shown that the drawbar requirements of most farms with favorable conditions of soil and topography can be more effectively and economically met with wheel tractors than with crawler tractors, especially where the light or medium weight tractor is required. Considerable experience and care are necessary in the operation of wheel tractors, especially when drawing cultivating machinery, since the sudden and severe resistances occurring in cultivation emphasize the rotating tendency of the tractor around its drive wheel axles and frequently result in accidents and damage.

The crawler or tracklaying tractor is adapted especially for conditions where drawbar work is very heavy or where soil and topographic conditions will not permit the operation of a wheel tractor. Such a tractor consists of an engine and frame mounted on and propelled by a combination of large geared wheels and very broad, heavy endless chains. The power for propulsion is transmitted from the engine to the large gear wheels over which the endless chain passes, laying several links at a time on the ground as the tractor proceeds. These chains are wide and large enough so that the weight of the tractor is distributed over quite a broad area, resulting in a very low pressure on the soil per unit area. This permits the crawler tractor to operate with ease over soil in which a wheel tractor would sink. Since the chain tread extends the entire length of the tractor and on both sides thereof, the frictional contact of the soil-gripping devices is relatively very great and its propulsive energy is at a maximum. The crawler tractor is thus a very powerful unit. In addition, the large area of contact of the treads with the soil permits operation over ditches and land with rough topography. The crawler tractor has been found well adapted to the breaking of virgin swamp and cut-over lands in the United States and to rice land cultivation, especially in India. Owing to its rather limited practical agricultural utility as compared to wheel tractors, the crawler is usually a heavy, high-powered unit of relatively high cost.

About the hardest agricultural belt work for which a tractor is adapted is operating the thresher. Such work will require from 10 to 80 horse power, varying with the type of machine and grain, but under most conditions the threshing of wheat and oats will require only from 20 to 30 belt horse power. Other of the larger belt power applications of the tractor are corn husking and shredding, hay baling, ensilage

cutting and blowing, corn shelling and feed grinding, all of which usually require less power than threshing. While there is considerable controversy as to the extent of the actual utility of the tractor in agriculture, obviously it has become a factor of considerable importance in farming operations. Its capability of performing timely field operations quickly and on a large scale was officially recognized by the French, British, and Italian governments in their efforts to increase food production during the War. It was extensively used in the United States for belt and drawbar operations on farms even prior to 1917. As evidence of the continued and increased belief in its utility on farms, especially under conditions where timeliness in the performance of belt and field operations is an important factor, a conservative estimate indicates that there were approximately 325,000 internal-combustion tractors on farms in the United States on Jan. 1, 1923, and approximately 400,000 on Jan. 1, 1924, representing an actual increase of 100,000 and a discard of 25,000 in one year. The conditions and requirements of service for different localities and types of farming are so variable as to make it difficult to estimate the average life of a tractor with any accuracy. An estimate of from five to seven years would probably be sufficiently conservative for the majority of conditions of normal service.

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FARRAND, LIVINGSTON (1867-). An American educator. In 1914 he became president of the University of Colorado, and held that position until 1919. During the War he was director in France of the International Health Board, in 1917-18, and from 1919 to 1921 was chairman of the Central Committee of the American Red Cross. In the latter year he was chosen president of Cornell University. He contributed many articles to psychological and anthropological publications.

FARRAND, MAX (1869-). An American university professor (see Vol. VIII). He published *Development of the United States* (1918) and *Fathers of the Constitution* (1921).

FARRAR, GERALDINE (1882-). An American dramatic soprano (see Vol. VIII). At the height of her artistic powers she retired from the operatic stage, appearing for the last time at the Metropolitan Opera House as Zaza, in Leoncavallo's opera, on Apr. 22, 1922. After the fall of the curtain, scenes of wild enthusiasm were enacted inside the house and on the street. For 16 consecutive seasons she had been one of the most popular artists of the company. Since the sensational success of her film production of *Carmen*, in 1915, she has been in-

creasingly active in this field. In 1916 she published an autobiography, *Geraldine Farrar* (Boston).

FARRÈRE, CLAUDE. Pseudonym of CHARLES BARGONE (q.v.)

FARWELL, ARTHUR (1872-). An American composer, born at St. Paul. He studied with Norris in Boston, Humperdinck in Berlin, and Guilmant in Paris. From 1910 to 1913 he was director of municipal concerts in New York City, and from 1915 to 1918, director of the Music School Settlement there. He then moved to Pasadena, where he devoted much time to community music. He was always deeply interested in the music of the American Indians and at various times visited Indian reservations. In 1901 he established at Newton Centre, Mass., the Wa-Wan Press for the publication of American works, especially those based on Indian themes. He was the first recipient of the Composers' Fellowship awarded by the Pasadena Music and Art Association (1921). In his compositions he employs chiefly Indian themes. He published collections of Indian melodies and folk-songs of the South and West and was known as a writer on his subject, particularly through his former associate editorship of *Musical America*.

FASCISM. Fascism (Italian, *fascismo*) denotes an ultranationalistic regenerative movement which played a prominent rôle in the post-bellum development of Italy, 1919-24, and which spread to Spain, Bavaria, and other countries. The central impulse of Fascism was nationalism, an ideal generating in turn the determination to extricate Italy from chaos, to give her moral unity, to make her a new state, and to make it an axiom and a creed with every one that all social progress must be through and by the nation. Fascism came into power with dramatic suddenness, a movement of emotion and action fusing together in the crucible of patriotism the most diverse elements of Italian society: soldiers back from the trenches, business men, peasants, and proletarians. The first groups of Fascisti were formed in March, 1919, at the very moment when Italy's nationalist claims to Fiume were being disputed at Paris, while within Italy communist agitators were boldly preaching not only social revolution but also antimilitarism and pacifism. The two-fold aim of the original Fascisti was to suppress communism and exalt patriotism. Taking their name from the Latin *fascēs*, the bundle of rods wrapped round an ax to indicate power to punish offenders, the Fascisti assumed the right to enforce order by using violence against socialists and pacifists. Unlike members of the American Ku Klux Klan, the Fascisti did not conceal their identity; but like the Klan, they appreciated the emotional appeal of uniforms, organization, and sonorously titled officers. Each active member of the Fascist organization wore a black shirt, oftentimes decorated with war medals; for many had fought with distinction in the War. The organization was very elaborate, modeled on the ancient Roman imperial army. Strict discipline bound rank and file to obedience. And at the head of the movement was the forceful Benito Mussolini, a blacksmith's son, once a socialist, and later editor of the patriotic *Popolo d'Italia*.

During the early stages of the movement, two phases of activity were most notable. First and foremost, the Fascisti, as has been said,

were patriots, superpatriots, and they expressed their loyalty to Italy by forcibly suppressing pacifist demonstrations, by conducting propaganda in favor of Italy's most extreme territorial claims, to the Tirol, Istria, Fiume, Dalmatia, Albania, etc.; and by inculcating a spirit of devotion, almost of worship, toward the national state. One very significant manifestation of this nationalist devotion was the scorching criticism which the Fascisti heaped on the "outworn and incapable governments which had become a menace to the development of Italy and under whose rule the authority of the state had fallen into decadence and decay." Fascist writers and speakers, with this phase of their movement in mind, often described Fascism as a "spiritual revolt." Secondly, Fascism was anti-communist. From 1919 to 1922 it waged a sort of guerrilla warfare against socialism in Italy; Fascisti roughly dispersed Socialist party meetings, raided Socialist printing offices and headquarters, and administered novel and ingenious forms of physical punishment to leading Communists. Further, it organized labor unions of its own, found work for the unemployed with Fascist capitalists, and thanks to its success in these directions, soon began to accept the affiliation of unions which deserted socialism. To prevent the landless peasants of southern Italy and Sicily from joining forces with the social revolution, the Fascisti took it on themselves in many localities to cut the Gordian knot of the agrarian problem by compelling landlords to subdivide and sell their estates, or by persuading friendly landowners to offer small plots for sale to peasants. So effective were these measures that communism in Italy was, if not annihilated, at least compelled to work underground, and even the more moderate political socialism was reduced to impotence. By 1921, Fascism, in the words of Mussolini himself, was no longer "liberation but tyranny; no longer the safeguard of the nation, but the upholding of private interests and of the most grovelling and unenlightened classes existing in Italy." Cesare Rossi, one of Mussolini's chief lieutenants, likewise said, "Fascism has become, in truth, an entirely conservative and reactionary movement. . . . *It reacts with foolish and purposeless cruelty against everything that tells of progress in the life of to-day.* . . . That very character of petty, overbearing tyranny, of which we used to accuse the Socialist party in the days . . . of their supremacy, has now been transferred to the very heart of the Fascist movement."

As the organization became more powerful, it entered its political phase. Indeed, now that it embraced workingmen and peasants as well as bourgeois and militarists, it could no longer pursue a clear-cut policy in economic matters, nor could it survive permanently by merely talking about patriotism. Political action was a necessity as well as a logical consummation of the order's career. Gradually the Fascisti gained control of many municipalities, using violence where votes would not avail. Then their leaders looked to Rome. Mussolini grew more insistent in his declarations that the existing parliamentary government, headed by a vacillating coalition cabinet, was unrepresentative and unworthy of Italy. Soon he had the temerity to demand for himself and his followers places in the cabinet. Meeting refusal, he became but more ambitious. In October, 1922,

he compelled the Ministry to resign and installed a Fascist cabinet. See ITALY, *History*.

The Fascisti preserved their organization as a sort of unofficial militia on which Mussolini could, if need be, rely; at the same time they constituted themselves a political party for parliamentary and electioneering purposes. Though he had denounced the inefficiency and unrepresentative character of parliamentary government, Mussolini utilized Parliament to carry out his own policies, and after he had won a sweeping electoral victory, his administration became in form at least a responsible government, like its despised predecessors. One marked difference characterizing Fascist rule, however, was the fact that force was relied on as an expedient to be employed if democracy failed. "I declare," said Mussolini in 1923, "that my desire is to govern, if possible, with the consent of the majority, but in order to obtain, to foster, and to strengthen that consent, I will use all the force at my disposal." All else failing, "there is always force." This was the aspect of Fascism that appealed so strongly to ambitious leaders in Spain, Bavaria, Bulgaria, Mexico, and many another country: if votes fail, there is always violence.

In economic policy since 1922, the Fascists emphasized chiefly the reform of governmental finance. In reducing expenditures, to balance the budget, they performed fiscal miracles. For labor, they enacted an eight-hour day law and a collective agreements law designed to promote collective bargaining between organized labor and organized capital. This was their substitute, in practice, for the state socialism, the syndicalism, or the communism which radical workers had desired. State monopolies, such as telephone service, matches, etc., were handed over to private companies, in accordance with the Fascist principle of maintaining private enterprise and combating state socialism. In religion, the Fascisti, in power, were partisans of reconciliation between Catholic and non-Catholic; they restored compulsory religious instruction; and they endeavored to establish more cordial relations with the Vatican—all for the sake of that national unity which, to their way of thinking, should transcend all else. This brings us, finally, to the patriotic or nationalist aspect. In keeping with its ardent nationalism, Fascism insisted on improvement of military, naval, and, above all, air forces; it revived interest in the colonies; it persistently cherished irredentist hopes for Fiume until in 1924 Mussolini was able to obtain the coveted city; it was ready to burst into hot flames of chauvinist emotion at any slight to national honor. Such a force, as the Corfu incident only too clearly showed, could be a peril to European peace as well as a temptation to aggression. See ITALY.

FATIGUE. See PSYCHOLOGY, ABNORMAL.

FAULHABER, MICHAEL VON (1869-). A bishop of Munich, born at Heidenfeld. He took his degree at the University of Würzburg and spent some years in Rome. He is the author of works of timely import, among them *Petrus Stirbt Nicht* (1903); *Die Vesperpsalmen* (1906); *Schule und Religion* (1907); *Priester und Volk* (1911); *Hirtenbriefe* (1912); *Charakterbilder aus der Biblischen Frauenwelt* (1920); *Die Freiheit der Kirche* (1913); *Waffen des Lichtes* (1918); *Das Schwert der Geister* (1918); *Trennung von Kirche und Staat*

(1919); *Zeitfragen und Zeitaufgaben* (1920); and *Das Papsttum in Unserer Demokratischen Zeit* (1920).

FAULKNER, JOHN ALFRED (1857-). An American church historian (see Vol. VIII). He published *Wesley as Sociologist, Theologian, Churchman* (1918), *Value of Study of Church History* (1920), and *Modernism and the Christian Faith* (1921).

FAY, ALBERT HILL (1871-). An American mining engineer, born in Appleton City, Mo. He graduated from the Missouri School of Mines in 1902 and took post-graduate courses at Columbia. He was in charge of mining operations in Mexico, Alaska and Tennessee until 1908, when he joined the editorial staff of the *Engineering and Mining Journal*. He served with the Bureau of Mines from 1911 to 1920, and from the latter date was valuation engineer with the Internal Revenue Bureau. From 1921 he was also head of the natural resources division of that bureau. He wrote *Coal Mine Fatalities in the United States, 1870 to 1916* (1916); *Glossary of the Mining and Mineral Industry* (1920). He also wrote numerous technical bulletins.

FAY, HENRY (1868-). An American chemist, born in Williamsport, Pa. He graduated from Lafayette College in 1889 and took post-graduate courses at Johns Hopkins. He was instructor at that university from 1893 to 1895, and from the latter date to 1920 was a member of the faculty of the Massachusetts Institute of Technology, becoming professor of analytical chemistry and metallography in 1920. He was also consulting chemist for several large corporations and was lecturer at the United States Military Academy and the United States Naval Academy. He wrote *Microscopic Examination of Steel*, 1917, and contributed articles on chemistry and metallography to various journals.

FAYANT, FRANK H. (1876-). An American publicist, born at Fort Plain, N. Y., and educated at Cornell University. He worked on various newspapers from 1895 to 1900, acting as war correspondent for the *New York Sun* in the West Indies from 1898 to 1900. In the latter year he was London correspondent for the *New York Herald* and served other American magazines and journals until 1911, when he became a member of the editorial staff of the banking and currency reform campaign. He served during the World War in various important capacities and is author of *Fools and Their Money* (1907), *Government and the Railroads* (1919), *To Increase Railroad Efficiency* (1922), and other works.

FAYOLLE, MARIE EMILE (1852-). A French soldier. He was educated at the Superior School of War and for several years served as instructor at that institution. In 1903 he was promoted lieutenant-colonel and became general in 1910. In 1914 he commanded the artillery brigade of Vincennes, and in the same year was made commander of the 70th Division of Infantry. In the year following he was made commander of the 33d Army Corps, and later of the 6th French Army. He was given command of the French forces in Italy in December, 1917. He greatly distinguished himself in the first French offensive in Lorraine, in 1914, by energetic action which held up the German advance. He also performed important service in the battles of Arras. His name is chiefly connected,

however, with the battle of Somme, in 1915. Here he commanded the 4th French Army. In 1918 he was given command of a group of armies which included a part of the American Expeditionary Force. His efforts in withstanding the movements of the Germans at Amiens in 1918 were especially effective. In 1920 he visited the United States as a representative of General Foch at the convention of the American Legion.

FAZY, HENRI (1842-1920). A Swiss Radical statesman and historian, born at Berne. He studied philosophy and law at Geneva; in 1860, he became a member of the cantonal parliament, and in 1897, a member for the remainder of his life of the cantonal executive. Like his great-uncle, James Fazy, he played a prominent part in Radical politics at Geneva. His proposal to separate the Church and State was not accepted by the Swiss until 1907. He was a member of the Swiss National Council (1896-99, 1902-20), archivist of Geneva, and professor of Swiss history at the University of Geneva (1896-99, 1902-20). Although the Radicals were completely defeated in the election of 1918, he still held his office. His *Life of James Fazy* appeared in 1890, works on the Swiss Government shortly afterward, *Histoire de Genève à l'Epoque de l'Escalade, 1589-1601* (1902), and *Genève et Charles Emmanuel* (1909).

FECHTER, PAUL (1880-). A German editor and art critic. He has been literary and dramatic editor of the *Dresdener Neueste Nachrichten*, the *Vossische Zeitung*, and other prominent papers, and is the author of *Der Expressionismus* (1914), *Frank Wedekind* (1920), *Das Graphische Werk Max Pechsteins* (1920), *Die Tragödie der Architektur* (1921), and other works.

FEDERAL AID ROAD ACT. See **ROADS AND PAVEMENTS.**

FEDERAL COUNCIL OF THE CHURCHES OF CHRIST IN AMERICA. Founded in 1908 by the official action of 30 Protestant denominations in the United States to represent them and act for them in matters of common interest. No control was exercised over the churches; rather it was their own agency for coöperation and common expression, directed and controlled by their representatives. Four hundred members elected by the denominational assemblies compose the quadrennial Council, which met in 1916 and 1920 and was scheduled to meet in December, 1924. The executive committee met annually; the administrative committee, monthly.

The activities of the Council during the years between 1914 and 1924 were varied and were carried on through numerous commissions. The commission on international justice and goodwill was especially active. It rendered effective service in European relief movements and for several years was of assistance to the Near East Relief. A committee on mercy and relief was appointed, through which, in the summer of 1922, a representative of the Council was sent to Russia to distribute relief, especially to the destitute among the clergy of the Russian church and their dependents; in 1924 it carried on a church campaign for the relief of German children. Through its committee on relations with the Orient a representative of the missionaries of Japan toured the United States in 1924 in the interest of good feeling between this country and the eastern races; in return a Christian embassy was sent to Japan

the following year. This Committee made investigations on the Pacific coast of the Japanese problem in the United States and in 1919 started a movement to urge Congress to introduce an amendment to the Constitution admitting to citizenship in the United States Chinese and Japanese already in this country, but at the same time in no way affecting the Chinese Exclusion Act and other immigration laws. In 1922-23 a special commissioner was in the Orient in the interest of furthering a better understanding between the eastern and western worlds.

The commission on international justice and goodwill also, when the Disarmament Conference was assembled at Washington, worked through the churches to influence public opinion in favor of its proposals. On the successful completion of the treaties on disarmament it continued its activities unabated to secure the participation of the United States in permanent organized cooperation for world peace and human welfare. During 1924 it concentrated attention on the entrance of the United States into the Permanent Court of International Justice.

In May, 1917, the Federal Council held a special meeting to consider the problems of the churches arising from the entrance of the United States into the War. There was organized, to coordinate the work of the denominations in behalf of the soldiers and sailors, the general war-time commission of the churches. It also worked with the various relief agencies in Europe. On its dissolution in 1919 it appointed a committee on the War and the religious outlook, made up of a few representatives of the larger churches, to study the state of religion as revealed or affected by the War. It issued several volumes setting forth the results of its findings, including *The Church and Industrial Reconstruction and Christian Unity: Its Principles and Possibilities*.

Other commissions took up the relief and reconstruction work of the Council in Europe after the close of the War, assisted the churches in the devastated countries, and were active in initiating and preparing the way for a universal conference of the Church of Christ on life and work, to be held in 1925 for the purpose of considering how the churches of the world can bring about a fuller application of the Christian gospel to modern life.

The commission on the church and social service was actively engaged in efforts to improve industrial relations and promote the intelligent cooperation of the churches in community service and in support of such social movements as prison reform and the abolition of child labor. Many of the contacts for this work were formed during the War when the commission cooperated with the Red Cross in army and navy centres, industrial centres, and Negro communities.

The department of research and education devoted itself chiefly to bringing together and interpreting social data made available by various research organizations in so far as they bore on the work of organized religion. Certain original studies were made, as in the case of industrial disputes where the human factors were an important element in the situation. The department issued a weekly information service and occasional bulletins on particular subjects; for example, wages, hours of

work etc. It maintained, jointly with the National Catholic Welfare Council and the Central Conference of American Rabbis, a conference on economic factors in international relations which in 1924 was preparing educational material for the churches on the economic basis underlying hostile relations between governments.

In 1918 the Council introduced carefully prepared lessons in international peace into the Sunday schools and also took up the matter of religious instruction in cooperation with the public schools. It developed cooperation between the various denominational commissions on evangelism, making available for all those methods which each had found most successful; carried on temperance education, through prohibition pamphlets and motion pictures; and made a survey of religious conditions in rural communities throughout Ohio.

The committee on the church and race relations was organized in 1921 to bring about fuller cooperation between whites and Negroes. There were also permanent committees on army and navy chaplains, on religious work in the Canal Zone, on the interchange of preachers and speakers between the churches of America, Great Britain and France, and an editorial council of the religious press. The publicity department issued the bi-monthly *Federal Council Bulletin*. The presidents of the Council during the period were Dean Shailer Mathews, 1912-16; the Rev. Frank Mason North, 1916-20; and Dr. Robert E. Speer, 1920-24.

FEDERAL FARM LOAN ACT. See AGRICULTURAL CREDIT.

FEDERAL HORTICULTURAL BOARD. See HORTICULTURE.

FEDERAL LAND BANKS. See AGRICULTURAL CREDIT.

FEDERAL POWER COMMISSION. See WATER POWER.

FEDERAL RESERVE BANKING SYSTEM. See FINANCE AND BANKING; AGRICULTURAL CREDIT; UNITED STATES, *History*.

FEDERAL TERRITORY. A territory of the Australian commonwealth lying within the state of New South Wales. Area, 940 square miles; population in 1911, 1714; in 1922, 2592. The site for a Federal capital and a port was acquired from New South Wales in 1909 and work was begun in 1913 on the construction of the commonwealth's capital city. An additional area of 28 miles at Jervis Bay was added for the purpose of establishing a naval college. Progress on the work was seriously retarded during the War. By 1922, upwards of \$5,000,000 had been spent.

FEDERAL TRADE COMMISSION. See TRUSTS.

FEDERAL WATER POWER ACT. See WATER POWER.

FÉDÉRATION INTERALLIÉE DES ANCIENS COMBATTANTS. See LEGION, AMERICAN.

FEDERATION OF LABOR, AMERICAN. See LABOR, AMERICAN FEDERATION OF.

FEDERN, KARL (1868-). An Austrian critic, translator, and authority on Dante. He was born in Vienna. He studied law at the University of Vienna and practiced it before he turned to literature. He traveled in Italy, England, and France and has written on a great variety of subjects. His earliest works, including *Gedichte* (1893) and *König Philipps Frau-*

en (1894) were poetical, but he soon abandoned verse for prose. His book on the *Vita Nuova*, *Das Neue Leben des Dante Alighieri* (1897), was the forerunner of his *Dante*, a biography (1900), which has been translated into other languages. Two noteworthy books of essays are *Essays zur Amerikanischen Litteratur* (1899) and *Essays zur Vergleichenden Litteraturgeschichte* (1904). Other works are *Frauenrecht und Logik* (1904) and the book in which he branded the attitude of Italian judges toward women, *Der Prozes Bonmartini-Murri* (1906), translated into Italian and French. He also wrote some fiction, *Zwei Novellen* (1899), *Rosa Maria* (1901), and *Die Flamme des Lebens* (1906), and edited a collection of the world's fiction, *Hundert Novellen* (1912-13). As a student of seventeenth-century France he wrote *Der Chevalier Grammont* (1910) and *Schriften und Briefe des Herrn St. Evremond* (1912). To the literature of the War he contributed *Die Politik der Dreieverbündeten* (1915). He has translated Emerson, Edward Carpenter, Mesnil, Whitman, Croce, and others.

FELAND, LOGAN (1869-). An American soldier, born in Hopkinsville, Ky. He graduated from the Massachusetts Institute of Technology in 1892. He served in the Spanish-American War and in 1899 was appointed first lieutenant in the Marine Corps. He was promoted to be major in 1916, colonel in 1918, and brigadier-general in 1920. He served in the Philippines, Panama, Cuba and Santo Domingo. He was commander of the 5th Regiment of Marines in 1918 and the 2d Brigade of Marines in Santo Domingo in 1919-20. For distinguished service in France, he was three times awarded the Croix de Guerre with Palm, and was made an Officer of the Legion of Honor. He also received the Army D. S. M. and the Navy D. S. M. for distinguished service.

FELDEN, EMIL J. (1874-). A German clergyman and author, born at Montigny (near Metz), and educated at the Gymnasium and the University of Strassburg. After serving as vicar and then pastor in various places, he was finally made primate of St. Martini, Bremen, in 1907. In 1904 he was editor of the *Elsässische Tageblatt* of Colmar. He became a member of the Bremen Bürgerschaft in 1920. Besides articles on religion and ethics in newspapers and periodicals, he is the author of numerous works, among them *Im Gebirgsdorf*, a novel (1899); *Die Protestantische Kirche in Deutschland* (1902); *Kirchlicher Liberalismus und Radikalismus* (1908); *Königskinder* (1914); *Kind und Gottesglaube* (1915); *Grundriss eines Freien Religionsunterrichts* (1916); *Menschen von Morgen* (1918); *Im Kampf um Frieden* (1919); *Die Sünde des Vatikans* (1920); *Spiritismus und Andere Okkulten Systeme* (1920); *Sieghafte Menschen* (1920), and *Die Sünde wider das Volk* (1921). He became the editor of the periodical *Es Werde Licht* in 1920.

FELLOWSHIPS. See UNIVERSITIES AND COLLEGES.

FELTON, LLOYD DERR (1885-). An American physician who, having received the degree of M.D. from Johns Hopkins, became attached to the Laboratory of Bacteriology and Immunology there. He resigned to accept a similar position at Harvard. In 1924, after researches pursued under the auspices of the Metropolitan Life Insurance Company, he an-

nounced the discovery of an antipneumonic serum which had already shown the ability to reduce greatly the mortality of that disease and had received the approbation of prominent health officers. Dr. Felton has recently been appointed assistant professor of hygiene and preventive medicine at Harvard.

FELTON, SAMUEL MORSE (1853-). An American railway official (see VOL. VIII). He was appointed director-general of military railroads by the Secretary of War in 1917 and was chairman of the port and harbor facilities commission of the United States Shipping Board in 1918-19 and was acting chairman of the board in 1919. He was president of the Western Railway Association and a member of several engineering and patriotic societies. He was awarded the Distinguished Service Medal for his war-time services and was also awarded the Cross of the Legion of Honor by the French government.

FEMINISM. See WOMAN SUFFRAGE; WOMEN IN INDUSTRY; PAINTING, France; AND SCULPTURE, United States.

FENCING. See SPORTS.

FENOLLOSA, MARY MCNEILL ("SIDNEY MCCALL"). An American author, born at Mobile, Ala., and educated at Irving Academy in that city. She is the author of entertaining stories, some of them dealing with Japan, where she lived for some years. Her works include *A Flight of Verses* (1899), *The Dragon Painter* (1906), *The Breath of the Gods* (1906, 1920), *Blossoms from a Japanese Garden* (1915), *Sunshine Beggars* (1918), *The Stirrup Latch* (1917), *Christopher Laird* (1919), and others. She edited her husband's *Epochs of Chinese and Japanese Art*.

FERBER, EDNA (1887-). An American novelist and short story writer, born at Kalamazoo, Mich. After studying at the Appleton (Wis.) High School, she became a reporter on the Appleton *Daily Crescent*, and was later employed on the *Milwaukee Journal* and *Chicago Tribune*. Miss Ferber's writings are characterized by understanding and alertness of thought. She has published *Dawn O'Hara* (1911), *Buttered Side Down* (1912), *Roast Beef Medium* (1913), *Personality Plus* (1914), *Emma McChesney & Co.* (1915), *Fanny Herself* (1917), *Cheerful by Request* (1918), *Half Portions* (1919), *The Girls* (1921); the comedy, *Our Mrs. McChesney*, in collaboration with George V. Hobart; *Gigolo* (1922), and *So Big* (1924).

FERDINAND I, KING OF BULGARIA (1861-). (See VOL. VIII.) In 1918 he abdicated in favor of his son Boris and retired to Coburg.

FERGUSON, ELSIE (1885-). An American actress, born in New York. She made her first appearance at the Madison Square Theatre in *Liberty Belles*. She starred in *The Outcast*, *Margaret Schiller*, and *Shirley Kaye*. In 1917 she went into motion pictures in *Barbary Sheep* and later did excellent work in *Rose of the World*, *The Avalanche*, *The Witness for the Defense*, *Footlights*, and *Peter Ibbetson*. She returned to the speaking stage in 1920 in *Sacred and Profane Love* and appeared in *The Varying Shore* (1921).

FERGUSON, FRANK WILLIAM (1861-). An American architect, born at Portsmouth, N. H., and educated at Dartmouth College. As a member of the firm of Cram and Ferguson he

helped plan buildings at the United States Military Academy at West Point, Saint Thomas's Church in New York City, Princeton University, Richmond College, Williams College, and Rice Institute at Houston, Tex.

FERGUSON, JOHN CALVIN (1866-). An American in the service of the Chinese government (see Vol. VIII). He was counselor in the Chinese Department of State in 1915-17 and became adviser to the President of the Republic of China in 1917. He was a delegate to the Disarmament Conference (1921).

FERNALD, ROBERT HEYWOOD (1871-). An American engineer, born at Orono, Me. He studied at the Maine State College and at the Massachusetts Institute of Technology, Case School of Applied Science, and Columbia University. For several years he was a member of the faculty of the Case School, and from 1902 to 1907 was professor of mechanical engineering at Washington University. From 1907 to 1912 he was professor of mechanical engineering at the Case School, and from 1912 to 1921 was Whitney professor of dynamical engineering at the University of Pennsylvania. From the latter date he was director of the Department of Mechanical Engineering at that university. He was a member of many engineering societies and was the author of many reports and bulletins relating to the conservation of the fuel resources of the United States.

FERNOW, BERNHARD EDUARD (1851-1923). An American forester and educator (See Vol. VIII). From 1907 to 1919 he was dean of the faculty of forestry at the University of Toronto and in the latter year was retired as professor emeritus.

FERRAN Y CRUA, JAIME (1852-1919). A Spanish bacteriologist and sanitarian, contemporary of Koch and said by his fellows to have made some of the latter's discoveries independently and to have anticipated many important developments in the prevention of epidemic diseases. As early as 1885 he wrote on immunization against cholera. In 1893 his work on this subject was translated into French with the title *L'Inoculation préventive contre le Cholera*. Recently (1921) Fernandez, a Spaniard, published a considerable volume, with a Latin title, *Woe to Great Inventors*, seeking to show that Ferran had anticipated the methods of immunization practiced successfully in the War by 30 years. Another subject in which Ferran was always deeply interested is tuberculosis and the possibility of immunization against it. Some of his ideas on the transmission and virulence of this disease are revolutionary.

FERRI, ENRICO (1856-). An Italian criminologist (see Vol. VIII). After 1914 he published *Il Diritto Staccionata* (1916); *L'Azione di Risarcimento dei Danni dell'Imputato Assolto contro il Denunziante* (1916); *Enrico Pessina ed il Pensiero Italiano sulla Giustizia Penale Discorso Commemorativo* (1917), and *Commissione Reale per la Riforma della Leggi Penali* (French, English, German translations; 1921). His *Criminal Sociology* appeared in a new English translation in 1917. He is the subject of one of the chapters in Giovanni Papini's *Ventiquattro Cervelli; Saggi non Critici* (1918).

FERRIS, DAVID LINCOLN (1864-). An American bishop, born at Peekskill, N. Y., and educated at the Peekskill Military Academy,

the Cayuga Lake Military Academy, Hobart College (Geneva, N. Y.), and the Berkeley Divinity School (Middletown, Conn.). He was ordained priest in the Protestant Episcopal Church in 1894, having become deacon in the year preceding. He held several pastorates from 1893 to 1920, becoming in the latter year suffragan bishop of the diocese of Western New York. He served on various religious boards and committees and was made a trustee of Hobart College.

FERRIS, WOODBRIDGE NATHAN (1853-). An American educator and public official (see Vol. VIII). He was governor of Michigan, 1913-14 and 1915-16, and was elected United States Senator for 1923-29.

FERTILIZERS. The term fertilizer as used in this article includes not only commercial fertilizers, but also farm manures and other substances added to the soil to increase its productiveness. It therefore includes materials which not only furnish plant food but perform other functions in correcting soil deficiencies and promoting plant growth. During and immediately following the War, the price of commercial fertilizers was prohibitively high, with the result that the use of fertilizers was seriously curtailed to the detriment of the manufacturer and the farmer. The effect of the War upon the production and price of fertilizers is strikingly indicated by the fact that there were produced in the United States in 1921, 5,994,179 tons (of 2000 lb. each) of fertilizers valued at \$174,878,864, as compared with 8,432,206 tons valued at \$153,260,212 in 1914. Fertilizer prices reached their peak in 1919. Recognizing the need for cheaper fertilizers, the Tariff Act of 1922 exempted from duty all materials used chiefly for fertilizing, as well as sulphuric acid, an essential in the fertilizer industry. Prices in 1924 were about 1913 levels plus the increased cost of labor and freight. It is estimated that freight alone on raw materials and finished product represents 25 to 30 per cent of the average cost of fertilizers to farmers. This emphasizes especially the importance of high grade concentrated fertilizers and fully justifies the recent effort which is being made to reduce the number of fertilizer formulas and to encourage the use of only high grade mixtures.

The experience of the ten years 1914-24 demonstrated strikingly the precarious nature of the world's supply of raw materials for fertilizers in times of disturbed commerce, particularly that of nitrogen. Nitrogen for fertilizer purposes is largely drawn from the nitrate deposits of Chile, but these are steadily declining in quantity and quality and increasing in cost of mining and delivery to consumers. Moreover, this source of supply may be cut off entirely in times of war or other disturbed conditions. The production of sulphate of ammonia as a by-product of coke ovens cannot be expected to meet the world's needs, and organic sources of nitrogen, such as cottonseed meal, slaughterhouse products, and the like, are being more profitably utilized for other purposes. Fertilizer nitrogen must therefore come in increasing proportion from other sources. Fixation of the nitrogen of the air by electrical processes offers an inexhaustible supply. The world's production of fixed nitrogen increased from about 1 to 35 or 40 per cent of the total production of nitrogen fertilizer between

1914 and 1924. In 1910 Germany imported 65 per cent of the nitrogen compounds she used. In 1924, largely because of development of fixation processes, she was practically independent in this respect. A considerable fixed nitrogen industry also was developed in Norway, but practically nothing had been achieved in this direction in the United States up to 1924, although, with an appropriation of \$20,000,000 carried in the National Defense Act, construction was begun in 1916 at Muscle Shoals, Ala., of a plant estimated to have a capacity of 40,000 tons of fixed nitrogen per year. This plant had not been completed and operated, and President Coolidge recommended to Congress that it be sold, subject to recall in time of war and with a proviso requiring further investigation with the object of cheapening the cost of the fertilizer produced. Various offers and proposals were under consideration by Congress. (See MUSCLE SHOALS.) A Fixed Nitrogen Laboratory was established in 1919 by the Secretary of War, under the National Defense Act, to aid in developing the industry and especially for perfecting methods. This laboratory, transferred to the Department of Agriculture in 1921, reported the discovery of a catalyst which it was believed would increase the efficiency and reduce the cost of the fixation process. The various products of the fixation processes, including cyanamide, nitrates, urea, with the possible exception of cyanamide, have shown fertilizing effects comparable with those of nitrate of soda and sulphate of ammonia, although some of them are difficult to use because of their hygroscopic nature. Urea has, however, proved to be an effective nitrogen carrier on all types of soils tested.

Phosphoric acid is almost universally needed by the soils of the United States, but fortunately the natural supply of phosphates is abundant (estimated at over 10,500,000,000 tons), as are the materials necessary for converting it into available form. The production of acid phosphate, the form in which phosphate is most commonly used as a fertilizer, was 3,367,220 tons (of 2000 pounds each) in the United States in 1923. The preparation of acid phosphate by the usual method of treatment with sulphuric acid requires a high grade of rock phosphate and results in great waste of the lower grades. Effort therefore has been made to find a process which will utilize the low grade phosphates. The Bureau of Soils of the United States Department of Agriculture has developed such a process. This consists of smelting rock phosphate with silica and carbon and condensing and collecting the volatilized phosphoric anhydride which is used in the preparation of highly concentrated fertilizer compounds. Reduction of rock phosphate by means of sulphur undergoing bacterial oxidation, as proposed by Lipman, was one of the newer developments and appeared to have practical possibilities.

The necessities of the War led to strenuous efforts to develop a potash industry in this country, utilizing for this purpose especially certain western dry lake deposits, kelp, alunite, and dust of cement works, and blast furnaces; but while the industry prospered with war-time prices and fostering, it did not grow to any great proportions, the annual output never exceeding 50,000 tons, and it practically disappeared when prices fell and the German potash

salts were again available. Hope of developing a domestic potash industry has, however, been revived by results of recent studies by the United States Geological Survey, confirming earlier indications of the occurrence of extensive and commercially workable deposits of potash in the Permian salt beds of western Texas and eastern New Mexico similar to those of Stassfurt and Alsace. The scarcity and high price of potash fertilizers during and immediately following the War resulted in a great reduction in the use of such fertilizers, and while this proved to be a distinct disadvantage in some cases, it also indicated other conditions under which potash fertilizers may not give a profitable return.

The growing relative scarcity of manure has led to efforts to find an efficient substitute for it. The Rothamsted Experimental Station reported a fair degree of success with an artificial manure consisting of a fermented mixture of straw, chalk, and ammonium sulphate. Attention has also been turned anew to the possibility of greater use of peat and city refuse, to better methods of preserving manure and to sterilization as a means of prolonging the efficient use of manure in greenhouse culture and market gardening, but the most hopeful advance in meeting this situation has probably been made in the direction of showing the large extent to which commercial fertilizers may replace manure.

The need for liming is widespread and is often increased by the use of commercial fertilizers, as is especially evident in the case of continued use of sulphate of ammonia. Lime corrects acidity, creates favorable bacteriological conditions in the soil, and sometimes supplies needed plant food. It appears also to be an efficient means of controlling certain plant diseases, as, for example, finger-and-toe disease of cabbage, turnips, and similar plants; but it increases scab in potatoes. The different forms of lime, oxide, carbonate, and hydrate, appear to be about equally effective if equally fine and used in amounts supplying the same amount of lime (CaO). See also PHOSPHATE ROCK.

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FÉVRIER, HENRI (1875-). A French dramatic composer, born in Paris. He received his musical education at the Conservatoire under Pugno, Leroux, Fauré and Massenet. His reputation rests on the success of a single work, *Monna Vanna* (Paris, 1909; Boston, 1913).

In 1919 he visited the United States for the purpose of witnessing the world première of his *Gismonda* by the Chicago Opera Company. Besides these operas he wrote *Le Roi Aveugle* (Paris, 1906) and the operettas *Agnès, dame galante* (1912), *La Princesse et le porcher* (1912), and *Carmosine* (1914), all produced in Paris.

FEWKES, JESSE WALTER (1850-). An American anthropologist (see VOL. VIII). He has contributed largely to anthropological and other magazines and was appointed chief of the Bureau of American Ethnology in 1918.

FICKE, ARTHUR DAVIDSON (1883-). An American author, born at Davenport, Iowa, and educated at Harvard and the College of Law of the University of Iowa. He taught English at the latter institution and was admitted to the bar in 1908. Among his recent works are *Sonnets of a Portrait Painter* (1914), *The Man on the Hilltop* (1915), *Chats on Japanese Prints* (1915), *An April Elegy* (1917), and *Spectra*, with Witter Bynner (1917).

FICTION. See LITERATURE, ENGLISH AND AMERICAN.

FIELD, HAMILTON EASTER (1873-1922). An American artist, born at Brooklyn, N. Y. He studied at the Polytechnic Institute, at Columbia and Harvard Universities and under Raphael Collin and Fantin-Latour at the Ecole des Beaux Arts in Paris. Shortly before his death he inaugurated the Salons of America, of which he was the first president. He was editor of *Arts and Decoration*, editor and owner of *The Arts*, the *Touchstone Magazine*, and *The American Art Student*. He was director of the Thurnscoe School of Modern Art, Ogunquit, Me., and the Ardsley School of Modern Art, Brooklyn. He was also connected with the Ardsley Studio in Brooklyn and at one time was art editor of the *Brooklyn Eagle*.

FIELD, HERBERT HAVILAND (1868-1921). An American zoölogist, born in Brooklyn, N. Y., and educated at Harvard. His published papers at Harvard were mostly on the embryology of the frog, but from 1895 he lived in Zurich (Switzerland), where he organized and administered the *Concilium Bibliographicum*, an international catalogue of scientific literature, which aims to give in card-catalogue form the title of every paper on zoölogy published throughout the world.

FIELD ARTILLERY. See ARTILLERY.

FIELDS, JOHN CHARLES (1863-). A Canadian mathematician (see VOL. VIII). He became a member of the University of Toronto Senate in 1914 and was president of the Royal Canadian Institute from 1919 to 1922. Largely due to his efforts was the success of the meeting of the American Association for the Advancement of Science at Toronto in 1921. He had much to do with the organizing work in connection with the International Mathematical Congress which met in Toronto in 1924.

FIJI ISLANDS. See PACIFIC OCEAN ISLANDS.

FILTRE, STREAM LINE. See CHEMISTRY, PHYSICAL.

FILTRES. See SEWERAGE AND SEWAGE TREATMENT.

FINANCE AND BANKING. The subject of public finance, customarily restricted to include discussion of revenue and expenditure, may also be taken to cover the discussion of public debt; and in recent years has frequently

been employed to include within its scope discussion of banking and credit as well. The term finance is here used in the latter broad sense. Finance in its public aspect includes two distinct fields of thought; the first covering the theory of taxation and of public revenue in general, as well as the theory and practice of budgetary management on the part of modern nations, the latter including survey of actual results attained as to revenue and expenditure by principal nations. In banking, discussion is usually divided into two more or less distinct fields, the former dealing with the theory and organization of banking institutions, the latter with actual banking systems and results of operation.

Prior to the War, steady and consistent effort was made by nations to maintain a distinct line of separation between public finance and banking, the principal connection between the two types of activity being afforded by the operation of central banks in the different countries. During the War, public revenues were in no small degree obtained through banking methods, with corresponding effects upon prices, while governments practically took possession of banking systems with a view to controlling supplies of credit, issues of currency and rates of interest. The result has been that, since the close of the War, a very intimate connection has continued to exist between public finance and banking in actual practice, while levels of prices and other aspects of the general economic situation have felt the effects of financial and banking policies compositely, rather than independently. Therefore, much discussion of public finance and of banking is to-day carried on jointly, while the bulk of the consideration of public finance implies specified conditions as to banking; and, conversely, statements of theory and practice in banking are based upon specified assumptions as to financial conditions.

Relation of Finance and Banking. Banking is the phase of economic organization, or the economic institution, by means of which the credit function is exercised and through which actual wealth is made available as a means of exchange. Public finance is the science or method whereby governments obtain the resources they need, and apply them to designated objects. Evidently where governments become large operators of industry, large owners of wealth, or large consumers, they come to occupy a very important relationship to banking, inasmuch as they require extensive banking services and must rely largely on banks for the collection and payment of funds as well as for the transfer of wealth from individuals to the government and vice versa, and for the advancement of private resources for government use pending the time when the government has collected from taxpayers wealth in sufficient quantity to meet its requirements. Moreover, the increasing use of paper currency and the hazards involved in leaving its issue unrestrictedly in the hands of the banks have led to the establishment of an intimate relationship between the government and the banking mechanism with respect to the control of the circulating medium. At the same time, the creation and retirement of such medium, coupled with the variations in the volume of bank credit in other forms, have exerted a direct influence on prices, and hence on the volume of taxation required to furnish means for the government's

needs as respects the purchase of commodities and services.

Trend of Finance 1914-24. The war and post-war period included in the decade 1914-24 is too recent to permit of a very positive judgment with respect to the general trend of methods or currents in public finance. It will require a much longer lapse of time to reach definite conclusions as to the probable outcome of the factors which had been set at work as a result of the War; yet there are outstanding facts which are deserving of special notice from a descriptive standpoint and which supply the basis for inferences with regard to the probable trend to be followed in the future. Generally speaking, the outstanding feature of the decade is found in the enormous growth of public expenditure which has carried the outlays of substantially all modern governments, whether belligerent or neutral, up to figures that before the

This showing is clearly paralleled in the fact that Great Britain, whose conditions are perhaps closer to those of the United States than are those of any other country, has seen her national expenditure rise from £2.31 per capita in 1890 to £3.52 in 1900, followed by a very moderate decline to £3.50 in 1910 and an increase to £22.7 in 1921.

Expenditure of Principal Countries. It is worth while to take careful account also of the expenditure of the principal Continental countries, not only because of the inferences that may be drawn from such comparisons as to the causes of growth of public outlay in the different countries but also because of the light that is thereby thrown upon the burdens to which the public of the several nations have been subjected. The accompanying table furnishes the data necessary for such a comparison during the war and post-war period.

Countries	NATIONAL EXPENDITURE (000,000 omitted)									
	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
United States*	\$ 700	731	723	1,977	12,697	18,515	6,141	5,166	3,372	3,294
Australia	£ 23.1	38.1	65.2	87.5	111.4	111.4	92.6	77.9	62.3	62.3
United Kingdom	£ 197.5	560.4	1,559.1	2,198.1	2,696.2	2,579.3	1,195	1,079	1,079	910
Germany	mark 8,654	25,708	27,723	49,098	53,360	45,573	54,867	135,315	300,399	352,291
France	franc 6,589	22,804	29,536	36,345	39,419	49,793	29,882	23,262	24,687	23,179
Russia	ruble 2,927	2,898	3,647	4,078	46,706	215,402	1,215	26,076	922	1,418
Italy	lire 3,129	5,954	12,711	17,146	25,329	28,171	37,689	21,759	20,618	20,618
Austria Hungary kronen	5,210 ^b	6,048	.....	.....	25,612	.....	258,229	347,533	.....	.....
Japan	yen 574	648	583	602	714	1,808	1,396	1,584	1,482	1,350
Canada	\$ 127	197	296	456	522	712	1,064	.....	345	.....
							347	375		

* Fiscal year. ^b 1913. ^c Estimated.

War would have been considered purely imaginative. This enormous growth of public expenditure was, in the belligerent countries, the natural result of warfare and its cost, but in the neutral countries was only partly brought about as the indirect result of these factors. Many of the smaller countries, especially those bordering on the scene of action, found it necessary to mobilize their armies and to keep large bodies of men ready for defense should such a step become necessary. Yet this alone was not a sufficient influence to bring about the tremendous growth of outlay. Added to it was the fact that the enormous inflation of credit and currency in the belligerent countries was reflected in the neutral states, while the world demand for commodities itself tended to raise prices everywhere; the outcome being a great advance in the price level, of which the net result was to necessitate corresponding increases in the amounts of revenue raised for the public service as expressed in terms of money. This state of things, it should be remembered, came into existence at a time when there was already a general drift towards higher levels of expense, which had already made itself apparent not only with respect to absolute amounts but also in proportion to population. The movement, viewed in the aggregate, may be illustrated by the experience of the United States, which was at first a neutral and later a belligerent, its federal expenditure both absolutely and per capita moving as follows:

AMERICAN FEDERAL PUBLIC EXPENDITURE		
Year	Total (000,000 omitted)	Per Capita
1900	\$520.8	\$6.30
1910	693.6	7.30
1915	760.5	7.26
1920	6,141.7	57.72
1923	3,294.7	29.77

Classification of Expenditure. Almost as important as the gross amount of expenditure, is its classification as between different purposes. Before the War there was everywhere a substantial growth toward an undue outlay for military and naval expenditure, which gave rise to much of the demand for a means of obtaining international agreements for the maintenance of peace. The drift of public expenditures during and after the War greatly exaggerated this tendency toward the growth of military outlay, while at the same time it naturally enlarged the proportion of expenditure going to public debt, due to the fact that the War was necessarily (as will be seen later) so extensively financed upon a borrowing basis. While some progress was made after the close of the War in diminishing the amounts directly spent for army and navy, it was still true in 1924, if the public debt be primarily regarded as a legacy of post-war outlays, that the total amount payable for military and naval reasons far exceeded any other category and was probably on the increase. The table on page 453 reviews the development of American Federal government outlays at intervals from 1870 down to the situation during the fiscal year ending in 1923. Whether expenditure has proceeded more rapidly than the growth of wealth in recent decades is another point as to which statistics are very much less positive. It would seem in the main that prior to the War wealth was increasing slightly faster than expenditures. War experience makes the question far more debatable.

Comparative Revenues. While there is much advantage to be derived from careful comparison of the revenues of different countries, the same difficulty inheres in any such comparison that has been noted in connection with expendi-

Year	EXPENDITURE IN MILLIONS OF DOLLARS						Interest on the Public Debt	Total
	Civil and miscellaneous ^a	War	Navy	Indians	Pensions			
1870	\$64.3	\$57.6	\$21.7	\$3.4	\$28.3		\$129.2	\$309.6
1875	63.8	41.1	21.4	8.3	29.4		103.0	274.6
1880	54.4	38.1	13.5	5.9	56.7		95.7	267.6
1885	82.9	42.6	16.0	6.5	56.1		51.3	260.2
1890	94.8	44.5	22.0	6.7	106.9		36.0	318.0
1895	82.2	51.8	28.7	9.9	141.3		30.9	356.1
1900	131.6	134.7	55.9	10.1	140.8		40.1	520.8
1905	127.9	126.1	117.5	14.2	141.7		24.5	567.2
1910	171.5	189.8	123.1	18.5	160.6		21.3	693.6
1912	172.2	184.1	135.5	20.1	153.5		22.6	689.8
1910	3,133.1	1,100.9	629.9	40.5	213.3		1,024.0	6,141.7
1923	1,169.5	355.7	322.5	45.1	264.1		1,055.0	3,244.7

^a Exclusive of postal deficiencies.

tures. Nevertheless, it is possible to afford a rough general comparison of outlays, particularly for recent years, war necessities and negotiations having compelled a closer basis of analysis for the purpose of reducing national expenditures and receipts to somewhat the same footing in one country as in others. The figures in the accompanying table furnish comparative data designed to contrast revenue and expenditure conditions in the several countries over the past decade.

Local Versus National Finance. In the United States, particularly, great interest has always attached to the distribution of taxation and expenditure between the Federal and local governments. This is due to the fact that under our peculiar system of State and local government there has been considerable jealousy between the different grades of administration, as well as more or less conflict in their taxing policy. The War and the developments after it materially affected this relative situation while they widely altered the relationship existing between the amount of Federal and local expenditure and income. In 1904, the Census Bureau, in a first report on the subject, showed that local expenditures were 61.8 per cent of all governmental outlays in the United States. Similar inquiries in Great Britain showed local

United States have been studied by the Census Bureau, which furnishes the following figures:

	1902 (000 omitted)	1912	1922
States and territories	\$189,165	\$306,521	\$367,470
Counties	199,119	307,872	745,000
Cities over 25,000 ..	424,763	849,971	1,532,435
Cities 800-25,000 ..	75,216	.....	95,100
All other minor civil divisions	219,304	.....	248,321
Total	\$1,107,569	\$1,464,364	\$4,224,616
General revenues are classified as follows:			
	1902 (000 omitted)	1912	1922
General property tax	706,660	3,323,166	
Special property and business tax	62,327	256,647	
Poll taxes	16,581	29,140	
Liquor licenses	55,241	408,271	
Other licenses and permits	19,841		
Fines and forfeits	7,962		
Inventions and grants	60,984		
Donations and gifts	2,903		
All others	2,027		
Total		203,392	

Sources of Public Revenue. The theoretical classification of public revenues employed by most writers on public finance, omitting minor or casual sources of income such as fines and gifts, includes: (1) Prices.—By this term is meant the revenue arising from the sale of public property such as land and its products, usually a small proportion of the income of well

Countries	NATIONAL (GOVERNMENTAL) INCOME (000,000 omitted)									
	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
United States..	\$ 735	698	780	1,117	3,665	5,152	6,695	5,625	4,109	4,007
Australia..	£ 21.7	22.4	30.8	34.1	86.8	44.7	52.8	65.5	64.9	59.5 ^a
United Kingdom	£ 198.2	226.7	336.8	573.4	707.2	889	1,339.6	1,425.9	1,124.9	914.2 ^a
Germany.. mark	2,350.83	3,400	3,320	4,340	7,332	9,200	53,000	149,600	1,091,600	5,640,900
France... franc	1,239	4,113	4,641	5,811	6,987	11,200	21,170	2,330.2	28,381	19,285
Russia... ruble	2,262	2,878	3,647	3,999	16,583	48,959	159,604	4,139,900	368 ^c	1,056 ^d
Italy.... lire	2,262	2,155	2,702	3,722	4,645	22,080	37,251	28,052	17,497	17,767 ^b
Austria										
Hungary kronen	5,210 ^a	5,724.8	.....	8,663	.....	.....	.....	93,325	209,763	.....
Japan.... yen	549	509	513	233	714	722	1,396	1,584	1,482	1,350
Canada... \$	163	133	127	595	261	310	400	440	380	.....

^a Gold rubles.

^b 1913. ^c Estimated. ^d Gold rubles for 9 months.

expenditures for 1910 as 55 per cent. While the increase of local expenditure not only here but in England and in other countries has gone on rapidly measured in absolute figures, being augmented by special causes which are perhaps not permanent in their nature, the relative proportion of local outlay has been reduced, due to the fact that national or Federal expenditures have been so vastly enlarged. For 1920-21, Great Britain's local expenditures were only 18 per cent of her national total while those of the non-Federal grades of government in the United States, in 1922, were 56 per cent of the total.

Local Revenues. Local revenues in the

developed states; (2) Charges.—By this term is meant the sums exacted for the particular services, largely industrial, rendered by the state, including post office, telegraph, telephone, railroad, gas and electric light and sale of manufactured products; (3) Fees.—By this term is meant the sums exacted for services rendered by public authorities in the course of administration of business. Included are court fees, licenses and the like. They are charged upon the theory that they represent the return for a special service which is not enjoyed by the entire body of the community. Special assessments are grouped under the head of fees by

most writers; (4) Taxes.—By taxes are meant sums levied upon the citizen as a contribution to the general welfare or for the support for the government in the performance of functions which are so broadly applicable to all citizens that they cannot be apportioned or assigned, while their cost is so great that they must be paid for on a common basis regardless, in some measure, of specific advantage to the individual. The characteristic of the decade 1914-24 has been the great growth of the latter revenue source.

American Revenues. The following figures furnish a brief survey of principal sources of revenue in the United States since 1900:

Year	Total	Customs	Int. Rev.	Income and profits tax
1840	\$19.5	\$13.5		
1845	30.0	27.5		
1850	43.6	39.7		
1855	65.3	53.0		
1860	56.1	53.2		
1865	333.7	84.9	\$209.5	
1870	411.2	194.5	184.9	
1875	238.0	157.2	110.0	
1880	333.5	186.5	124.0	
1885	323.7	181.5	112.5	
1900	567.2	233.2	295.3	
1905	544.2	261.7	234.0	
1910	675.5	333.6	268.9	
1912	692.6	311.3	293.0	
1920	6,704.4	323.9	1,442.2	3,956.9
1923	3,847.0	561.5	35.6	1,691.0

Reliance on Direct Taxation. Pre-war finances in many countries relied largely on indirect taxation. In the United States the Federal government was collecting in normal years the great bulk of its income from customs duties and internal revenue charges. During the early war years a small income from direct taxation was also obtained. Great Britain had long had the income tax in effect and it was producing substantially at the opening of the War. Nevertheless Great Britain also relied largely on indirect taxes and the same was true of most countries. The war necessities changed all this and hostilities greatly increased the total burden of taxation and made it absolutely necessary, in order to get the required funds, to rely largely on the proceeds of direct levies. Not only, therefore, was the total burden of taxation very greatly added to, but also the amount paid to governments as direct deductions from income not dependent upon purchase or the performance of specified acts was greatly enlarged. The effect of this change in method of taxation was undoubtedly to make the burden of the tax loads very much more obvious and to make it seem more serious than would have been true had it been collected entirely through indirect sources. Efforts to reduce budgets after the close of the War did not prove very successful and it was found in almost all cases that indirect taxation had been carried practically to the extreme of its productivity, while the income and excess profits taxes in this country which depended upon these sources of income predominantly had been raised to a point which was interfering with the growth of wealth. This latter consideration seemed to be of peculiar force in Great Britain and in the United States where during the early post-war years there was an obvious decline in the

amount of saving due to the fact that taxpayers of large income really engaged in business found it a matter of relative indifference whether to increase their business expenses to a point which consumed what might otherwise have been additional net income or to pay the latter in large part to the government. With rates on incomes running as high as 60 to 70 per cent the inducement to saving beyond a specified limit was not strong. Hence most post-war fiscal policies which aimed at budgetary economy sought to bring about such economy by a reduction in the burden of direct taxation. One outgrowth of this movement was the adoption in November, 1921, of the Income Tax Revision Law in the United States which eliminated the excess profits tax, while in Great Britain the budget estimates for the year beginning Apr. 1, 1922, abandoned the idea of further debt reduction during the year in question, excess profits taxes having already been repealed in 1921. The post-war taxation on the Continent naturally followed a somewhat different course because of the fact that during the War so great a reluctance to further tax increases had been made manifest. The necessities of such countries as France, Germany, and Italy after the War naturally dictated the imposition of new rather than the withdrawal of old taxes because of the necessity of providing means which would carry the very heavy interest charges resulting from the borrowing policies of the War.

POST-WAR FINANCE

Post-war finance, both in the United States and in Europe, has had three principal objects—the reduction or abolition of the enormous taxation of the war period, the funding and consolidation of the debts created during war, and the reduction of government expenditures. Coincident with these it has been necessary to find a means of beginning the restoration of banking systems to a sound condition in order that foreign exchange rates might be placed upon a more stable basis and the international flow of trade and of investments be correspondingly facilitated. One principal obstacle to success in these undertakings has been the tangle of indebtedness existing between the various countries. Such indebtedness represented the aid extended by one country to another during the War, but it was early perceived that in the last analysis there was but one great creditor, the United States and one great debtor, Germany. It was recognized accordingly that the key to the restoration of a sound system of post-war finance was probably to be found in the introduction of a satisfactory system of reparation payments which should enable the Allied belligerents to collect from Germany enough to enable them to offset the bulk of the losses to which they had been subjected and at the same time to settle with their external creditors. The Treaty of Versailles had made no definite disposition of these questions, leaving final settlement to the so-called Reparation Commission, which in March, 1920, announced a scheme of reparation payments whereby Germany's total obligation was fixed at 135,000,000,000 marks (pre-war gold value). Elaborate details concerning the payment of this sum were provided and the bulk of the cash proceeds was assigned to France, Belgium, and Italy. The Germans, however, failed to pay more than approximately enough to cover the cost of holding the occupied

German territory which had been taken by the Allies as security for the liquidation of their claims. Accordingly, France and, in a much lesser degree, some of the other countries that relied on the collection of German indemnities as a means of meeting their budget requirements were unable to obtain the funds necessary to settle the budget obligations they incurred in the belief that they would be able to transfer the cost to the Germans. Hence, their budgets failed to balance, and such reductions in taxation as occurred simply cut away the fundamental basis upon which a restoration of soundness would necessarily rest. Great Britain, which did not rely on any considerable receipts from Germany, was able gradually to restore her exporting power, despite some serious industrial obstacles such as the coal strike of 1921. The pressure for reduction of the terrible tax load was severe in all countries, but even in those where a cut might have been made, as in the United States, the recurrence of socialistic or semi-socialistic antagonism to wealth and capital resulted in the retention of many war taxes as a peace expedient. The Republican party, elected in the autumn of 1920, largely on a platform of tax reform, adopted in October, 1921, a so-called tax revision measure which, however, cut the burden of taxation but slightly, although technically repealing the excess profits tax. Great Britain likewise did away with the excess profits tax and similar action was taken in other countries. Nevertheless, in all the problem of rebalancing, the budget was seen to rest more and more upon the restoration of sound banking conditions.

Progress toward sound budgetary conditions was greatest in the United States and in England during 1920 and 1921. In the United States ordinary receipts up to November 12, for the fiscal year beginning July 1, 1921, exceeded ordinary disbursements by about \$155,000,000. The British budgetary situation was less satisfactory, showing deficits in 1920-21, although it was steadily improving. It must be remembered, however, that the main factor in tax policy which accounts for this unfavorable balance was the reduction in receipts from the excess profits tax. Although certain funds were still coming in on this account from excess earnings during earlier years, there was a decrease during the first six months of 1922 of £82,336,000 from the corresponding period of the year before.

In most of the Continental countries the budget situation during 1921, on the contrary, showed no real improvement; in fact, the reverse, although in the case of France and Italy a certain amount of relative advance was scored. In other words, the total amount of outgo of these countries which had to be made, not from the proceeds of taxation, but either from short-term bank borrowing or the issuing of currency, increased rather than diminished. Figures for Italian finances for the fiscal years ending June, 1921, and June, 1922, were still in the form of estimates, the actual accounts not being available at the latter date. According to the latest estimates, however, it appeared that the deficit for the year would be only about one-half that for the year ending in June, 1921. In other words, the estimated deficit for 1920-21 amounted to 10,300,000,000 lire, while the estimated deficit for 1921-22 worked out at 5,000,000,000 lire. The French government contem-

plated an expenditure for 1921 amounting to 42,412,000,000 francs, as contrasted with receipts of 23,312,000,000 francs, thus leaving a deficit of about 19,000,000,000 francs to be procured by the flotation of loans. Of this deficit, about 16,000,000,000 francs was regarded as eventually recoverable from Germany under the terms of the peace treaty. Of the ordinary receipts, 14,558,000,000 francs were expected from indirect taxes and monopolies. During the first half of 1921 the total public debt of France rose from 245,000,000,000 francs to 264,000,000,000 francs, calculating in both instances the foreign debt at par. This figure does not include loans floated by the cities and industries in the devastated regions, although the government is responsible for their interest and repayment. In the case of Germany close estimates of the total amount of government expenditures for 1922 were not available.

There has been a prevailing belief for a long time past that the principal element in the existing fiscal difficulties of many countries is to be found in their great outlay for war. This statement is true in broad terms, but requires to be qualified and limited in its application. In some countries, such as the United States, the outlay for war, while a very large part of the total outlay, is in large measure an expense which serves to carry the cost of past wars in the form of interest on public debt. While naval and military expenditure is large in such countries, it is a relatively moderate part of the entire budget. In other countries, like France, the current cost of military support still constitutes a very important fraction of the budgetary outgo. It has, therefore, been thought worth while to compile statements designed to show the comparative situation of the budget in several of the principal countries, with a view to ascertaining approximately how each one of them stands in this matter of expenditure for national defense, especially as compared with the pre-war years.

Compared with 1913, the last pre-war year, the amounts of money expended for national defense by the governments of France, Italy, and Germany show enormous expansion, but it should be remembered that the purchasing power of the currencies of these countries has undergone varying degrees of depreciation, and that the larger amounts for the more recent years, when reduced to 1913 monetary equivalents, will not show the same degree of expansion as is indicated in the table. During the war years the proportion of the total expenditures made for war purposes was in excess of 80 per cent in all three of these countries. In 1920, the proportion had declined to 60 per cent in Germany, to about 50 per cent in France, and, according to preliminary figures not included in the table, to less than 40 per cent in Italy; in Great Britain and the United States the proportion for the fiscal year 1921 was 26 and 24 per cent, respectively. Nevertheless, the financial burden upon taxpayers of these countries due to military expenditures was much heavier than before the War, since national production and income had suffered severely, and fiscal requirements for rehabilitation and reconstruction were an additional drain on national resources and income. While the proportion of total expenditures devoted to military purposes was, according to the fiscal returns, smaller in some countries in 1922 than before the War, these

GREAT BRITAIN
(In thousands of pounds sterling)

	(a) Revenues	(b) Expenditures	(c) Public debt charges	Per cent (c) to (b)	(d) Expenditures for national defense	Per cent (d) to (b)
1904-05	143,370	141,956	27,000	19.8	66,055	48.5
1912-13	165,778	165,598	24,500	14.8	72,436	43.7
1916-17	573,427	2,198,113	127,250	5.9	1,302,603	54.0
1918-19	842,050	2,579,301	269,965	10.6	1,701,545	70.0
1920-21	1,425,984	1,195,427	349,599	30.5	292,288	25.5
1921-22	1,160,521	1,079,186	332,300	30.0	189,300	18.4

FRANCE
(In thousands of francs)

1905	3,766,346	706,835	1,205,124	34.9	1,143,820	33.1
1913	5,091,744	5,066,931	1,284,079	27.2	2,070,530	43.9
1917	5,575,845	* 41,679,600	4,863,686	11.7	34,065,809	81.7
1919	11,300,000	* 793,884	7,986,823	16.3	35,811,390	73.0
1920	21,770,243	29,882,700	11,833,174	22.7	26,432,545	91.7
1921	23,302,584	23,262,969	13,320,000	57.4	5,027,000	23.0
1922	23,381,334	24,687,958	13,320,000	54.1	4,539,000	18.4

ITALY
(In thousands of lire)

1905	1,950,620	1,902,822	574,017	37.6	419,200	22.6
1913	2,385,130	3,289,010	598,220	18.2	1,666,660	50.7
1917	5,170,430	16,971,000	1,348,119	7.2	14,310,680	84.3
1919	22,080,185	32,150,100	2,705,200	8.4	26,974,420	83.9
1920	37,251,018	28,171,296	3,543,024	12.6	.....	.....
1921	23,052,053	37,689,951	3,712,790	10.9	5,026,038	13.4
1922	17,497,130	21,759,255	3,708,272	12.2	3,450,000	15.8

GERMANY
(In thousands of marks)

1905	2,215,232	2,208,887	127,556	8.6	1,052,288	48.3
1913	1,957,380	2,024,523	231,176	11.4	1,582,290	78.2
1917	2,122,304	27,821,047	2,616,793	9.4	24,920,907	89.5
1919	31,589,709	45,513,671	5,914,204	12.6	40,179,143	85.5
1920	16,907,025	54,867,028	8,922,692	14.5	37,033,588	60.2
1921	135,315,768	135,315,768	12,693,316	9.1	8,007,812	1.1
1922	350,099,885	300,399,885	16,121,472	5.3	3,658,896	1.2

* Total expenditures.

expenditures undoubtedly constituted a larger proportion of the diminished national incomes and were, therefore, a more crushing load on the financially weakened countries of Europe.

The accompanying table exhibits the post-war burden of taxation in some of the chief countries of the world:

PER CAPITA TAXATION	
United States	\$70.80 *
United Kingdom	99.43 *
Australia	28.16 *
Canada	35.05 *
Germany	243.42 *
France	94.23 *
Italy	22.80 *
Japan	7.38 *

* On basis of 1923-24.

• On basis of 1920-21.

The question whether some adjustment or alleviation of this tremendous burden can be devised has occupied the attention of statesmen since the close of the War but has confirmed most in the belief that heavy direct taxes will continue the chief reliance of most countries for a long time to come.

Government Activity in Business. The participation of the government in business, which before the War had produced a very considerable element in the revenue system of some countries (e.g. France, Germany, Austria and others), received a considerable extension in consequence of the War and of necessities attendant thereon, but the success obtained has been so slender as to produce a reaction of opinion among those who in former years regarded public activity of this kind as a probable source of future increase in revenue yield. Rail-

road operation, which was undertaken on an extensive scale both by Great Britain and the United States, proved an actual source of loss and was discontinued in both countries. The operation of ocean-going ships was equally disappointing and state manufacture of various kinds of commodities turned out even more unsuccessfully than during pre-war years. Instead of assuming an increasingly important position in budgets, revenue derived from industrial and business occupations has not only come to form a smaller and smaller proportion of total income; but, as just stated, it has been obtained under circumstances of such difficulty as to make it clear that it must be regarded as an inadequate reliance for the future.

Tariffs and Internal Revenue. Highest productiveness was believed by some to have been reached in the tariff system of the United States prior to the War, with a revenue of about \$350,000,000 as a maximum. In Europe, the productiveness of tariff duties had declined as rates increased. During the War, tariff systems fell into disorder and yielded far less than normal returns, owing to the interruption of international trade or its distortion as a result of war demands. After the War, a new era of tariff taxation set in, based upon the nationalistic spirit and essentially intended for protective purposes. The tariff of the United States adopted in 1922 (Fordney-McCumber Act) has been unexpectedly large in its yield, the annual income amounting to \$560,000,000. European tariffs continued in a tentative condition of development, owing to disturbances of trade during post-war reorganization, but also showed an increased rate of yield. One feature of the

tax system of the War was the great extension of internal revenue duties, especially taxes on articles of luxurious consumption. These taxes proved so unpopular that the greater share of

rience may be described as a universal advance in world indebtedness. The outstanding facts in the situation as affecting the principal countries are reviewed in the accompanying table:

DEBTS OF PRINCIPAL NATIONS, AND AGGREGATE FOR ALL NATIONS OF THE
WORLD AT VARIOUS DATES
(In millions of dollars)

Dates	Austria	Belgium	France	Germany	Italy	Nether- lands	Russia	United Kingdom	United States	World
1913	3,799	825	6,300	1,200	2,852	462	4,500	3,500	1,193	42,940
1918	15,807	1,902	32,322	39,200	11,900	652	24,564	28,600	12,243	205,396
1919	28,584	1,888	42,700	48,552	15,009	981	24,564	37,221	25,482	295,070
1921	15,800	4,900	55,000	80,000	21,200	1,046	24,564	37,000	24,297	382,634
1922 .....	.....	6,708	65,921	1,984,475	22,816	....	24,564	38,009	22,350	.....

them were abolished. The United States eliminated a large portion of its consumption taxes from and after Jan. 1, 1922. In all countries taxes on tobacco and liquors continued very heavy with increasing returns. In the United States, however, the adoption of the prohibition system largely eliminated the regular yield of the liquor taxes.

State and Local Taxation. As a result of war demands, local expenses as well as national greatly increased. Such increase in expenditure was met chiefly through an advance in the rate levied upon already existing objects of taxation. In the United States, however, State income and inheritance taxes were given a very considerable development while in some cases surtaxes were added. Real estate taxation became much heavier both in the United States and in Europe. Public debts were largely added to among local governments and the tendency to increase in that direction was furthered by bonus distributions to ex-service men, the borrowing for this purpose being rendered easier through exemption of bonds from taxation.

Budget of the United States. In all countries the importance of budgetary control was emphasized as a means of economy. An effort to introduce a budget system into the financial organization of the United States was made early in the administration of President Harding, being recommended in a message to Congress on Dec. 5, 1921. This was the result of about 12 years of discussion beginning during the administration of President Taft. On June 10, 1921, Congress approved a law providing for a national budget system and a bureau of the budget. Appropriations in Congress, however, continued in the hands of the numerous Congressional committees vested with the power of appropriation and resulted in preventing the development of a genuine budget system analogous to that of European countries. In fact, on various occasions Congress disregarded the budget estimates and appropriated money according to its own inclination. On the other hand, savings which were nominally introduced as a result of the budget system turned out to be illusory in some cases, owing to the fact that they were merely due to curtailments of allowances for upkeep which eventually had to be restored although temporarily interrupted.

Changes in Public Debt. It follows closely from what has been said with respect to public finance that the decade 1914-24 was notable in its relation to the public debt. Like the growth in public revenue and expenditure, the growth in debt was practically universal in all countries, although not proceeding in the same proportion in all; but in the main the expe-

Taxation in France followed a course rather different from that pursued in the United States. The first new impositions adopted in 1914 were made effective in 1916 and applied to incomes in excess of \$1000 with excess profits rates running up to 50 per cent. On July 1, 1916, a special war levy was made on all citizens who had not actually served with the troops, and fees and stamp dues as well as taxes on investments were raised all around. In 1917 and 1918 extensive luxury taxes were introduced. After the War, continuous legislation on taxation was proposed but the situation was never taken in hand very vigorously until early in 1924 when the absolute necessity of equalizing the budget became evident.

Germany, in the belief that the War would be short, attempted to do without new taxation but in 1915 provided for a substantial increase, applicable largely in the several German states. The Imperial government in 1916 imposed war profits taxes, excess profits taxes and others, besides taxes on transactions and various objects of consumption. In 1918, internal revenue duties were extended and the rates on war profits were made heavier. The system, however, continued inadequate and receipts were by no means comparable with outlays. A similar policy of waiting prevailed in Austria, although as the War progressed advances were made from time to time. Italy, on the other hand, recognized the necessity of heavier taxation practically from the beginning of the War, but was not very successful until the struggle was nearly over. In 1918, there were great extensions of luxury and consumption taxes and in 1919 a supplementary income tax. In the minor European countries, no general or uniform policy was pursued, some increasing the revenues through taxation while others relied largely on loans and indirect taxes.

In the United States, as a result of continuous agitation, the administration of President Coolidge obtained from Congress at the session of 1923-24 the adoption of a more thorough plan of tax revision than that adopted in October, 1921, basing the demand upon the presence of an expected surplus in the budget for the fiscal year 1925. Among the minor European countries budgetary progress was slow, while in Germany the unsettlement with regard to reparations and the unsatisfactory industrial conditions resulted in continuous deficits.

As already incidentally noted, this growth in indebtedness is to be ascribed in part to actual military expenditure, in part to the protection of neutral frontiers and in part to the advance of prices and wages. Which one of these factors was predominant in any given country, is possibly a matter of secondary interest. The sig-

nificant facts relating to the debt situation are, first of all, the actual growth of indebtedness as just surveyed, and secondly the methods by which the debt position at the end of the decade was attained as throwing light upon the problem of reduction.

A feature which distinguishes the financial experience of the war period from periods of similar trial in the past relates to methods of public borrowing. During the War, a probably unprecedented use was made of the short-term obligation, while at the same time the plan of funding the short-term obligations thus incurred into long-term debt was carried to a higher point of development than ever before. The use of this method was practically identical in all of the belligerent countries, but naturally was carried on with far greater success in certain of them, owing to the fact that a greater degree of responsiveness on the part of the public was achieved in some than in others. This method of borrowing, as developed most successfully in England and the United States, was substantially as follows: A given quantity of revenue having been estimated as necessary within a specified period, funds were then obtained direct from the banks through the issue of certificates of indebtedness or treasury bills, or the equivalent. These short-term obligations usually ran for only about three months. The intent of every issue was to obtain steadily from the community a proportionate part of its current earnings and thus to make sure of drawing off from the general fund of commercial income a sufficient amount to provide for public necessities. In placing these certificates with holders, use was usually made of the central banking mechanism, the method being substantially the same in Great Britain and in the United States. Certificates issued by the Treasury were placed in the hands of reserve banks which distributed them at first voluntarily and later by a process of assignment to members. The proceeds were marked up on the books of the subscribing banks as a credit to the government. These deposits were then called

vanced the practice grew of making a small preliminary payment, borrowing the remainder at the buyer's bank. The result then was chiefly to convert the obligation of the government into the obligation of the individual citizen, presumably to be paid for out of his income or savings. As the floating debt outstanding increased in this way, and as the amount owing by bond buyers to the banks for the purchase of bonds increased, inflation naturally resulted, owing to the fact that bank credit was greatly outrunning in its rate of growth the rate of production of commodities. The effect was very largely the same as that which had been produced in former wars through the issue of irredeemable currency. Upon the close of the War, the stronger governments took measures to reduce their outstanding floating indebtedness, but during the first two or three years after the close of the struggle, the only countries that made any material progress in this direction were Great Britain and the United States. Italy later began to take steps along the same line but other belligerents met with no success.

Internal and External Loans. At the opening of the War, much discussion developed in all countries as to the relative advantage of internal or external loans. Embargoes and blockades made it impossible for some to borrow abroad, but the major belligerents, as the War advanced, tended more and more to draw upon foreign markets. The United States was naturally regarded as a primary source of such loans, although during the early year of the War London houses succeeded in distributing a great many of them. As the War advanced, investors grew more and more hesitant, and it became necessary to negotiate not with foreign investors but with foreign governments, either obtaining their permission or when possible inducing them to advance the funds themselves. Thus arose the enormous international obligations which assumed a size that was wholly unprecedented and in a very real sense constituted a new phase of national finance. The

EXTERNAL AND INTERNAL DEBT*
Approximate value in millions of dollars—conversion at par

	External	Internal	Total	Pre-war wealth	Ratio of debt to national wealth on pre-war basis
United States .....	.....	\$22,400	\$22,400 ^b	\$204,400	11
United Kingdom	\$5,650	31,850	37,500	70,500	53
Australia	552	1,408	1,960	8,600	23
Canada	243	2,074	2,317	14,650	16
Germany	(^c)	71,500	71,500	80,500	89
France	15,000	42,200	57,200	57,900	102
Russia	4,500	20,900	25,400	58,400	42
Italy	4,200	11,500	15,000	21,800	66
Japan	710	902	1,612	11,200	15

* Debts for which figures are given vary somewhat but are approximately representative of conditions at beginning of 1921. ^b End of 1921. ^c For Germany's external debt, see terms of the reparations.

when necessary, the government giving as much notice as possible, and also endeavoring to pay out the funds as nearly as possible in the parts of the country from which they were drawn. After a period of some months had elapsed, a general loan was offered to the public and when subscribed, the proceeds were used to redeem the certificates and thus to reimburse to the banks the amounts they had advanced. Success in the method was dependent upon payment by buyers of the long-term bonds in actual cash or bank credit, but as the War ad-

table reviews for several of the belligerent countries the situation at about the opening of 1921 (when conditions were most critical) as regards the division of public debts between internal and external obligations.

Inter-Governmental Debts. When the United States entered the War it found nearly all of the Allied powers approaching exhaustion. England had previously made large war loans to the Allies; but could no longer continue them. Advances were accordingly authorized by Congress in 1917 from the Treasury of the

United States. They were steadily made during the remainder of the War and were continued about eight months after the conclusion of the struggle. Thus a total sum of about \$9,500,000,000 was loaned, the proceeds being used in large measure for buying in the United States commodities that were needed for exports. The debts thus contracted were represented by temporary certificates evidencing the obligations in question and assigned by the representatives of the various borrowing European countries. Eventually the question of "funding," or providing for their definite payment and for the rate of interest they should bear meanwhile became a pressing question. No interest on them had been paid from the time of their issue and Congress eventually passed, on Feb. 9, 1922, the so-called Debt Funding Commission Act in which a commission of five, headed by the Secretary of the Treasury, was directed to make arrangements for settling the obligations of the various countries. These obligations consisted of the following at the time of the adoption of the Act:

NET OBLIGATIONS OF FOREIGN GOVERNMENTS,
UNDER AUTHORITY OF ACTS APPROVED
APRIL 24, 1917, AND SEPT. 24, 1917,
AS AMENDED (ON BASIS OF CASH
ADVANCES)

Belgium	\$347,691,566.23
Cuba	8,147,000.00
Czecho-Slovakia	61,256,206.74
France	2,950,762,938.19
Great Britain	4,166,318,358.44
Greece	15,000,000.00
Italy	1,648,034,050.90
Liberia	26,000.00
Rumania	23,205,819.52
Russia	187,729,750.00
Serbia	26,175,139.22
Total	\$9,434,346,829.24

Accrued interest on this total was also due, besides some \$573,000,000 for surplus war supplies sold to various foreign nations. Great Britain, meanwhile, had advanced to Continental countries sums amounting in the aggregate to about \$8,500,000,000, a sum nearly as great as that lent by the United States. Some relatively small loans had likewise been made by sundry of the Continental powers to one another, France advancing nearly \$2,509,000,000. Out of this situation arose in 1919-22 the demand for international debt cancellation.

German Indemnity. The most troublesome phase of the debt situation produced by the War grew out of the establishment of an indemnity or reparation for Germany. (See REPARATIONS for an extended treatment of this subject.) Because of the inability of the Powers to hasten a settlement, the questions of international debts and reparations passed into a waiting stage which lasted well into 1924. The only important progress during the period was the funding of the British debt to the United States which was finally effected in January, 1923 (formal agreement June 18, 1923). Great Britain recognized the entire indebtedness and arranged to pay it over a period of about 61 years with an annual interest rate of 3 per cent, rising after 10 years to 3½. As the United States had outstanding the bonds which were issued to provide the funds advanced to Great Britain, and was paying 4½ per cent on them, the arrangement with Great Britain was equivalent to partial cancellation, although not technically so.

Change in Revenue Systems. In the endeavor to avoid unnecessary increase in debt, England and the United States early in the War resorted to heavy taxation, adopting income and excess profits taxes upon a large scale and particularly advancing the rates of surtax up to figures never before thought of. Other countries were slower to resort to heavy taxes because of the reluctance of their own citizens to submit to such control, yet it was practically inevitable that they should eventually do so and in substantially all countries there was an effort to get away from public borrowing and shift over to a basis of budgetary balance. Only by so doing, it was recognized, would it be possible to restore a condition of solvency in the principal countries. The result of this necessity was to emphasize the finding of new sources of income and hence the reconstruction of fiscal systems. How this change worked may be noted from a comparison of the sources of income in France, Germany, and the United Kingdom, shown in the table on page 460.

Proportion of Loans to Taxation. Authorities on public finance prior to the War had generally taken the view that no public loan should ordinarily be floated without the imposition of taxation in an amount sufficient to provide for interest on the principal thus created and for an amortization or sinking fund sufficient eventually to extinguish the debt. At the opening of the War there was a widespread opinion among theorists both in the United States and Great Britain in favor of restricting loans to not over 50 per cent of total outlay, the balance to be raised by taxation. On the Continent, governments found their populations very restive under taxation and before the War were disposed to make use of deficit financing through public loans because of the already existing burden. During the War, both Germany and France relied largely on borrowing. No consistent policy of financing in this respect was pursued during the War.

Debts, Prices and Exchange. The growing proportion of debt both before and in a more striking degree after the War, as compared with the volume of national wealth, became an alarming feature because of the disproportionate absorption of national income in meeting debt charges. Inasmuch as existing debts were incurred in units of currency of the pre-war gold value, attempt to pay them in full at the close of the decade would involve an enormously greater transfer of wealth than that which was originally borrowed. Alternative to such a course would be the partial repudiation of the debts, either by "devaluation" (change in the gold equivalence of the currency unit) or by the so-called "capital tax," which amounts to an appropriation of enough of the wealth of the propertied class to pay the state's debt to that class. Some settlement of this question would be necessary if the countries were to attempt to restore a sound banking and currency system. The difficulty in the case is particularly marked in those countries which have heavy foreign debts because they must usually settle in terms of gold.

Relations with Banks. Owing to the fact that the War took all countries by surprise, bank loans were necessary in nearly every case in order to furnish funds for immediate requirements. This was an inevitable episode in war finance and was not open to criticism except in

FRANCE
In million francs

	1919	1920	1921	1922 *	1923 *
Direct taxes	1,069	1,620	1,872	2,507	2,983
Stamp taxes	2,195	3,260	3,289	3,515	3,176
Tax on securities	290	568	926	737	821
Sales tax	269	1,256	1,911	3,058	2,513
Customs duties	1,477	1,596	1,197	2,466	1,923
Indirect taxes	1,779	2,612	2,919	2,927	2,682
Sugar taxes	377	444	365	543	519
Monopolies	1,052	1,582	1,711	1,802	1,837
Post Office	589	921	1,071	1,108	—
Public domain	155	151	113	183	176
Miscellaneous	455	938	1,173	985	1,420
Total ordinary	9,707	14,948	16,547	19,831	18,060
War-profits tax	672	3,224	3,169	3,050	1,225
Sale of war material	1,207	1,649	1,501	500	—
Total general budget	11,586	19,821	21,217	23,381	19,285
Special budget	—	—	326	1,310	—
Grand total	11,586	19,821	21,543	24,691	19,285

* Estimated.

GERMANY
In billions (milliards) of marks

	1919	1920	1921	1922 *	1923 *
Taxes on wealth and exchange:					
Income	—	10.2	29.7	350.	450.
Corporation	—	0.1	1.6	5.	7.
Produce (Kapitalertragsteuer) ..	—	0.9	1.5	2.	—
Emergency levy (Reichsmotopfer) ..	0.002	9.9	0.8	4.	—
Property (Vermögenssteuer)	—	—	—	—	60.
Possessions (Besitzsteuer)	0.08	0.01	0.1	0.002	—
Inheritance	0.09	0.3	0.6	1.5	2.
Turnover (Umsatzsteuer)	0.8	5.1	11.5	177.5	500.
Real estate purchase (Grunderwerbsteuer) ..	0.06	0.7	0.7	1.5	1.4
Dividends and interest (Kapitalverkehrssteuer) ..	—	—	—	35.2	65.8
Motor vehicles	—	—	—	0.1	4.
Insurance	—	—	—	1.3	1.5
Races and lottery	—	—	—	0.8	2.2
Stamps	0.9	1.7	6.8	2.1	4.5
Transportation	0.5	1.4	2.2	34.2	520.
Non-recurring war taxes	1.2	5.6	5.4	—	—
Total	3.7	35.7	59.1	614.9	1,617.9
Taxes on commodities:					
Customs	1.1	2.2	5.9	88.	500.
Coal	1.6	4.9	7.0	150.	2,750.
Other excises	1.7	4.1	8.3	59.6	189.
Total	4.4	11.2	21.2	297.6	3,439.
Miscellaneous	1.1	6.1	6.93	119.1	574.
Grand Total	9.2	53.0	149.6	1,071.6	5,640.9

* Budget estimates.

UNITED KINGDOM
In millions of £

	1920	1921	1922	1923	1924 *
Customs	149.4	134.0	130.0	123.0	118.5
Excise	133.6	199.8	194.3	123.0	155.7
Motor vehicles	—	7.1	11.1	12.2	13.2
Estates	40.9	47.7	52.2	56.9	52.0
Stamps	22.6	26.6	19.6	22.2	20.0
Land tax	0.7	0.7	0.6	2.9	3.0
House duty	1.9	1.9	1.9	—	3.0
Income tax	359.1	396.3	398.8	379.0	328.0
Excess profits	290.0	218.2	30.5	2.0	12.0
Corporation profits	—	0.7	17.5	18.9	20
Land value duties	0.7	0.1	0.1	—	—
Total tax revenues	998.9	1,032.7	856.7	774.7	732.2
Non-tax revenues	340.7	394.2	268.2	139.3	120.4
Total revenues	1,339.6	1,426.9	1,124.9	914.2	852.7

* The figures are for Great Britain and North Ireland.

so far as it might be adopted as a systematic policy. Fear of popular discontent led a good many countries to continue the short-term financing much longer than they otherwise would, the only countries that possessed the real internal strength to tax severely and effectively during the War being Great Britain and the United States. In falling back upon the banks, the various governments resorted to methods of borrowing that had not been tried in precisely the same form during the course of former struggles. Relatively small use of legal tender paper or "flat money" was made but the banks were required to take and distribute short-term obligations which were then funded from time to time into longer term loans as circumstances seemed to permit. The fact that the subscribers to these loans were encouraged to borrow from the banks the funds which were necessary in order to enable them to make good their subscriptions naturally tended to produce in all countries a highly inflated condition of prices, together with a steady disappearance of specie, notwithstanding an early embargo upon movements of coin which took effect in nearly all countries, comparatively early in the struggle although at slightly differing dates. The United States was the last to declare such an embargo, owing to the fact that it did not enter the War until the year 1917 was well advanced. Heavy borrowing at the banks in nearly all countries left these institutions at the close of the War in a very unliquid condition, their government paper holdings being "frozen" owing to inability to find buyers for them either at home or abroad due to the deterioration of public credit. But reliance upon foreign borrowing which was characteristic of practically all European countries that had found themselves able to get access to

other markets, left all of them at the close of the War with tremendous external obligations which they were in no position to liquidate, owing to the fact that as a result of the conflict their productive power had been very greatly decreased. An unavoidable consequence of the drawing off of a large share of the population from economic occupation had been in all a corresponding curtailment of productive effort. The close of the War, therefore, found practically all European countries facing a highly complex problem in public finance—that of reducing the cost of their government to such an extent as to make it possible to pay the necessary sums from the proceeds of taxation, thereby avoiding further borrowing while at the same time enlarging their surplus export power sufficiently to provide a balance large enough to furnish the necessary funds abroad with which to pay interest and maturing obligations. This latter necessity was the more obvious because of the fact that for one reason or another it had been found necessary to "release" a great deal of gold as the War advanced, thereby reducing the bank reserves and in some cases bringing the specie stock to so low an ebb that it was exceedingly doubtful whether any restoration of gold redemption could be brought about in the near future.

Results of Inflation Policy. The self-conscious inflation policy which was thus adopted by the belligerent governments soon proved disastrous. It was not only exceedingly disturbing to business, but it also defeated the efforts of the governments which resorted to it as a fiscal expedient. Price levels rose rapidly and enormously in nearly all countries, as may be seen from this table of index numbers:

INDEX NUMBERS OF WHOLESALE PRICES (ALL COMMODITIES) *

United States; Federal Reserve Board (90 quotations) ^b	Canada; Department of Labor (271 quotations) ^c	United Kingdom; Board of Trade (150 commodities) ^d	France; Bulletin de la Statistique Générale (45 commodities) ^e	Italy; Prof. Bachi (38 commodities until 1920, 76 during 1921 and 100 thereafter) ^f	Germany; Statistisches Reichsamt (38 commodities) ^g	Sweden; Svensk Handelstidning (47 quotations) ^h
1913	100	100	100	100	100	100 ⁱ
1914	...	101	...	...	95	116
1919	206	217	...	356	364	330
1920	226	246	307	510	631	947
1921	147	182	197	345	578	211
1922	149	165	159	327	562	162 ^j
1923	156	153	159	419	575	163 ^k

Christiania, Norway; Økonomisk Revue (92 commodities) ^l	Denmark; Finansstatistik (83 commodities) ^m	Belgium; Department of Statistics (130 commodities) ⁿ	Switzerland; Dr. Lorenz (71 commodities) ^o	Holland; Central Bureau of Statistics (53 commodities) ^p	Australian Commonwealth; Bureau of Census and Statistics (92 commodities) ^q	Japan; Bank of Japan for Tokyo (56 commodities) ^r
1913	100	100	100	108	100	100
1914	115 ^s	100 ^t	100 ^u	109	100 ^v	95
1919	322	294	...	304	180	235
1920	382	382	...	326	218	259
1921	298	250	...	195	167	200
1922	238 ^w	179 ^x	367	168	54	196
1923	233 ^y	201 ^z	201	180	170	199

* These figures are taken from the table published in the Bulletin of the Federal Reserve Board.

^b Average for the month.

^c End of month.

^d Middle of month.

^e End of year and end of month.

^f First of month.

^g July 1, 1913, to June 30, 1914 = 100.

^h Dec. 31, 1913—June 30, 1914 = 100.

ⁱ July 1, 1912—June 30, 1914 = 100.

^j July, 1914 = 100.

^k Prices as of first of the month. 914 = 100.

^l Based upon prices of 52 commodities during 1920, 53 during 1921. 1913 = 100.

^m Average of last half of month.

ⁿ April, 1914 = 100.

^o End of year.

The effect of this advance in prices, brought about as it was by the practice of borrowing over heavily at banks, was to make commodities and services cost enormously more than they otherwise would. Particularly harmful results were experienced in the case of those countries which found it necessary to apply to foreign markets for munitions and supplies. Nearly all of the European countries had found themselves obliged at an early stage to buy heavily in the United States. Although the American price level had risen considerably even before the United States entered the War the advance had not been comparable to that which occurred at a later date.

Federal Reserve System. The war period with its sequel had a peculiarly important relationship to American banking conditions because of the fact that simultaneously with the opening of the War the United States had arranged to organize an entirely new banking system—the so-called Federal Reserve. This banking system had been framed entirely without reference to war necessities but was just on the point of taking effect when the struggle broke out in Europe. During the first two years—1915 and 1916—in which the United States was a neutral, the Federal Reserve System was practically in process of organization and the task of installing its various elements was in progress. Its business during that period was small; but with the entry of the United States into the active participation in the struggle early in 1917 the Federal Reserve System became a war banking system almost exclusively, and this character it retained until the struggle was over and the great advances made by the United States to European countries had been completed and the Liberty Bond issues largely growing out of them had been financed and digested by the banks and the public. Thereafter, the Federal Reserve System was able once more to turn its attention to the tasks of peaceful finance and to assist in restoring more normal conditions.

Immediately after the inauguration of President Wilson in 1913, a bill which had previously been developed under the direction of a sub-committee in the preceding Congress was introduced (June, 1913) and thereafter considered and adopted by the House of Representatives on September 17. This measure was considerably modified in the Senate but in conference committee it was amended back into nearly its original form, becoming a law on Dec. 23, 1913. As thus passed, the act provided for the establishment of a "Federal Reserve" System in which all national banks were obliged to take membership by subscribing 3 per cent of their capital and surplus to the stock of institutions to be organized in a number of districts throughout the country and known as Federal Reserve Banks. These banks were corporations chartered for 20 years under Federal authority, receiving deposits only from the government and from their member banks (though subsequently allowed to receive deposits from other banks under certain conditions), their chief duties being the issuing of notes and the holding of the reserves of their members. Their business consisted primarily of rediscounting paper for their members, although they were also authorized to buy paper (of the same kind that had been made rediscountable) in the open market, should they see fit. In issuing notes the Reserve Banks, as they were popularly

called, were authorized to deposit eligible rediscounted paper with their chairman (the Federal Reserve Agent), acting as trustee for the government, who then issued an equal amount of notes to the Reserve Bank. The latter then placed them in circulation by paying them out or handing them to members who had requested such accommodation. By a later amendment, gold might also be deposited with the chairman of the board in lieu of eligible paper. These notes were made obligations of the United States and receivable for all public dues. An organization committee, created under the act, eventually divided the country into districts and established twelve banks. Government control of the institutions was provided for by authorizing the Federal Reserve Board to name three out of nine directors for each of the reserve banks, the other six members being required to include three business men and three bankers, one business man and one banker being selected by banks voting individually, in each of three distinct groups (including the small, medium and larger banks of each district). It was further provided, in order to insure democratic government of the banks, that each bank should have but one vote regardless of capitalization. With reference to reserves, the act required that the 25 per cent reserve formerly required in central reserve cities be cut to 18 per cent of demand obligations; likewise also the 25 per cent formerly required in reserve cities was cut to 15 per cent, and the 15 per cent in other places was cut to 12 per cent. Of these reserves 7 per cent was to be placed by central reserve city banks with their reserve bank, 6 per cent by reserve city banks and 5 per cent by all others. Time deposits were made subject to a 5 per cent rate throughout. Federal Reserve Banks were to be authorized to pay 6 per cent cumulative dividends, after all expenses and allowances had been provided for, to their stockholders, and their remaining earnings were then to be paid to the government.

An important feature of the act on its foreign banking side was found in the authorization granted the larger national institutions to establish branches abroad and in its grant of the power of accepting time bills (not over 90 days' maturity) to national institutions. In its ordinary rediscount operations the reserve banks were limited to ninety-day paper growing out of commercial, agricultural or industrial transactions, speculative paper being barred.

The act as thus adopted was subsequently modified by 10 principal enactments. The important features in these amendments were: (1) enlargement of the acceptance power to 100 per cent of capital and surplus; (2) permission to national banks to subscribe to the stock of foreign banking enterprises formed for the purpose of establishing branches abroad; (3) termination of the reserve requirements of the original law and substitution therefor of a provision requiring all reserves to be kept in Reserve Banks, such reserve to consist of 13 per cent of demand deposits for central reserve city banks, 10 per cent for reserve city banks, 7 per cent for all others, with time deposits at 3 per cent; (4) adoption of the so-called Edge Act authorizing the formation of corporations for the purpose of making long-term investments abroad, national banks being permitted to subscribe to their stocks; (5) enlargement of amount of loans permitted to be made on the

strength of Liberty Bonds as collateral; (6) modification of voting arrangements governing the election of directors in Federal Reserve Banks; and a few others. Of these amendments the only one which fundamentally altered the structure and significance of the act was that transferring the entire reserves to the central institutions and the Agricultural Credits Act of 1923 which gave special privileges to paper growing out of farm credits (see AGRICULTURAL CREDIT).

As provided for by the Act of 1913 the Federal Reserve System went into operation (preliminary details having been arranged by an organization committee) technically on the 10th of August, 1914, the banks themselves being actually opened for business on November 2, while reserves were paid over on November 14 of the same year. The two years 1915-16 were occupied largely in developing methods of discounting and establishing new plans of note issue. A constructive piece of work carried through during these years was the establishment of the Gold Settlement Fund at Washington whereby the Federal Reserve Banks were enabled to clear on the central set of books conducted by the Board the bulk of their obligations against one another, thereby avoiding the shipment of specie. This clearance, at first carried on only once each week, was later made a daily clearance, and eventually came to supersede in large part the work of the local clearing houses.

With the entry of the United States into the War early in 1917, a new epoch in the history of the Federal Reserve System and of the banking system of the United States in general opened. The fundamental problem at the opening of the War was that of finding means to supply the Treasury with necessary funds. This object was temporarily accomplished by direct borrowing from the Federal Reserve Banks on short-term treasury certificates. The system of Liberty Loans was then developed and the Reserve Banks were made the active agents of the Treasury in placing them. The Federal Reserve Act had originally provided for making the banks the fiscal agents of the government and this was now interpreted to include not only sub-treasury functions but also all those relating to the sale and distribution of bonds. The importance of the sub-treasuries accordingly was reduced and they were eventually closed in 1920, but during the latter part of the War and the period just after it their activity was purely nominal. With the issuance of the First Liberty Loan in July, 1917, the activity of the Federal Reserve Banks was largely transferred to a war basis including the management of public finance and continued so throughout the remainder of the struggle.

War Banking and Finance. From the date of the entry of the United States into the War, the function of the Federal Reserve System became almost exclusively that of financing the process of borrowing from the people. During the years 1917, 1918, and 1919 the government increased the national debt from a little over \$1,000,000,000 to a little over \$25,000,000,000. These great loans were for the most part placed first through the banks and then with the rank and file of the investing public. It would probably have been impossible to dispose of the enormous quantities of bonds which the government was obliged to sell in

order to provide itself with funds without some kind of special banking aid. Such aid was particularly necessary in view of the fact that it had been determined by the Treasury authorities to dispose of the bonds at a rate of interest quite materially below the prevailing rate in the market. The first issue of Liberty Bonds was sold at $3\frac{1}{2}$ per cent and as subsequent issues were put out the rate was gradually raised until it reached $4\frac{3}{4}$ per cent on the fifth, the Victory Loan (1919); although it should be remembered that the first loan bearing $3\frac{1}{2}$ per cent had been wholly exempt from taxation of all classes, while subsequent loans were only partially so exempt. That the public might be induced to purchase up to the full extent of its saving power, paying for the bonds it thus bought on the installment plan, Federal Reserve Banks were instructed by the government through the Federal Reserve Board to fix a rate for the rediscount of paper equal to the coupon rate on the Liberty Bonds. Commercial banks generally were induced to discount directly for their customers at the same figure. Thus a buyer of bonds who was unable to pay for them in full, borrowed from his bank the additional amount he needed, the bank carrying it without cost to him since the coupons provided for the borrower's own interest charge. The bank then rediscounted such paper at the same (coupon) rate with the Federal Reserve Bank of its district. This policy was very successful in "stabilizing" the rate of interest, but it also tended to transfer the principal burden for the time being at least to the banks. The system was perfected through the steady issue of Treasury certificates sometimes as often as twice a month, these certificates running for 90 days as a rule and being funded at the end of that period into the successive issues of Liberty Bonds which were then subscribed for and carried as indicated. The burden resting upon Federal Reserve Banks thus became heavier and heavier as the War advanced and as successive issues were sold. Hence the reduction of the reserve ratio (ratio of gold to demand liabilities) of the system, which fell from about 90 per cent before the War to about 52 per cent at the end of 1918, shortly after the Armistice. The fifth Victory Loan, which was floated early in 1919, was sold upon the same general principles that had been pursued in the earlier financing and resulted in increasing the burden resting upon the reserve system still further. The successful floating of this loan was followed by a speculative development of business and especially of foreign trade, which continued during the year 1919, and although checked early in 1920 did not reach its peak until about the close of the latter year.

Prices during the War had tended to rise rapidly as a result of a variety of causes. Of these the principal was the tremendous demand exerted by all governments for commodities, coupled with the natural shortage in production which resulted from the withdrawal of a large part of the productive labor of all of the Western nations for the purposes of war. A contributing cause of the rise in prices, however, was found in the suspension of specie payments and excessive issue of currency which produced the condition of "inflation" reflected in unduly high prices for commodities and services of all classes. This price and wage advance continued steadily up to a peak in May, 1920, at

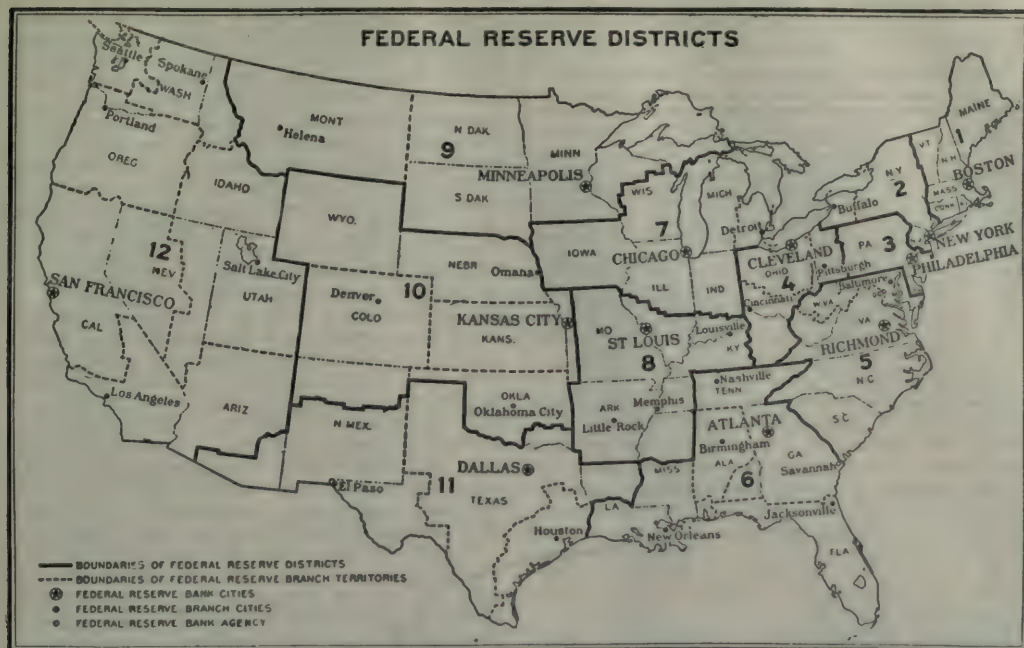
which time the index number of prices was approximately 270 measured from a base in 1913 taken as 100. The check to expansion and wholesale-price advance administered early in 1920 has been variously explained and has been popularly attributed in the United States to the fact that Federal Reserve Banks toward the end of 1919 resolved upon the so-called deflation policy. This deflation policy took form as an advance of interest rates above the low levels that had been established during the Liberty Bond period. It was aided by a more strict interpretation of the eligibility of paper for rediscount, coupled with an effort to induce borrowers who had obtained advances on Liberty Bonds as collateral to settle these loans and thus to take them out of the banks. The inadequacy of this explanation is indicated by the fact that the recession in business and prices which set in early in 1920 did not originate in the United States but was first indicated by the collapse of the silk market in Japan, while in most foreign countries no very definite deflation effort was undertaken until after the business recession had begun. Federal Reserve discounts, as already stated, did not reach their peak until the end of 1920, about eight months after the business decline had started. At that time total assets of the Reserve Banks were approximately \$5,000,000,000 while bills discounted were about \$2,700,000,000 and currency outstanding was about \$3,336,000,000. As the decline of business became more pronounced during 1921, the price level gradually sank to approximately 140, or a little more than half its level at the peak, while discounts at Federal Reserve Banks had been reduced by the end of 1921 to less than \$1,150,000,000. Notes at the same time receded to about \$2,400,000,000, thus contracting over one-fourth of their maximum amount. The inability of foreign countries to settle their enormous purchases in the United States had led during the War to very heavy advances made by the government to foreign governments and expended almost entirely in the United States. These advances were to be continued until about the middle of 1919, eight months after the Armistice, and amounted to about \$9,500,000,000. When they came to a close there ensued a period of trade expansion already noted during which considerable advances were made by American banks and business houses for the purpose of carrying foreign buyers as long as possible. As it became more and more evident that foreigners would not be able to liquidate these debts in full, banks and exporters began to withdraw these credits and the large movement of gold into the United States which had been very marked during 1916 and 1917 was resumed. From the opening of the War in 1914 to the close of 1923 the total net importations of gold into the United States amounted to about \$2,150,000,000 and the total gold holdings of the Federal Reserve Banks rose to about \$3,200,000,000. At the same time the ratio of reserve to liability advanced to approximately 78 per cent. One of the noteworthy services of the Reserve Banks during this whole period of unusual trial and strain was seen in the great reduction of bank failures, the total of failures at no time being large and in some years being practically negligible.

The general situation and development of the Federal Reserve System during the two years following the close of the inflation period was

substantially as follows: Immediately after the completion of the task of readjusting the discount rates and business which culminated in the spring of 1921, Federal Reserve Banks endeavored to return to a basis in which their principal activity would be devoted to commercial undertakings while they sought to divest themselves so far as they could of government obligations and to induce the investment public to take up and hold such securities. The result was a steady decline in their activity, since they had consistently refused to enter into any considerable competition with the larger member banks which held their stock. Coupled with this change of policy was a second remarkable transformation of their position, owing to the steady and great movement of gold into the United States, which resulted in building up enormous specie reserves in the hands of Federal Reserve Banks. The situation of the reserve system at approximately the close of 1923 may be conveniently reviewed in the table on page 465.

Development of Clearing System. The national system of clearance which has constituted one of the most outstanding achievements of the Federal Reserve Board under the mandatory provisions of the original act had attained only a moderate degree of development prior to the close of the War. It was not put into effect at the outset of the Federal Reserve operations but first took form in a definite way on July 1, 1916, when arrangements were made for collecting checks on member banks or on non-members which remitted at par without charge for exchange or collection. Credits and debits were entered upon a deferred basis corresponding to the amount of time required actually to collect the items. From the time that the system was fully inaugurated the totals transferred by this means rapidly grew, the system largely superseding clearing houses in many parts of the country, a number of the latter being closed in the meantime, as a result. Owning, however, to the fact that as a result of the clearance at par without charge many small banks lost a valued source of income, criticism arose and during the years 1920-23 hostile legislation was undertaken in eight southern States and suits were brought against reserve banks for the purpose of having their clearance function declared unconstitutional. In 1924, this litigation was still incomplete, although one or more cases had gone to the Supreme Court. In these the exercise of the clearance function had been upheld, subject to some important reservations. This resulted in reducing somewhat the total number of banks remitting at par, the remaining number being about 28,000.

European Banking Development. European banking was in a far more stable and completed condition at the opening of the War than was the banking system of the United States, but the strain to which it was subjected was far more severe, relatively speaking, than that to which the United States was obliged to adjust itself. In a general way, the principal effect of the War was to bring about an extensive redistribution of specie, a great reduction in the bank reserves of some countries, an even larger relative reduction in these reserves as compared with outstanding obligations and a very material alteration in the character of the investments held by the banks, this change taking form as a great growth in



RESOURCES AND LIABILITIES OF THE TWELVE FEDERAL RESERVE BANKS COMBINED

(In thousands of dollars)

	May 7, 1924	Apr. 30, 1924	May 9, 1923
Resources			
Gold and Federal Reserve agents	2,110,776	2,088,317	2,005,066
Gold redemption fund with United States Treasury	39,755	50,749	54,435
Gold held exclusively against F. R. notes	2,150,531	2,139,066	2,059,501
Gold settlement fund with F. R. Board	601,766	610,622	706,261
Gold and gold certificates held by banks	377,309	370,701	323,062
Total gold reserves	3,129,606	3,120,389	3,088,824
Reserves other than gold	102,502	102,220	92,557
Total reserves	3,232,108	3,222,609	3,181,381
Non-reserve cash	51,243	49,811	67,726
Bills discounted:			
Secured by United States government obligations ..	167,556	161,164	358,637
Other bills discounted	272,729	286,021	336,380
Total bills discounted	440,285	447,185	695,017
Bills bought in open market	87,287	124,485	266,992
United States government securities:			
Bonds	18,353	19,269	29,573
Treasury notes	232,091	221,771	119,387
Certificates of indebtedness	60,438	60,620	36,854
Total United States government securities	310,882	301,660	185,814
All other earning assets	51	51	40
Total earning assets	838,505	873,381	1,147,863
Five per cent redemption fund—F. R. bank notes ...	28	28	191
Uncollected items	566,511	586,350	600,824
Bank premises	56,540	56,494	50,155
All other resources	23,730	22,530	13,811
Total resources	4,768,665	4,811,203	5,061,961
F. R. notes in actual circulation	1,927,027	1,926,013	2,241,780
F. R. Bank notes in circulation—net	338	343	2,065
Deposits:			
Member bank—reserve account	1,953,532	1,944,952	1,886,455
Government	18,381	32,503	22,616
Other deposits	22,439	27,926	28,599
Total deposits	1,994,352	2,005,381	1,937,670
Deferred availability items	500,211	533,466	536,222
Capital paid in	111,231	110,927	109,029
Surplus	220,915	220,915	218,369
All other liabilities	14,591	14,158	16,826
Total liabilities	4,768,663	4,811,203	5,061,961
Ratio of total reserves to deposit and F. R. note liabilities combined	82.4%	82.0%	76.1%
Contingent liability on bills purchased for foreign correspondents	21,388	20,505	33,615

* Revised figures.

* Including Victory notes.

STATISTICS OF MONEY AND CREDIT
IN THE U. S.—1914-1923

(000 omitted)

All banks, national, State, and trust companies			
	General stock of money in United States	Loans and discounts	Deposits
June, 1914 •	\$3,733,288	\$15,288,397	\$18,517,732
June, 1915 •	3,989,456	15,722,440	19,135,380
June, 1916 •	4,482,391	17,811,605	22,773,714
June, 1917 •	5,407,990	20,594,228	26,062,986
June, 1918 •	6,741,072	22,514,828	27,748,471
June, 1919 •	7,605,366	25,255,171	32,665,286
June, 1920 •	7,909,998	31,208,142	37,315,123
June, 1921 •	8,099,006	28,932,011	34,844,572
June, 1922 •	8,177,477	27,860,443	37,194,318
June, 1923 •	8,603,732	30,416,577	40,034,195
June, 1924 •	8,750,765	.....	.....

• Figures as of last week in month.

the amount of government paper held by the banks and discounted for the several governments with a corresponding (relative) decrease in the amount of paper discounted for private citizens. A brief general survey of the banking situation of certain principal countries as it has developed during the period in question, and as it stands approximately at the end of the decade, is shown in the table on "Financial Statistics" on page 467.

Banking in England. Opening the War with a well coordinated money and banking system, Great Britain shortly found it necessary to resort to an embargo on gold and an issue of government notes. The result was immediate depreciation of currency, inflation of prices, and disturbance of exchange. This latter gave rise to a "pegging" of the rate as compared with dollars (and at the same time a pegging of francs in relation to sterling and dollars) the funds therefore being first supplied from the British Treasury and later through loans obtained from the United States. This situation continued until March, 1919, when the pegging was suspended and exchange left to take its own course, the embargo on gold being retained. Almost immediate reaction occurred in the value of sterling, steady recession taking place until Great Britain had been able in a measure to rectify her international position. The result was a general recovery which brought sterling up to a general level (at the opening of 1924) of about \$4.35, varying from day to day but showing substantial ability to maintain itself. The material improvement in the British budget which took place, and the slight reduction of indebtedness, together with the funding of Great Britain's debt to the United States, all tended to produce a more stable financial position and brought about a return of confidence in the value of sterling. Like other countries, Great Britain suffered quite materially from the elimination of inflation; and popular dissatisfaction occasionally compelled a suspension of drastic measures. The general situation of banking in England may be inferred from the tabular presentation already given but it is enough to say generally that improvement was steady and that if Great Britain could have been assured of a continuously favorable balance of trade it could have restored the gold standard at any time when the British public was willing to permit such restoration. On the other hand, there was a feeling among large groups in Great Britain that such action would probably tend to aggravate the depression and unemployment

in the country at large so that it would probably be well to defer such action until a more complete adjustment of reparations had been effected. This tended to defer action which otherwise might have been feasible looking to the retirement of legal tender notes issued during the War and the restoration of the convertibility of Bank of England notes into gold. Little change occurred in the general structure of Great Britain's banking system as a direct result of the War, although the creation of the Irish Free State separated a portion of the Irish banks from the general British money market, at least in theory, even though they continued to be closely associated with it in fact. Scotch and Irish notes, which had been made legal tender during the War, were deprived of that quality after the Armistice, while it should be remembered that the Currency and Bank Notes Act of 1914 providing for legal tender issues was not in form a temporary act, so that it might be said that there is no direct assurance of the restoration of pre-war conditions. There is no certainty how long the war changes in banking and currency, profound as they have been, will continue or when they will be offset by new measures. Meanwhile, the principal obvious mark left by the War upon the British banking system is to be found in the great concentration of banking which has occurred, there being today only about 25 banks in the United Kingdom of which by far the more dominating position has been assigned to five or six of the British institutions with headquarters in London.

Continental Banking. The outstanding changes in Continental banking which took place during the War were, in theory and effect, very similar to those in Great Britain, although usually assuming a more extreme form. In France, a moratorium was declared shortly after the opening of hostilities, applying to deposits as well as notes. This was soon ended but at no time during or since the War have Bank of France notes been convertible into coin. Large support has been given by the Bank of France to the government in the form of short-term loans, the result being an enormous increase in note circulation, although changes in the actual structure of banking in France have been fewer than in England. Provisions for the official control of exchange and prohibition of the export of capital were early introduced and have continued in effect. In 1924, France's banking problem was more than ever intimately associated with governmental budget conditions. The decline in exchange which carried the franc down into an ordinary level of about 5 cents soon after the opening of 1924 (a low point of 3.43 cents having been reached in the late winter of 1924), merely reflected the declining confidence of the foreign public in France and her budget management, due to the continuance of extraordinary budgets without provision to meet them, the continued insistence upon reparations at a rate probably out of the question, and the effort to rely upon inflation and short-term loans in lieu of taxation. Conditions became so alarming as to bring about pledges from the Poincaré Ministry in the spring of 1924 bearing upon the reintroduction of budget balances and heavier taxation designed to overcome existing evils. No progress in this direction had been made up to the close of spring of 1924, while the coming of the new ministry had left the situation still doubtful.

FINANCIAL STATISTICS OF PRINCIPAL FOREIGN COUNTRIES

ENGLAND (In millions of pounds)					CANADA (In millions of dollars)				
	Oct.	1923 Nov.	Dec.	1922 Dec.		Sept.	1923 Oct.	Nov.	1922 Nov.
Gold and silver, coin and bullion	155	155	155	154	Chartered banks:				
Bank notes in circulation ^a	102	103	106	104	Gold coin and bullion ^a	61	67	54	92
Currency notes and certificates	280	282	299	301	Current loans and discounts	1,219	1,241	1,190	1,255
Total deposits	119	121	132	133	Money at call and short notice	283	300	325	303
Nine London clearing banks:					Public and railway securities	417	434	410	317
Money at call and short notice	101	105	102	106	Note circulation	184	185	181	170
Discounts and advances	1,021	1,019	1,026	1,030	Individual deposits	1,997	1,990	2,030	2,036
Investments	336	337	341	360	Gold reserve against Dominion notes ..	114	112	109	96
Total deposits	1,629	1,630	1,685	1,684	Dominion note circulation	243	242	241	251
Total clearings	3,243	3,192	2,914	2,769	Bank clearings ^b	1,220	2,220	1,910	1,619
Government floating debt:					^a Not including gold held abroad.				
Treasury bills	635	646	652	719	^b Total for month.				
Temporary advances	175	158	208	222	FRANCE (Amounts in millions of francs)				
Total floating debt ..	810	804	860	941		Oct.	1923 Nov.	Dec.	1922 Dec.
Index number of foreign exchange value of the pound sterling	125.5	127.7	127.2	125.8	Bank of France:				
^a Less notes in currency note account.					Gold reserve ^a	3,675	3,675	3,676	3,670
					Silver reserve	296	296	297	289
					War advances to the Government	23,400	22,800	23,300	23,600
					Note circulation ..	37,670	37,329	37,905	36,359
					Total deposits	2,033	2,204	2,384	2,309
					Clearings, daily average of Paris banks ..	877	919	935	630
					Savings banks, excess of deposits (+) or withdrawals (-) ..	-33	-41	+2	+33
					Price of 3 per cent perpetual rente ..	55.70	54.00	53.25	59.02
					^a Not including gold held abroad.				
					JAPAN (In millions of yen)				
						Oct.	1923 Nov.	Dec.	1922 Dec.
Banks of issue:					Bank of Japan:				
Gold reserve	1,133	1,134	1,134	1,136	Reserve for notes ^a ..	1,062	1,061	1,057	1,064
Total reserve	1,917	1,853	1,853	2,039	Loans and discounts ..	499	491	654	375
Loans and discounts ..	9,982	10,421	10,618	9,082	Advances on foreign bills	86	133	207	205
Note circulation for commerce	9,274	9,387	9,482	9,782	Note circulation ..	1,449	1,415	1,697	1,590
Note circulation for the State	7,761	7,758	7,756	8,075	Government deposits ..	350	416	360	333
Total deposits	2,316	2,520	2,285	2,688	Private deposits	58	49	63	66
Leading private banks:					Tokyo banks:				
Cash	756	751	....	781	Cash on hand	110	131	133	169
Loans and discounts ^b ..	9,223	8,741	....	8,659	Total loans	2,225	2,376	2,381	2,011
Due from correspondents	3,048	3,935	....	3,568	Total deposits	1,816	1,826	1,879	1,869
Participations	252	252	....	339	Total clearings	1,460	2,003	2,418	3,329
Total deposits	12,514	12,454	....	11,960	^a Gold abroad, gold coin and bullion in Japan.				
Index of security prices	161.61	160.05	162.33	111.09					
^b Including treasury bills.									

In Germany, the shock to the banking system caused by the War was fully as severe as that felt elsewhere, but technically produced no great change during the continuance of the struggle. Early in August, 1914, the government provided for a legal tender currency which was later retired, its place being taken by Reichsbank notes. All notes and currency were declared inconvertible and a special type of loan banks was established. Partly as a result of strict military control and government regulation of prices, it was possible to maintain, up to the close of the War, a semblance of solvency. Immediately after the Armistice, this semblance largely disappeared, and rapid deterioration began, partly due to loss of specie, the restoration of the reserves to foreign banks which had been carried away, the necessity of

paying for large quantities of raw material abroad and other factors of the same sort. The outcome necessarily was the steady recession of the mark, somewhat aided by apparently intentional inflation with shipment of paper marks and mark obligations abroad. According to expert Committee No. 2 whose report was rendered to the Reparation Commission in April, 1924, careful investigation showed that Germans had in this way disposed of a total abroad of nearly 8,000,000,000 marks, receiving, of course, goods in exchange to an equal amount, the marks in the meantime becoming practically worthless. Increasing difficulty continued and was greatly emphasized by the inability to obtain any balancing of the budget or any adjustment or reparation claims. The result was to drive the mark down to practically

nothing, the quotation at about the close of 1923 being \$0 00000000000022. At this microscopic figure the mark was practically valueless and its place was rapidly being taken by foreign currencies. Decisive deterioration in the quotation of the mark had set in about the middle of 1922 and continued more or less steadily from that day onward to the autumn of 1923, when effort was made to obtain a substitute currency by organizing the so-called "Rentenbank." This was a bank whose obligations were secured by mortgages upon the lands, houses and industrial property of Germany, the unit in which they were expressed being designated as the "Rentenmark," presumably equivalent to the gold mark. During the winter of 1923-24, there was also gradually brought into existence under the supervision of Dr. Schacht, the so-called "Gold Diskont Bank," whose purpose it was to finance foreign transactions. This "gold" bank was such only in name as its capital was largely derived from English sources in sterling while its foreign payments were made in sterling, it being thus really a sterling bank rather than a gold bank. The reparation committee's plan called for a governmentally controlled bank which would supersede both of these emergency establishments as well as the Reichsbank and would reestablish a gold currency in Germany with corresponding stability in foreign exchange based upon the idea of conversion of outstanding currency at demand either into actual gold or into the gold currency of other countries at a specified rate of exchange. In the autumn of 1924, preliminary arrangements relating to this plan had only just been concluded. German banking had not changed greatly in its external form, but the same tendency to consolidation apparent in England was felt also in Germany and resulted in a reduction in the number of independent banks, accompanied by some increase in the degree of their dependence upon the Reichsbank.

In other European countries where central banking systems were in operation practically upon the same general basis as in England or France at the opening of the War, very much the same war changes were experienced. Practically all introduced gold embargoes which were continued after the close of the War and in most of them attempts were made, usually with but little success, to control the direction of foreign exchange. In Russia, practically the entire pre-war stock of specie was taken from the banks and eventually exported. Austria, too, lost her entire reserve of coin and was obliged to submit to a reorganization of her finance under the auspices of the League of Nations with a gold loan based upon or guaranteed by the Allies themselves. In Italy, conditions more closely resembled those of France, and the restoration of governmental frugality under Mussolini had the effect of stabilizing the lira and curtailing bank inflation. Among the so-called neutral countries such as Switzerland, Holland and Scandinavian nations, conditions varied somewhat, but the general drift was toward increase of gold owing to payments made by belligerents for supplies that they needed. The result generally was to bring about an over-expansion of gold reserves with a corresponding tendency to inflation in bank obligations. Altogether, therefore, the tendency was somewhat parallel to conditions among the belligerents although for different reasons. Subsequent to the

War this whole group of countries found itself better able to resume the free payment and movement of specie than before the struggle, yet disinclined to do it because of the fact that the principal customers were themselves on a paper basis. Efforts to bring about a "monetary union" between them, Great Britain and the United States, were not successful because of the fears in regard to the effect of such action on the competitive position.

"Colonial" and Oriental Banking. Conditions in the colonies of the various principal powers, prior to the War, had been generally dependent upon the situation in the parent countries. The War for the most part threw their systems of money and banking out of gear, partly by cutting off regular trade movement between them and the parent country, partly by leading them to declare embargoes, as in Canada and Australia, in the fear that otherwise they might lose their specie, as well as out of a sense of loyalty to the colonizing nation itself. As a result of these conditions abnormal difficulties were encountered in those parts of the world where the so-called gold exchange standard had been established, e.g. in India, the effort being there to bring about a conservation of specie and a fair stability of value. After the close of the War these difficulties disappeared in some measure, still leaving the dependencies, such as Australia, Canada, and others, inclined to move parallel to the currency of the parent country. In Japan, where an independent gold standard system had existed for many years, the embargo on gold early established during the War was maintained, notwithstanding that the stock of metal there was large and foreign trade in a fairly satisfactory condition. No serious changes in the structure of banking took place in the colonial or Oriental countries upon any considerable scale during the post-war period, perhaps the outstanding development being the creation of a reserve bank, closely modeled upon the Federal Reserve system, in South Africa. In other countries effort was made to popularize the banking systems and so far as possible rather to diminish the power of central oversight so far as practicable. Price movements in these economically dependent countries were naturally governed to no small extent by the price movements in the parent country, as may be seen by consulting the table of prices printed earlier in this article.

War Changes in Foreign Banking. The War naturally affected the banking systems of all nations very profoundly, resulting in most countries in an enormous expansion of credit both in the form of notes and of deposits, while practically everywhere the banks of the several countries became overloaded with government securities of various kinds either purchased for their own account or taken as collateral behind paper which had been left with them by customers for the purpose of carrying these bonds. pending gradual liquidation of subscriptions to them. After the close of the War, the general development of banking in most countries passed through considerable changes of volume and character of transactions but the alteration in banking structure was comparatively slight. The general effect of the War, as noted above, was to tend toward concentration of banks—England, for example, reducing the number of institutions from upward of 100 to only about 25, of which five were of preponderating im-

portance. In France, the drift toward concentration was not so strong because France had already reached a highly concentrated position in banking prior to the War. The War, therefore, found conditions ready to hand for the exercise of strong government control, while on the other hand such control did not produce the effect that was witnessed in England and elsewhere in drawing banks closer to the government because they were already very directly affiliated with and under the control of the public powers. In Germany, the Reichsbank became little more than a tool in the hands of the government, being used there for the purpose of floating short-term loans and later of issuing paper currency in almost unlimited volume to care for the needs of the government and avoid the necessity for heavier taxation.

Another phase of post-war banking was seen in the fact that the portfolios of practically all European institutions changed greatly. In lieu of the short-term paper which formerly occupied so nearly exclusive a place, the primacy was taken by government obligations and so-called short-term notes, "direct advances to the state," and other types of public obligations. The result was the maintenance of an inflated and unsatisfactory condition throughout the entire banking structure, solvency continuing to be entirely dependent on the condition of affairs in the public treasury, while prices were not able to react toward normal because of the continued inflationary influence to which they were subjected in consequence of the status of affairs in government relations with the banks. Still a third important change in the situation after the War was seen in the fact that so many banks and banking institutions were either driven into failure or obliged to go out of business or to amalgamate with others because they had become overburdened with non-liquid paper. The banks in such cases frequently were found to have ventured a good deal of their funds in foreign trade operations of one kind or another and there was great mortality and severe losses among the foreign banks of the world at large. In the United States there was a rapid, but not very successful, development of foreign banking during the War, owing to the fact that foreign, and especially English, institutions were so seriously crippled, and hence so little able to take care of the necessities of foreign trade. As a result the United States enjoyed an unequalled opportunity for the development of its foreign banking system and business, but it never succeeded in gaining a strong foothold; and after the reaction of 1920-21 when foreign trade showed such extensive and serious net losses, there began a movement to disestablish foreign banks which, numerically speaking, went very much further than in any other country, while at the same time the serious losses, which had to be recognized and written off as a result of the shrinkage of prices, became very pronounced. This, taken in conjunction with the readjustment of foreign trade, was perhaps the most striking economic-financial development of the entire post-war period in the business and credit world.

Banking, Prices, and Finance. The problem of banking, prices, and finance thus became unusually closely intertwined as a result of disturbance to revenue systems and to bank reserve holdings during the War and there was a dis-

position towards the end of the decade to treat the whole situation as essentially a large problem of public concern in which a restoration to soundness could be brought about only through the direct invocation of government assistance coupled with legislation. It was generally admitted that permanent recovery from the effects of war finance and restoration of stability in currency would involve certain standardized and fairly definite elements. Conspicuous among these was the restoration of a budgetary balance designed to bring about freedom for the central banks from constant demands on the part of government short-term borrowing. At the same time the necessity of bringing about, so far as possible, a uniform condition of the monetary standard in all countries trading with one another was recognized. It was thought that this might not necessitate the actual redistribution of gold coin, opinions differing as to the advisability of such a step, pending the time of full restoration of commercial and economic soundness; but it did imply the restoration of currency and banking convertibility into foreign standards of recognized stability and strength and in so doing it rendered the international monetary problem practically a uniform matter subject only to variations of local attitude growing out of the varying amounts of specie that were held, the varying conditions of public debt, budgetary balance and the like. Finally, it was recognized that in some way it would be necessary to bring about a scaling down or cancellation of international indebtedness on a fairly large scale, since without such cancellation, it would be practically impossible to develop a situation in which the various countries could meet their foreign obligations and provide the interest essential to keeping them alive.

Not only budgets but international debt and exchange conditions as well as the distribution of specie among the several countries were thus (in 1924) in a highly transitional condition in which the development of stability or a return to soundness must depend upon measures still to be taken, some of them of an international nature. Nothing could be expected for some time, owing to the fact that political conditions in the various countries and the persistence of race and national prejudice following after the War prevented the discussion of the economic problems presented upon a business basis.

Bibliography. The principal sources of information of war finance are still (1924) the financial reports of the various countries. For the United States the reports of the Secretary of the Treasury and the annual reports of the Federal Reserve Board give the most complete and authentic information. The League of Nations published, preliminary to the international financial conference at Paris, a series of documents which deal at great length with public finances during the War. Volume IV is perhaps the most useful of these publications. The following works are also of service in this same connection: Bogart, *Direct and Indirect Costs of the Great World War*; Anderson, *Effects of the War on Money, Credit, and Banking in France and the United States*; Gottlieb, L. R., *Financial Status of the Belligerents and Post-War Finance* (a series of four monographs issued by the Bankers' Statistics Corporation, New York, 1920-21); Benson, *State Credit and Banking during the War and After*; Seligman,

Currency Inflation and Public Debts (Equitable Trust Company, New York, 1922); *Hollander, War Borrowing*. Fisk, *Inter-Ally Debts* (New York, 1924); *Reports of the National Monetary Commission* (Washington, 1910-11); *Reports of the Comptroller of the Currency*; Kirkbride, Sterrett and Willis, *Modern Trust Company* (New York, 1921); Willis and Edwards, *Banking and Business* (New York, 1922); *Reports of Federal Reserve Board*, 1914-21; *Currencies After the War* (London, 1920). See **TARIFF**; **TAXATION**; **AGRICULTURAL CREDIT**, etc.; also paragraphs on *Finance* in articles on countries; and the article **STATE FINANCES**.

FINLAND. Formerly a grand duchy of the Russian Empire, but since Dec. 9, 1917, an independent republic, situated in the northeastern part of Europe on the gulfs of Finland and Bothnia. Area, 149,639 square miles, of which 17,100 square miles are under water; population (census of 1922), 3,105,103, as against 3,364,807 in 1920. The 1920 count was a gain (for the same area) of 224,399 over the last decennial period, or 7.2 per cent. The gain for the decade of 1900-10 had been 14.8 per cent. The population was preponderantly rural though with the twentieth century the urban population steadily increased. In 1900, 12.5 per cent of the population lived in towns; in 1910, 14.6 per cent; in 1920, 16.3 per cent. In 1920, there were 1026 females to 1000 males. Racially, the population was divided into Finns, 88.7 per cent; Swedes, 11 per cent; Russians, 1 per cent; Germans, 0.8 per cent; Lapps, 0.5 per cent. The National Church was Evangelical Lutheran, but liberty of conscience was guaranteed. At the end of 1920, there were 3,300,520 Lutherans, 54,791 Greek Catholics and Raskolnics, 404 Roman Catholics, 6614 Baptists, and 1618 Jews. During 1916-20 inclusive, emigrants numbered 16,678 of whom 16,597 went to America. In 1921, emigrants numbered 3557. The principal towns, with their populations in 1910 and 1922, were: Helsingfors, the capital, 200,-

Finland imported about 30 per cent of her cereals, mainly from Russia, but during the years 1914-16 this trade fell off about a fourth and from 1917 on it decreased to about 3 per cent of its former quantity. The necessity for stringent regulation at once became evident and food-cards had to be resorted to. From 1919 on, large quantities of grain were imported from the United States. In 1913, cereal imports totaled \$17,505,100; in 1918, imports were only \$2,861,658; by 1921, they had reached \$13,756,740, and in 1923, \$19,904,850. The manufacture of dairy products, a thriving industry before the War, steadily declined during 1914-18 and by 1919 had not yet recovered. In 1914, there were 651 creameries; in 1919, only 431; in 1921, 462. In 1911-15, an average of 13,013,000 kilograms of butter were produced; in 1916-20, 8,803,000 kilograms; in 1921, 9,449,000; in 1914, 2,462,000 kilograms of cheese were produced; in 1919, 1,016,000; in 1921, 3,292,000. The same was true in the case of domestic animals. Not until 1920 did Finland succeed in making up the losses suffered during the War. In 1921, horses numbered 392,558 (294,264 in 1914); cattle, 1,791,947 in 1921 (1,167,112 in 1914); sheep, 1,572,444; swine, 374,636. The necessity for increasing the land-holding class was a concern of major importance in the country and from 1919 on the government consistently applied itself to that end. In 1919, 1920, 1921, state subventions were made for the purchase of new lands, and by the law of 1922, provision was made for the increase of small holdings created out of State and Communal property. The decision, by the law of 1919, to permit the tenant to pay for his rental in money instead of labor, was significant and pointed to the eventual destruction of the large estates through the elimination of cheap labor. The country's chief wealth lay in its forests and its water power. The forests of pine, spruce, and birch covered more than half the country, and the state forests alone included 33 per cent of the country's area. These yielded a considerable revenue, as may be seen from the fact that for 1920 the maintenance cost was 64,117,327 marks and the income derived, 130,625,765 marks. In 1913, wood and wood products (including pulp and paper) formed 75 per cent of the exports of the country. By 1921, these had increased to 79 per cent and in 1923, to 89 per cent. It was estimated that there were 3,000,000 horse power available in Finland's water courses, but these as yet had been tapped only slightly, as was indicated by the fact that only 100,000 were in use in 1920.

Mining. Mineral resources were still inconsiderable for want of capital, copper ore, magnetite, iron, pyrite being mined only in small quantities. In 1923, considerable deposits of kaolin, useful in the manufacture of porcelain and paper, were discovered near Wartila.

Manufacturing. The War played havoc with the country's industries, the cutting off of foreign markets, the unsettled political status,

RECORD OF CROPS
(Official Figures)

	1914 Hectolitres	1919 Hectolitres
Wheat	69,211	92,299
Rye	3,978,946	3,050,434
Barley	1,521,039	1,648,262
Oats	6,897,155	7,148,721
Potatoes	6,602,533	7,031,261
Turnips	2,779,486	1,989,799

208 (1910, 147,218); Abo, 58,694 (1910, 49,691); Tammerfors, 48,475 (1910, 45,442); Viborg, 30,748 (1910, 27,508).

Agriculture. The census of 1920 listed occupations as follows: agriculture, 65 per cent; industry, 14.8 per cent; communications, 3.4 per cent; commerce, 3.4 per cent; others 13.3 per cent. Only 9.9 per cent of the land was under cultivation (4,959,568 acres), worked in small holdings mainly. There were 250,748 farms in 1920 (284,188 in 1910) of which only 14,801 (5.9 per cent) were 62 acres and over. Cereals and root crops were raised for home

Item	1914	1920	1921	1922
Number of enterprises	5,024	2,920	3,141	3,294
Number of workers	106,097	117,230	120,317	132,707
Gross value of output, 1000 marks	702,105	6,168,031	6,533,772	8,079,519
Exchange rate	\$0.193	\$0.034	\$0.019	\$0.021
Value in American dollars	\$135,506,205	\$209,713,054	\$124,141,668	\$174,867,000

consumption and by 1910 the yields reached the pre-war stability (see table). Before the War,

strikes, etc., bringing conditions to an exceedingly low level. With 1920, however, affairs

were on the mend, as may be seen from the foregoing table.

The most important industries, by number of workers, were, in order: wood industries, iron and mechanical works, textiles, paper, leather, graphic arts, tobacco. By 1921, relations between employers and workers were on a more amicable basis, industrial conflicts in 1921 almost reaching the low level of 1914. In 1914, there were 37 strikes and lockouts involving 6217 workers and lasting 1300 days; in 1917, the height of unrest was reached with 483 strikes involving 139,812 men and lasting 9383 days; in 1921, the figures were again normal, viz., 76 strikes, 6251 workers, and 1944 days out; in 1923 they fell to 49, affecting 7409 employees.

Cost of Living. During the War and well into 1923, the cost of living steadily mounted, adding to the privations of the population. Based on the index figure of 100 for prices as of July, 1914, in December, 1920, prices reached 1,103.2 and in 1923, reached the high figure of 1147. The exchange rate steadily continued unfavorable to Finland, reaching 29 marks to the dollar in 1920, 52 to the dollar in 1921, 46.7 to the dollar in 1922, and 37.4 to the dollar in 1923 (par rate=5.18 marks to the dollar).

Commerce. Imports and exports for typical years (based on the American dollar) were:

Year	Imports	Exports
1913	\$96,600,000	\$78,100,000
1918	63,076,500	28,355,400
1920	125,051,000	100,911,100
1922	84,700,000	95,600,000
1923	123,010,000	117,070,000

The year 1922 was the first in the annals of Finland to show an excess of exports (13 per cent). In 1913, the excess of imports had been 22 per cent while for pre-war years the import excess had ranged from 15 to 40 per cent. On the basis of 1913 prices, exports in 1922 were 93.4 per cent of those in 1913, and imports were 74.4 per cent of those in 1913. Nothing can indicate more plainly than these figures how rapidly Finland was approaching its normal status. Principal imports were in order of value: textiles; cereals; coffee, tea, sugar; metals; machinery; oils and fats. Principal exports in order of value were: timber; pulp and paper; animal products, mostly butter; hides and leather; animals; matches; gums, tar, etc. In 1913, the following countries figured in goods sent into Finland, in order of importance: Germany, Russia, Great Britain, Denmark, Sweden, Holland, Belgium. The United States was fifteenth with \$712. In 1923, the order was: Germany, Great Britain, United States (\$15,600,000), Sweden, Holland, Denmark. In 1913 the following were countries of destination of Finnish exports, by order of value: Russia, Great Britain, Germany, France, Holland, Belgium, Sweden, Denmark. Nothing was reported for the United States. In 1923, the order was: Great Britain, France, United States (\$9,200,000), Holland, Belgium, and Germany.

Communications. In 1911, there were 2332 miles of railway; in 1923, the mileage was 2765, all but 184 miles of which belonged to the state. In 1921, there were 2525 post offices, 10,517 miles of telegraph, and 3230 miles of telephone wires. In 1913, 11,901 vessels entered Finnish ports, with cargo 1,668,000 tons, in ballast 2,028,000 tons; 11,937 cleared, of which with

cargo 3,374,000 tons, in ballast 255,000 tons. In 1923, a total of 7647 vessels entered, with cargo 1,696,000 tons, in ballast 1,763,000 tons; 7450 vessels cleared, with cargo 3,266,000 tons, in ballast 193,000 tons. In 1923, the Finnish merchant marine consisted of 683 sailing vessels of 102,111 tons, 781 steamers of 92,032 tons, 124 motor-driven ships of 18,649 tons.

Finance. On Dec. 31, 1923, there were 1,352,400,000 marks of the Bank of Finland in circulation. This was equal to \$33,400,000 at the current conversion rate. In 1914, there were 141,724,000 marks or \$27,352,732. Revenues in 1914 totaled 169,692,000 marks (\$32,777,556); in 1921, 2,887,179,000 marks (\$44,260,000); in 1923, 3,013,526,545 (\$104,491,170). Expenditures in 1914 were 185,987,000 (\$35,895,491); in 1921, 2,698,135,000 (\$51,887,211); in 1923, 3,497,446,804 (\$93,381,800). In 1914, the total debt was 171,186,038 marks (\$33,038,905). At the end of 1923, it was \$86,600,000, at current rates of exchange, including \$63,500,000 of foreign debt and \$23,100,000 of internal debt. In 1923, a loan of \$10,000,000 was floated in the United States while arrangements were made for floating Finland's debt to America.

Education. In 1922, there were three universities, the Swedish university at Abo being opened in 1919 and the Finnish university at Abo in 1922. There was a total of 2819 students. For secondary education there were 85 lycées, 31 middle schools, 26 girls' colleges, with a total student body of 28,839. There were in all (1921) 7214 elementary schools with 531,393 pupils. Besides, the educational system included schools for the teaching of navigation, commerce, arts and crafts, agriculture, forestry, etc. In 1921, there were 254 newspapers and reviews in Finnish, 87 in Swedish, 10 in Finnish and Swedish, and 5 in other languages.

Defense. The army and coast defense were recruited on the basis of universal service. In 1922, the class called up for service numbered 18,000. An integral part of the defense was the voluntary Civic Protective Guards Organization, which in 1922 numbered 98,319. By 1924, Finland had no battleships. The army and navy budget for 1922 amounted to 12.5 per cent of the total material expenditures.

History. The War brought Finland relief from the Russification policy which had been carried on with an increased intensity during the decade preceding the outbreak of hostilities. The years 1914-17 witnessed an abatement of the Russian programme, with the result that though Finns received no new political liberties their industrial growth was considerable. The manufacture of war materials was prosecuted advantageously, so that the cities grew affluent while the countryside, deserted by labor flocking to the cities, steadily declined. It could not be said that the Finns hoped ardently for a Russian victory, for enlistments were surprisingly few. Yet the Russian Revolution of March, 1917, was hailed with mixed feelings. The growing industrial activity had increased the size of the Social Democratic party and accessions to the workers' ranks had been made from Russia in which the workers had been impregnated with revolutionary ideas. The bourgeois classes feared as much the dominance of this group as they had the former Russian autocracy. One of the first steps of the Kerensky government was to restore representative

government to Finland. The Diet met on Apr. 5, 1917, and it was immediately evident that the Social Democrats were in control. Attempts were made by the radicals to set up an independent Finland, at least politically and economically, and altercations went on with the Russian government until the advent of the Bolsheviks. Affairs were further complicated by the epidemic of strikes which broke out in 1917, and the threatening famine due to the breakdown of agriculture.

In the new Diet, elected Oct. 2, 1917, a bourgeois bloc forced out the Social Democrats and, fearing the collapse of Russia with the attendant economic ruin, immediately issued a declaration of independence (Dec. 5, 1917). The Bolshevik government finally gave its assent on Jan. 9, 1918, and this was followed by recognition on the part of Sweden, Norway, France, Spain, Denmark, and Germany. The following year was a tragic one. The Social Democrats were averse to breaking relations with Russia, for such a connection meant the extension of communism into Finland. The bourgeois elements, on the other hand, fearing for the new-found wealth that had come from war manufactures, desired a connection with either Sweden or Germany. The result was the appearance of "White Guards" and "Red Guards," the latter being augmented by the influx of Russian soldiers. War broke out everywhere, beginning with the seizure of Helsingfors in January, 1918, by the "Red Guards," the establishment of a soldiers' and workers' council, and the inauguration of a Red Terror. The ready success of the Bolshevik forces and the inability of General Mannerheim, leader of the "White Guards," to cope with the situation led the government to appeal to Sweden and Germany for aid. Sweden very wisely declined, refusing to be embroiled in the War; Germany, however, was very quick to embark on the adventure. The treaty of Brest-Litovsk was signed Mar. 3, 1918. On Mar. 7, 1918, the Finno-German treaty was signed, and to all intents and purposes Finland was a German vassal. General von der Goltz, head of the German forces, immediately landed on the Åland Islands and thus was able to take the Red forces in the rear. Victories by von der Goltz and Mannerheim immediately followed; Helsingfors was retaken; and by May, 1918, the revolution was crushed. The White Terror that was inaugurated accounted for from 15,000 to 20,000 victims, and almost 100,000 men and women were thrown into jail.

The reactionary government that followed, under the dictatorship of Senator Svinhufvud, was completely under the control of von der Goltz, and attempted to erect a monarchy under a German prince, Frederick Charles of Hesse. It became plain that it was von der Goltz's intention to employ Finnish cooperation in a military movement on the Murman coast but the turn of events on the Western front made the plan impracticable. Fortunately the Armistice intervened to save Finland. In December, Svinhufvud, because of his pro-German tendencies, resigned, and Mannerheim, whose sympathies were monarchistic, was installed as Regent. During 1919, Mannerheim attempted unsuccessfully to ally Finland with the Entente powers in their adventure on the Murman front, but the reaction had swung in and from 1919 on Finland applied itself exclusively to its internal

problems. The Diet of Mar. 1, 1919, organized by a bloc of the Progressive-Agrarian parties (though the Social Democrats had a plurality), decided for a republic and on July 25, Prof. Kaarlo Juho Stahlberg was elected first president over General Mannerheim, for a six year term. The republican government received international recognition, and, after signing a treaty for the protection of minorities, Finland was admitted to the League of Nations, Dec. 16, 1920. One of Finland's leading aspirations was realized, when, on Oct. 14, 1920, by the Treaty of Dorpat with Soviet Russia, she received the Pechenga region on the Arctic Ocean. The significance of this port lies in the fact that it is open to navigation during the winter months because of the presence of the Gulf Stream. Eastern Karelia, on the other hand, was granted autonomy under Russia. During 1921, a local uprising in Karelia tended to alienate Russia and Finland, the former accusing Finland of complicity. Finland endeavored to carry the controversy into the World Court, but was thwarted by Russian opposition. The difficulty had not been adjusted by 1924 and hard feeling still prevailed. Another question of international importance was the disposition of the Åland Islands, claimed by Sweden on ethnographical grounds and by Finland because the islands were necessary for her national existence, being located as they were at the entrance to the gulfs of Bothnia and Finland. The matter was referred to the League of Nations in June, 1920, and a year later, the islands were granted to Finland. (See ÅLAND ISLANDS). Under the moderate coalition which continued in power after the election of 1922, the country made rapid strides toward regaining its stability and earned thereby the approbation of European powers and the United States. By the election of 1922, the Social-Democratic group was further whittled away and the government was formed by the Agrarian-Progressive bloc as heretofore. But a crisis was precipitated toward the end of 1923, largely as a result of the drastic measures taken against the Communist party. The cabinet fell from power, Jan. 16, 1924, and was succeeded by an interim government. New elections were announced for April, 1924.

FINLEY, JOHN HUSTON (1863-). An American educator and editor (see Vol. VIII). He was a member of the American Army Educational Commission (1918), commander of the American Red Cross for Palestine and the Near East (1918-19), editor of *Nelson's Encyclopedia*, and associate editor of the *New York Times* (1921-). In 1923 he was appointed exchange lecturer to Scandinavian countries under the auspices of the Scandinavian-American Foundation. Among his later works are *French Schools in War Times* (1917), *A Pilgrim in Palestine* (1918), and *The Debt Eternal* (1923).

FIORE, PASQUALE (1837-). An Italian jurist (see Vol. VIII). Revised and enlarged editions of two of his important works on international law appeared after 1914, *Il Diritto Internazionale Codificato e la sua Sanzione Giuridica: Studi* (1915), which contains in an appendix a summary of the most important international treaties from 1525 (English translation, 1918, New York); and *Trattato di Diritto Internazionale Pubblico* (1916), which contains (vol. iii) a discussion of war and its general effects, and of the rights and duties of

belligerents. He is the editor of *Il Diritto Civile Italiano Secondo la Dottrina e la Giurisprudenza* (1918). Pasquale Fiore is the subject of a discussion by Josef Müller in *Volksbildung*, vol. xix, under the title of "*Die Stellung des Menschen im Völkerrecht nach der Theorie Pasquale Fiore's*" (1921).

FIRE APPARATUS. See MOTOR VEHICLES.

FIRE FLY. See ZOOLOGY, *Physiology*.

FIRE FLY, LIGHT OF. See PHYSICS.

FIRE PROTECTION. It was a somewhat striking commentary on the progress of civilization that, with the various means of safeguarding life and property, the losses due to fire in the United States and Canada increased rather than diminished in the period from 1914 to 1924. In fact the annual destruction by fire and conflagration fairly could be compared with that of war, yet it was impossible to arouse adequate public sentiment to deal effectively with this great menace. However, there were certain advances to be recorded in securing more adequate fire protection, and a hopeful movement towards fire prevention which was becoming more general. It was realized that much of the work of a municipal fire department should be in the field of fire protection and securing the enactment and enforcement of adequate regulations in the interests of public safety.

The National Board of Fire Underwriters continued their inspection of municipal fire departments and water supplies, and from time to time made valuable recommendations which were carried into effect and reacted to the benefit of the citizens by more favorable insurance rates. The decade under consideration witnessed the practical disappearance of horse-drawn fire apparatus in favor of motorized equipment which had reached a point where for speed and reliability, as well as for economy, it was able to function satisfactorily. By the elimination of the cost of maintenance for the food and care of horses it was possible to provide more adequate protection to the smaller cities and towns, and the increased speed of travel on the road and capability of achieving greater distances made possible coöperative action by the fire departments of adjoining towns. In some of the larger cities, particularly those on the coasts and the Great Lakes, independent high pressure services were installed or extended, and with the tall buildings of modern construction such independent high pressure mains were considered absolutely essential.

In the fire departments themselves it was interesting to note that along with the increase of technical interest and training, there was a marked advance in the spread of the fire prevention spirit and campaign. It was clearly evident there was a passing of the old type of fire fighter whose method and pleasure apparently was the throwing of vast quantities of water. The reduction of the number of fire alarms rather than the number of fires extinguished was beginning to mark the efficiency of a fire department and its chief, who was becoming both a public conservation officer and educator. Chief O'Brien of the Indianapolis Fire Department, who had to deal with an average of five or six fires a day from sparks on shingle roofs, made it a practice as soon as he had such a fire under control to deliver a lecture on the wooden shingle hazard to the crowd of men and women attracted by the fire.

For the protection of water fronts large and more powerful fire boats were being built with modern centrifugal and other pumps, and these were valuable adjuncts to most of the large cities with warehouse piers and other harbor facilities, as their pumping facilities could be brought to bear on fires not too far distant from the water front either through hose lines or permanent pipe systems.

In Europe where greater care ordinarily is exercised than in America there were not the same fire losses, and in England, in particular, there was a steady improvement in fire apparatus which manufacturers of motor equipment are turning out constantly on a more efficient basis. In Japan, in connection with the earthquake of 1923, the district including the cities of Tokyo and Yokohama, suffered from fire involving a loss in the former city alone of 184,103 residence buildings and 4488 other buildings, or about 74 per cent of the total outlay of building in the city was destroyed, while in Yokohama the destruction was even more complete. Of course the earthquake was responsible for much of this destruction, and it would be impossible to settle the damage done by the primary cause and that resulting from fire, but it was a very serious element in this disaster.

Showing the widespread distribution of American cities in which the fire losses exceeded five dollars per capita in 1923, as reported by the Annual Board of Fire Underwriters, the accompanying table is of interest, and when it is realized that a number of these cities have figured on a corresponding list for more than one year out of five the seriousness of the situation may be appreciated.

UNITED STATES CITIES IN WHICH FIRE LOSS
EXCEEDED \$5.00 PER CAPITA
1923

Chicago Heights, Ill.	\$28.95	Wichita, Kans. .	\$6.77
Jackson, Miss. .	27.83	Durham, N. C. .	6.73
Hagerstown, Md.	18.33	Key West, Fla. .	6.72
Montgomery, Ala.	15.03	Louisville, Ky. .	6.69
Charlotte, N. C.	14.81	Nashville, Tenn.	6.55
Muskegon, Mich.	13.31	Savannah, Ga. .	6.52
Marion, Ind. . .	13.00	Duluth, Minn. .	6.52
Garfield, N. J. .	12.63	Pine Bluff, Ark.	6.47
Omaha, Neb. . .	11.43	Vicksburg, Miss.	6.46
Concord, N. H. .	11.14	Springfield, Ill.	6.21
Plainfield, N. J.	10.82	Norwalk, Conn. .	6.20
Chelsea, Mass. .	10.61	Springfield, Mass.	6.14
Stockton, Cal. .	10.55	Burlington, Iowa	6.13
Charleston, W. Va.	10.52	Shreveport, La. .	6.08
Dallas, Tex. . .	10.06	Memphis, Tenn. .	6.04
Duquesne, Pa. .	10.00	Danville, Ill. . .	5.92
Springfield, Mo.	9.85	Moline, Ill. . . .	5.73
Oshkosh, Wis. . .	9.78	Revere, Mass. . .	5.67
Leominster, Mass.	9.45	Baton Rouge, La.	5.63
Riverside, Cal. .	9.11	New London, Conn.	5.60
Lancaster, Pa. .	8.94	Ottumwa, Iowa . .	5.56
Haverhill, Mass.	8.56	La Crosse, Wis. . .	5.51
New Albany, Ind.	8.36	Sedalia, Mo. . . .	5.48
Boston, Mass. . .	8.18	Lowell, Mass. . . .	5.44
Fort Smith, Ark.	8.05	Battle Creek, Mich.	5.44
Grand Rapids, Mich.	8.03	Wilmington, N. C.	5.40
Eau Claire, Wis.	7.44	Oswego, N. Y. . . .	5.37
Asheville, N. C.	7.22	Niagara Falls, N. Y.	5.36
Providence, R. I.	7.21	Kokomo, Ind. . . .	5.34
Alton, Ill.	7.18	Lexington, Ky. . .	5.28
Kansas City, Mo.	7.14	Buffalo, N. Y. . .	5.24
Everett, Mass. . .	6.86	Columbus, Ga. . .	5.14
Orden, Utah . . .	6.79	St. Paul, Minn. . .	5.13
Winona, Minn. . .		Utica, N. Y.	5.01

* These cities in this class in two of the five years.

* In this class three of the five years.

* In this class four of the five years.

* In this class five years.

In the ten years from 1913 to 1923 the annual fire losses in the United States have continually mounted, reaching in 1923 the stu-

pendous figure of over half a billion dollars, and falling but \$10,000,000 short of the record property loss of 1906, the year of the San Francisco conflagration, when the destruction of property totaled \$518,611,800. The figures by years for the period under review are given in the following table.

COMPARATIVE FIRE LOSSES, UNITED STATES
1913-1923

	Population	Total Loss	Per Capita
1913—			
Whole country	97,163,330	*\$203,763,550	2.10
298 cities	33,281,804	*74,876,608	2.25
1914—			
Whole country	98,781,324	*221,439,350	2.24
298 cities	40,213,230	*93,368,795	2.32
1915—			
Whole country	100,399,318	*172,033,200	1.71
333 cities	35,161,266	*68,886,218	1.94
1916—			
Whole country	102,017,312	*214,530,995	2.10
329 cities	36,055,568	*79,440,658	2.20
1917—			
Whole country	103,635,606	*250,753,640	2.42
327 cities	36,557,011	*89,483,393	2.45
1918—			
Whole country	105,253,300	*290,959,885	2.76
328 cities	38,079,781	*95,365,412	2.50
1919—			
Whole country	106,871,294	*320,540,399	2.99
326 cities	39,898,869	*103,028,235	2.58
1920—			
Whole country	105,683,108	*447,886,677	4.23
370 cities	39,636,748	*151,120,951	3.81
1921—			
Whole country	108,540,838	*495,406,012	4.56
370 cities	40,324,918	*141,406,007	3.51
1922—			
Whole country	109,955,947	*506,541,001	4.61
366 cities	33,821,476	*120,964,112	3.57
1923—			
Whole country	111,715,242	*508,000,000	4.55
372 cities	42,946,639	*147,102,119	3.42

* Estimated from Records of the Actuarial Bureau, National Board of Fire Underwriters.

* Actual figures reported.

The same table shows the comparative fire losses for the whole country on the basis of population and for certain selected cities for which actual figures were reported to the Actuarial Bureau of the National Board of Fire Underwriters. It must be considered, however, in connection with these statements of fire losses that in the ten year period the burnable values had materially increased, and it was a source of some encouragement to fire underwriters that the proportion of fire losses to burnable values had shown a decrease. This was claimed to be the result of fire prevention efforts of various kinds but much more needed to be done to make such efforts effective.

The United States was suffering a vast drain on its total resources and the fire losses were vastly greater, both in amount and per capita than in Europe. This is indicated by the accompanying comparison of fire losses in the United States for three years in comparison with the corresponding figures for Great Britain:

Year	Great Britain	United States
1920	\$42,445,000	\$447,886,677
1921	38,820,000	495,406,012
1922	30,812,000	521,860,000

The population of Great Britain in 1922 was approximately 43,000,000 people, and the population of the United States for the same year was about 111,000,000. Consequently the per capita loss in Great Britain in 1922 was 72 cents as compared with \$4.75 for the United States. These figures indicated a continued decrease in the British fire loss, and a marked increase in losses in the United States. See INSURANCE; also FORESTRY, section Forest Fires.

FISCHER, EUGEN (1881-). A German writer, born at Balingen, Württemberg, and educated at the University of Tübingen. After teaching in the University of Berlin, he became a free lance writer, specializing in articles on the responsibility for the War. He was made press secretary of the Reichstag commission inquiring into pre-war history. Besides newspaper articles on cultural and political subjects, he is the author of *Der Kampf um Gott, Das Reich des Lebens*, an historical novel; *Woodrow Wilsons Entschluss*, political scenes; etc.

FISCHER, MARTIN HENBY (1879-). A German-American physiologist and pathologist, born at Kiel, Germany. He came to the United States in 1885 and took a degree at Rush Medical College. Having held subordinate positions in the department of physiology in the Universities of Chicago and California, he became full professor in the University of Cincinnati in 1910. He is known especially for his original research into the nature of nephritis and has been instrumental in bringing the subject of focal infection before the German medical men; he has also made a number of German works on physical chemistry available to English readers by his translations. In addition to many articles in periodicals he has published *The Physiology of Alimentation* (1907), *Cedema* (1910), *Nephritis* (1911), and has translated Cohen's *Physical Chemistry* (1903), Pauli's *Physical Chemistry* (1906), Ostwald's *Handbook of Colloidal Chemistry* (1915), and Ostwald's *Introduction to Colloidal Chemistry* (1917).

FISH, CARL RUSSELL (1876-). An American historian, born at Central Falls, R. I., and educated at Brown and Harvard Universities. In 1900 he became professor of history at the University of Wisconsin, and was research associate at the Carnegie Institution in 1908-09 and director of the British branch of Historical Service, 1917-20. His works include *Development of American Nationality* (1913), *American Diplomacy* (1915), *The Path of Empire* (1919), *Guide to the Study of American Diplomacy* (1919), and many articles on educational and historical subjects.

FISHBERG, MAURICE (1872-). A Russian-American physician and anthropologist, born in Russia. Having migrated to the United States in 1890, he took his medical degree at the University of New York in 1897. He is clinical professor of medicine at the New York University and Bellevue Hospital Medical College and physician to the Montefiore Home and Bedford Sanitarium and is a member of the American Anthropological Association. In 1897 he made a tour of Europe for the Bureau of Emigration; his report was published by the Government. He is one of the leading authorities on tuberculosis; most of his papers for the periodical press have been devoted to that subject. His major publications are *The Jew: a Study of Race and Environment* (1911); *Die Rassenmerkmale der Juden* (1913), and *A Treatise on Tuberculosis* (1916). He translated Gley's work on internal secretions from the French in 1917.

FISHER, ANDREW (1862-). An Australian statesman (see Vol. VIII). He was again Prime Minister of Australia in 1914-15 and was High Commissioner of Australia in England, 1916-21.

FISHER, DOROTHY CANFIELD (1879-). An American author, born at Lawrence, Kan.,

and educated at the Ohio State University and at Columbia University. In 1907 she married John Redwood Fisher of New York, and made her home on a farm near Arlington, Vt., and in New York City. In 1911-12 she and her husband went to Rome, where she made the acquaintance of Madame Montessori and helped translate her book about her pedagogical system. From this experience resulted her own book, *A Montessori Mother* (1913), which was translated into five foreign languages. During the War Mrs. Fisher edited a magazine for soldiers blinded in battle, cared for children from the evacuated portions of France, and managed the cooking and bought supplies for a large training camp for ambulance drivers. Her books include *The Squirrel Cage* (1912), *Mothers and Children* (1914), *The Bent Twig* (1915), *Hillsboro People* (1916), *The Real Motive* (1917), *Understood Betsy* (1917), *Home Fires in France* (1918), *The Day of Glory* (1919), *The Brimming Cup* (1921), *Rough-Hewn* (1922), *Raw Material* (1923), and *The Homemaker* (1924). She translated Papini's *Life of Christ* (1921).

FISHER, FRED (ERICK) B(OHN) (1882-). An American Methodist Episcopal bishop, born at Greencastle, Pa., and educated at Asbury College (Wilmore, Ky.), Boston University, and Harvard University. He was ordained in the Methodist ministry in 1903 and in the next year went to India as a missionary, returning in 1906. From 1908 to 1910 he was pastor of the First Church in Boston and in 1910-20, served on the Board of Foreign Missions and in the Laymen's Missionary Movement. In 1920 he was elected bishop. He is the author of *The Way to Win* (1915), *Gifts from the Desert* (1916), *India's Silent Revolution*, in collaboration with Gertrude M. Williams (1919), and *Garments of Power* (1920).

FISHER, HERBERT ALBERT LAURENS (1865-). An English historian and educator (see VOL. VIII). He received honorary degrees from Edinburgh University (1913), Sheffield (1918), Manchester (1919), and Cambridge (1920). In 1915 he was a member of the government committee on alleged German outrages. Two of his later works are *Studies in History and Politics* (1920) and *International Experiment* (1921).

FISHER, IRVING (1867-). An American economist (see VOL. VIII). He was an officer of many organizations for the advancement of the public health. His later writings include *Why Is the Dollar Shrinking?* (1914); *How to Live*, with Dr. E. L. Fisk and others (1915); and *Stabilizing the Dollar* (1919). His views on the means of insuring a stable medium of exchange were the subject of wide discussion.

FISHER, SYDNEY GEORGE (1856-). An American lawyer and writer (see VOL. VIII). He wrote *American Education* (1917) and *The Quaker Colonies* (1918).

FISHER, WALTER KENDRICK (1878-). An American zoölogist, born at Ossining, N. Y., and educated at Leland Stanford Junior University. He was special field naturalist for the United States Biological Survey (1897-1901); and Assistant (1902-05), acting instructor (1905-07), instructor (1907-09), assistant professor (1909-20), and associate professor (1920-) at Stanford. Professor Fisher was director of the Hopkins Marine Laboratory

(1917-). His published work was largely on the ecinoderms of the Pacific Ocean.

FISHERIES. A term of varied application but used here to designate organized governmental agencies which have to do with the collection of information concerning food supplies obtained from oceanic or inland waters and the application of this information to the problem of increasing or making these supplies more available to the citizens. In all countries where fishing industries are important, it has been the experience that there occur periods when there are noticeable decreases in the amount of these supplies to be obtained from the waters and this decrease is usually laid to injudicious fishing. As a result, a large part of the work of a fisheries bureau is to devise methods for increasing the supply, and legislation governing the methods to be employed in taking it.

In Great Britain, the plaice and herring industries have received most attention from this point of view, plaice investigations having been begun in 1908. McIntosh, an eminent Scottish zoölogist, has argued strongly against the desirability of spending public funds for investigations of this kind, on the ground that so small an area of oceanic waters can be covered by fishermen that it is impossible that any decrease in the supply can be caused by fishing. He argues that seasonal variations in the number of fish are caused by climatic or other agencies beyond man's control and have been known to occur for hundreds of years. These criticisms by McIntosh are directed especially against the work of the International Council for the Study of the Sea, composed of representatives of all the countries bordering on the North Sea, in so far as the work of this Council is directed at repopulating by artificial means the waters under their control. This Council was organized in 1901 and was functioning successfully when interrupted by the War. After the War, it resumed operations, the first meeting later than 1913 having been held in 1920. Statistics covering the herring and plaice industries have appeared in its reports. An interesting development from the work of this Council has been the discovery of the breeding place of the eel. Grassi discovered, as early as 1897, that the eel does not breed in fresh water but its exact breeding place was unknown. It has now been determined that this breeding place lies between 20° and 30° of north latitude and 50° to 60° west longitude, or a region southeast of Bermuda. From there it migrates to the continents and goes up rivers to the localities where it is commonly found.

In the United States, the Bureau of Fisheries (originally the United States Fish Commission but now a Bureau under the Department of Commerce) has general supervision over the marine and fresh-water fisheries in United States territory as well as the fur seal, reindeer and fox industries in Alaska. Under its control are four main laboratories; at Woods Hole, Mass.; Beaufort, N. C.; Key West, Fla.; and Fairport, Iowa. In all of these it has been the policy of the Bureau to encourage abstract scientific investigation as well as researches having more immediate practical application. At the Woods Hole station formerly there were hatched each year large numbers of lobsters which were set free in the neighboring waters; but as it seemed impossible to enlist the co-

operation of the fishermen in the attempt to prevent the catching of the "short" or immature lobsters, the supply decreased so that it was difficult to get enough eggs for this work and it was discontinued in 1919. In this case, it would appear that McIntosh's position is not well taken, due perhaps to the fact that the lobster has a very limited range of distribution and is not an open-sea animal.

Invention of machinery making commercially profitable the manufacture of buttons from the shells of fresh-water mussels led to the establishment of the laboratory at Fairport, where much attention has been given to the problem of the propagation of mussels and of the fishes upon which the young mussels are parasitic for a period during their immature stage. The latest reports of the Commissioner indicate that owing to lack of funds the laboratories at Beaufort and Key West have done very little research work in recent years. At these stations, and at many hatching stations, the Bureau hatches large numbers of fish annually and distributes them to appropriate localities. During the year ending June, 1922, it distributed 4,925,981,320 eggs, fry and older fish in this fashion.

According to the latest report available in 1924, a period of extreme depression in the fishing industries, which was more severe in Europe than in the United States but very noticeable in the latter country, followed the War. This depression showed itself in a marked decrease in the amount of fish taken as well as in the prices obtained; it continued for some years, though by 1922 a slight improvement was noted.

A large part of the work of the United States Bureau of Fisheries consists of the collection of statistics relating to the fisheries, including the Alaska fur industries, and the reports of the Commissioner as well as the occasional *Statistical Bulletins* should be consulted for this information, which is too varied and voluminous to be summarized here. These statistics cover not only data relating to fish properly so called, but relate to a wide range of aquatic products covering oysters and clams, lobsters, shrimps and crabs, and sponges, as well as by-products such as whale and fish oil, shark and porpoise hides, agar-agar, shark fins, whale skeletons and oyster shells ground up for use as lime and poultry grits.

Much of the recent work of the Bureau has been extended to cover determination of improved methods for merchandising fishery products as well as the consideration of better preservation procedures in connection with canning and freezing, thus broadening the scope of its operations so as to include the final distribution of the products as well as encouraging their increase.

In Alaska, the predominant fishery interests have been connected with the salmon, but halibut, herring, cod and shrimps form an important part of the total catch. The peculiar spawning habits of the salmon make them especially easy to catch but this also leads to overfishing, with consequent depletion of the supply, another case where McIntosh's reasoning seems at fault, and this situation calls for constant legislative supervision. The taking of skins of the fur seals is now under strict supervision. It being decided annually how many should be taken. This has resulted in a desirable increase in the size of the herds and the establishment of the industry on a more durable

basis. For the year 1921-22, the total value of the sealskins taken (as determined by the prices paid at auction for them at St. Louis) was \$722,060. Blue-fox skins taken from herds kept on the Pribilof Islands for the year 1920-21 had a value, determined in the same way, of \$109,398. See ALASKA.

FISK, EUGENE LYMAN (1867-). An American physician and cofounder of the Life Extension Institute, born at Brooklyn, N. Y., and educated at the medical college of New York University. In 1898 he joined the medical department of the Equitable Life Insurance Company and later became medical director of the Provident Savings Life Insurance Company. In 1910 he accepted a like position in the Postal Life Insurance Company and in 1913 became the medical head of the Life Extension Institute. In collaboration (Fisher and Fisk) he wrote *How to Live* (1916) and *Health for Soldier and Sailor*. He is the author of *Alcohol: Its Relation to Efficiency and Longevity* (1917) and *Health Building and Life Extension* (1923).

FISKE, BRADLEY ALLEN (1854-). An American naval officer (see VOL. VIII). He was awarded a gold medal by the Aéro Club of America for the invention of the torpedoplane in 1919. His later writings include *The Navy as a Fighting Machine* (1917, 2d ed., 1918); *From Midshipman to Rear Admiral* (1919); *The Art of Fighting* (1920), and *Invention* (1921).

FISK UNIVERSITY. A coeducational institution for negroes at Nashville, Tenn., founded in 1868. Dormitory limitations prevented much variation in attendance, which was 516 in 1914 and 517 in 1923-24, exclusive of the summer registration. For its rigid emphasis on high standards in all departments it was aided during the decade by the General Education Board, the Carnegie Foundation, the Carnegie Corporation, the Phelps-Stokes Fund, the Slater Fund, the American Missionary Association, the Harmon Foundation and the Juillard Foundation. Fisk received, chiefly from the General Education Board and the Carnegie Corporation, the sum of \$150,000 in 1917; in 1920 the General Education Board offered to give \$500,000 on condition that the University raise \$1,000,000. The faculty in 1923-24 numbered 71. President Fayette Avery McKenzie, Ph.D., was inaugurated in 1915.

FITCH, ALBERT PARKER (1877-). An American educator, born in Boston, and educated at Harvard University and Union Theological Seminary. He was ordained in the Congregational ministry in 1903, subsequently holding various pastorates, and becoming president of Andover Theological Seminary at Cambridge in 1909. In 1917 he resigned to accept the professorship of the history of religion at Amherst College, where he was one of those who withdrew from the faculty on the resignation of President Meiklejohn in 1923. In 1919-20 he was Beecher lecturer at Yale University. He is the author of *The College Course and the Preparation for Life* (1914), *Religion and the Undergraduate*, *Can the Church Survive the Changing Order?* (1920), and *Preaching and Paganism* (1920).

FITE, WILLIAM BENJAMIN (1869-). An American educator, born in Marion, Ohio. He studied at Hillsdale College and took post-graduate work at Cornell. After teaching mathematics in the Academy, he served on the

faculty of Cornell as instructor and assistant professor in mathematics until 1910, when he was appointed professor of mathematics at Columbia. He wrote *College Algebra* and *First and Second Courses in Algebra*.

FITZGERALD, F(RANCIS) SCOTT (KEY) (1896-). An American author, born at St. Paul, Minn. He left Princeton University in 1917 to join the American forces and served as aide-de-camp to Gen. John F. O'Ryan (1918-19). Written with refreshing verve and promising talent, his books on the younger generation include *This Side of Paradise* (1920), *Flappers and Philosophers* (1920), *The Beautiful and the Damned* (1921), and a play, *The Vegetable* (1923).

FITZ-GERALD, JOHN DRISCOLL, (1875-). An American philologist (see Vol. VIII). He is professor of Spanish at the University of Illinois. His most recent work was a translation with Thatcher Howland Guild, *A New Drama by Manuel Thoma y Baus* (1915).

FITZMAURICE-KELLY, JAMES (1858-1923). An English writer and Spanish scholar (see Vol. VIII). From 1909 to 1916 he was professor of Spanish language and literature at the University of Liverpool and in 1916 gave a special course at Cambridge. He was the editor of the Romance section of the *Modern Language Review*, 1913-20, and one of the leaders in his field in his own and other countries. Among his later works are *Cervantes and Shakespeare* (1916); *Gongora* (1918); *Fray Luis de Leon* (1921); and *Spanish Literature Primer* (1922). He edited *The Oxford Book of Spanish Verse* (1913), *Samaniego's Fabulas en verso* (1917), *Iriarte's Fabulas Literarias* (1917), *Garcilaso de la Vega's Eglogas* (1918), *Poesias varias* (1918), *Complete Works of Miguel de Cervantes Saavedra*, and *Cambridge Readings in Spanish Literature* (1920). He also contributed to the *Cambridge Modern History*, *Encyclopædia Britannica*, *Homenaje a Menéndez y Pelayo*, etc.

FITZPATRICK, EDWARD AUGUSTUS 1884-). American educator and author, born in New York, and educated at the New York Training School for Teachers and Columbia University. He taught in the public schools of New York (1903-12) and later identified himself in that city with training schools for public service. In 1919 he became secretary of the State Board of Education in Wisconsin. He has published *Educational Views and Influence of De Witt Clinton* (1911), *Budget-making in a Democracy* (1918), and *Public Administration and the Public Welfare in Freedman's America and the New Era* (1920).

FIUME-ADRIATIC CONTROVERSY.

The drawing of the boundary line between Italy and Jugo-Slavia was perhaps the most difficult problem before the Peace Conference, and continued to be a cause for dissension in Europe long after the peace treaties were signed. The territories in dispute were: Gorizia and Gradisca, Trieste, Istria, Dalmatia (all former parts of Austria), and Fiume (formerly belonging to Hungary). These lands, in the main, are separated from Jugo-Slavia by chains of mountains; in climate, economic, and cultural activities, with some exceptions, their orientation is plainly toward the west. While the Slavs made up the majority of the population, the Italians predominated in many of the towns,

and it was for sentimental, historical, and strategic, as well as economic reasons that Italian aspirations envisaged the acquisition of these territories. The nationalistic trend of the nineteenth century had made the region the scene of bitter struggles. In accordance with the Austro-Hungarian principle of "divide and rule," Slovene and Croatian hopes had been encouraged, as against the Italian, in the Austrian provinces; Hungary, on the other hand, had played off the Italians against the Southern Slavs in Fiume. Therefore, whereas an Italian irredentism was strong in the Austrian territories, it was correspondingly weak in the Hungarian. Because of these confused purposes there were no clear-cut programmes that either the Italians or the Southern Slavs could present at the outbreak of the War. It was natural, therefore, that the Italian claims, recognized by the secret Treaty of London (Apr. 26, 1915), were, in a sense, confusing. Italy gained the promise of Allied support to an Italian frontier which included Gorizia, Trieste, Istria, Northern Dalmatia and some islands to the south; Fiume was to remain in Croatia, on the supposition, evidently, that it was to continue to form a part of Hungary. The execution of this agreement would have meant turning over about 800,000 Jugo-Slavs to Italy. On geographical and cultural grounds there was indeed some justification for this. Gorizia, Trieste, and Istria (making up Venetia Julia), presented no real difficulty, for though in 1910 there were here 417,000 Jugo-Slavs and 356,000 Italians, the Slavic cultural and ethnical complexities were so many that the Italians were clearly the dominant group. As proof, the fact was urged that out of the 17 deputies in the Austrian Reichsrat for the three provinces, 10 were Italians. Dalmatia and Fiume involved other considerations. Dalmatia had 611,000 Jugo-Slavs in 1910 and only 18,000 Italians; and the Jugo-Slavs, politically, controlled every commune in the province but one. Italians, putting aside questions of ethnography, emphasized its alleged geographical unity with the west and its strategic importance, its long affinity with the Latin race and Italian culture, and the bitter fight which the communes of the province had fought with Austrian officials for the preservation of the Italian language in schools and administration (though by 1914 only one city, Zara, had succeeded in remaining Italian). On both sides there soon manifested itself a willingness to compromise these two points: Italy to get Venetia Julia, the Jugo-Slavs to get Dalmatia. Fiume furnished the basis of the real struggle. Fiume (together with its suburb Sušak) had a population distributed as follows: 22,488 Italians and 13,351 Jugo-Slavs in Fiume; 1500 Italians and 11,000 Jugo-Slavs in Sušak. The Fiumani had been encouraged in their independent spirit by the Hungarians and had derived great benefit from the Hungarian connection in that their city had served as the chief entrepôt of the Hungarian Adriatic trade. Italian nationalists, eager to obtain complete commercial and naval domination in the Adriatic, coveted Fiume not only because its upper class was Italian but also because it might rival Italy's newly acquired seaport of Trieste. The Jugo-Slav position depended on other factors. If the suburbs were included, Fiume was not Italian, but predominantly Jugo-Slav. Moreover, in order to connect Fiume with Italy,

large blocks of indisputably Jugo-Slav territory would have to be placed under alien sovereignty. Furthermore, the commercial hinterland of the city included Croatia, and Italian control of Fiume would mean the economic subservience of Jugo-Slavia, for Fiume was the only adequate outlet for Jugo-Slavia on the west. (In connection with this factor it must be borne in mind that perhaps one of the reasons why the settlement was such a tardy one was that the Fiume question was agitated only by the Croats and Slovenes while the more important Serbs manifested only a slight interest in the western frontier, for their natural trade outlets were the Danube and the Vardar.) So much for underlying considerations. On Oct. 29, 1918, Italian troops, at the behest of the Fiumani, occupied the town. The Allies, in their turn, protested on the ground that Fiume had not been assigned to Italy, with the result that an inter-Allied army took possession. The course of events before the Peace Conference was characterized by a bitter struggle that terminated in a deadlock. The Italians took their stand on the Treaty of London line, claiming Fiume as well on the ground that the dissolution of the Austro-Hungarian Monarchy had entirely changed the situation. The Jugo-Slavs found a champion in President Wilson, who stubbornly contested the Italian claims on the eastern boundary and supported a frontier which ran on the north along the London line to Tarvis and then dipped south along the centre of the Istrian peninsula. Fiume was to be internationalized though left within the Jugo-Slav customs union. (This was the well known "Wilson Line" presented Apr. 14, 1919.) That the Italians should be embittered was natural: they had entered the War largely as a result of the Treaty of London; they had the support of their allies in their claims; they demanded the territories for important strategical and cultural reasons. The failure to reach a compromise prompted President Wilson to issue his famous appeal of April 23 to the Italian people over the heads of their delegation. (See PEACE CONFERENCE AND TREATIES.) But the statement acted as a boomerang, for instead of winning over the Italian people it completely estranged them, with the result that Orlando's government, on June 19, was defeated in the Italian Parliament. All chances for a settlement, at least as far as the Peace Conference was concerned, had thus gone aglimmering. Meanwhile affairs in Fiume had steadily grown desperate. The Fiumani and the French soldiers in occupation fell out and rioting occurred; the disorganized economic life was producing real want among the population. Hence, When Premier Nitti showed a disposition to sacrifice Italian nationalistic claims in the interest of peace, Italian chauvinists took matters into their own hands. It was no wonder, therefore, that when on September 12 the poet-militarist D'Annunzio, at the head of a band of volunteers and Italian regulars, marched into Fiume, his coup de main should be received with such exuberant Italian approval. Italian soldiers and sailors in the port flocked to his standard and such eminent Italians as Professor Pantaleoni and General Ceccherini hastened to join him. The Supreme Council was spurred into action and during the next few months concerned itself with various programmes. The scheme proposed on Dec. 9, 1919, called for the

creation of a Fiume buffer state (for by this time Italy had dropped Dalmatia), which Italy, however, refused to support; a subsequent combined Italian-English-French proposal, Jan. 14, 1920, called for the assignment of Fiume to Italy with League control of its port and terminal connections, but to this both Jugo-Slavs and Wilson objected. Thenceforth the struggle became localized, and with the withdrawal of the United States from world affairs, the declining interest of Great Britain and France in the Adriatic, and the imminent defeat of the Democratic party in the American elections of 1920, it appeared evident to both disputants that only a spirit of conciliation would serve their best interests. In June, 1920, the Italians finally evacuated their last strongholds in Montenegro and Southern Dalmatia. On November 12, a treaty was signed by Italy and Jugo-Slavia at Rapallo which showed how much both had yielded. Italy was to annex part of Carniola and all Istria and push her frontier east to the confines of Fiume; Fiume was to be created an independent state though Sušak was to go to Jugo-Slavia; Italian claims to Dalmatia (except Zara) and almost all the islands (excepting Cherso, Lussin, and Unie) were renounced. Ratifications were exchanged Feb. 2, 1921, and the vexing business seemed on the verge of settlement when it leaked out that the Italian government privately had promised to turn over Porto Barros, a portion of the Fiume port, to Jugo-Slavia. Again the Italian public was aroused and again Fiume became the bone of contention. Meanwhile the D'Annunzio tangle had been straightened out. On Sept. 8, 1920, he had promulgated a singularly unconventional constitution, and this, with his continued impractical and flamboyant conduct, served to alienate the more serious elements which had joined him. In December he was ordered by the Italian government to evacuate the town, and on his refusal to do so, the signal was given to attack (December 24). Realizing the hopeless nature of his position, four days later he handed over his powers to the town council, and by Jan. 2, 1921, the Italian regulars were in control. D'Annunzio was ejected and steps were taken to establish the independent government provided for by the Treaty of Rapallo. Elections were held in April, 1921, for a Constituent Assembly, but the Italian nationalists, being defeated, destroyed the returns, and violence again prevailed. The Fascisti, who had organized themselves in sympathy with Italian Fascism (see ITALY), seized the city government and established a Fascist Directory. Difficulties engendered in Italian evacuation of the Northern Dalmatian zone necessitated the negotiation of the supplementary convention of Santa Margherita (October, 1922) between Italy and Jugo-Slavia, though even this did not much expedite matters, in particular as far as Fiume was concerned. In November, 1922, the Fascisti government came into power in Italy and Mussolini at once indicated that it was his intention to hasten a settlement. Independent local government in Fiume had proved itself a failure, though this may have been due to the interference of the Fascisti; economic life also was completely disorganized. In 1923, Mussolini exchanged a series of notes with the Jugo-Slav government relative to the status of the disputed city. As his demands for revision of the Rapallo Treaty and assignment of Fiume to

Italy were made in the peremptory style in which he had been accustomed to address the Italian Parliament, rather than with diplomatic suavity, the negotiations became increasingly acrimonious. When an Italian military force under General Giardino seized the city, a rupture of diplomatic relations and perhaps even graver consequences seemed imminent, but secret bargaining between Belgrade and Rome ultimately averted armed conflict. In January, 1924, it was announced that an agreement had been reached. The treaty, signed at Rome, three days later, ceded the city and port of Fiume to Italy, recognized Jugo-Slav sovereignty over Porto Barros, leased to Jugo-Slavia a port in the Fiume harbor, and made the Fiume railway station an international frontier station. Additional conventions signed at the same time recognized Jugo-Slav sovereignty over Dalmatia and Italian sovereignty over Venetia Julia. More significant than this settlement, momentous as it was, and clearly indicative of the Jugo-Slav attitude, was the treaty of friendship and alliance signed, by which Italy and Jugo-Slavia each pledged itself to maintain the "order of things established by the treaties of peace" and to remain neutral in the event of a war engaged in by either. It appeared, in 1924, to be a great forward step in the maintenance of European peace, and that the treaty was received with approval in Jugo-Slavia as well as in Italy indicated how general was the satisfaction.

FIVE-POWER NAVAL TREATY. See WASHINGTON CONFERENCE, and NAVIES OF THE WORLD.

FIXATION OF NITROGEN. See CHEMISTRY, and FERTILIZERS.

FLAMMARION, CAMILLE (1842-). A French astronomer (see VOL. VIII). Among his later writings are *Death and Its Mystery*, in three parts (1920, 1921, 1922), and *Haunted Houses* (1924).

FLANAGAN, JOHN (1865-). An American sculptor (see VOL. VIII). Although his work included such sculptures as the bronze memorial portrait of Samuel Pierpont Langley, Smithsonian Institution, and the Bulkley Memorial, Aetna Life Insurance Building, Hartford, he was active chiefly as a medallist, especially during the War. He executed the "Médaille de Verdun," voted by Congress and presented to that city by the President. The fine realism of his portraiture and his subtle handling of lights and shadows made him preëminent in low relief.

FLANDERS, BATTLES IN. See WAR IN EUROPE, *Western Front*.

FLEMING, DANIEL JOHNSON (1877-). An American clergyman, born at Xenia, Ohio, and educated at Wooster University, Union Theological Seminary, and Columbia, Chicago, and Punjab universities. He was ordained in the Presbyterian ministry in 1903 and went to India in 1904 as professor of physics and director of Forman Christian College at Lahore. He remained there until 1913. In 1915 he was appointed organizing director of the department of foreign service at Union Theological Seminary, and in 1918, professor of missions. In 1919-20 he was a member of the International Commission on Indian Village Education. He is the author of *Social Study, Service and Exhibits* (1913), *Devolution in Mission Administration* (1916), and *Marks of a World Christian* (1919). He collaborated in *Village*

Education in India (1920) and *Schools with a Message in India* (1921).

FLEMING, JOHN ADAM (1877-). An American magnetician, born in Cincinnati. He graduated from the University of Cincinnati in 1899 and from that year to 1910 was with the United States Coast and Geodetic Survey. From 1904 he was chief magnetician of the Department of Terrestrial Magnetism at the Carnegie Institution, and from 1919 was chief of the Magnetic Survey Division. He was a member of several scientific societies and wrote reports on terrestrial magnetism and other subjects for the Carnegie Institution. He also contributed numerous articles to reviews and magazines.

FLEMING, WALTER LYNWOOD (1874-). An American historian, born at Brundidge, Ala., and educated at the Alabama Polytechnic Institute and Columbia University. From 1903 to 1907, he was professor of history in West Virginia University, and from 1907 to 1917, in Louisiana State University. In the latter year he was called to a similar position at Vanderbilt University in Nashville, Tenn. He was one of the editors of the *Historians' History of the World* and edited *Lester and Wilson's History of the Ku Klux Klan* (1905), *Documentary History of the Reconstruction*, 2 vols. (1906, 1907), *Section Six of The South in the Building of the Nation*, 12 vols., and the *Mississippi Valley Historical Review*. Besides being a contributor to numerous periodicals and encyclopædias, as well as to the *Photographic History of the Civil War*, he is the author of *Reconstruction of the Seceded States* (1905), *The Civil War and Reconstruction in Alabama* (1905), *William Tecumseh Sherman as College President* (1912), *The Sequel of Appomattox* (1919), and *Biography of Jefferson Davis and a History of the Ku Klux*.

FLEMISH MOVEMENT. See BELGIUM.

FLensburg. See SCHLESWIG.

FLERS, ROBERT DE (1872-). A French dramatist, born at Pont l'Évêque, and educated at the Lycée Condorcet in Paris. He devoted himself to drama and diplomacy. Among his theatrical works, which earned him a place in the French Academy, the undisputed masterpiece is *Le Roi*, written with Cavallet and Arène. It combined the breeziness of a revue and the biting satire of Beaumarchais. His theatrical works include *Le Cœur à Ses Raisons*; *Les Sentiers de la Vertu*; *L'Ange du Foyer*; *Miquette et sa Mère*; *La Chance du Mari*; *Le Montausier*; *L'Amour Vieille*; *L'Eventail*; *Le Roi*; *Le Bois Sacré*, *L'Ane de Buridan*; *Papa*; *Primerose*; *L'Habit Vert*; *La Belle Aventure*; and *Monsieur Bretonneau*. His operettas and comic operas, written in collaboration with G. de Caillavet, are *Les Travaux d'Hercule*; *Chonchette*; *Le Sire de Vergy*; *Monsieur de la Palisse*; *Paris, ou le Bon Juge*; *Fortunio*; *Béatrice*; *Cydalisæ*; *Le Retour*; and *Les Vignes du Seigneur*. Among his critical and fictional works may be mentioned *Vers l'Orient*; *Entre Cœur et Chair*; *Essais de Critique*; *Histoire de la Courtisane Taia*, and *La Petite Table*.

FLETCHER, FRANK FRIDAY (1855-). An American naval officer (see VOL. VIII). He was promoted to the rank of admiral in March, 1915. He was a member of the War Industries Board in 1917 and the general board of the navy, and was awarded a medal of honor for distinguished conduct in battle.

FLETCHER, HENRY PRATHER (1873-). An American diplomat, born at Green Castle, Pa., and educated at Chambersburg (Pa.) Academy. He was admitted to the bar in 1894 and served with the "Rough Riders" in the Spanish-American War. His diplomatic career began in 1902 when he was secretary of the American Legation in Cuba. After diplomatic service in China, Portugal, Mexico, and South America, he resigned in 1920, and was under-secretary of state from Mar. 8, 1921, to Mar. 6, 1922. On the latter date he accepted the post of Ambassador to Belgium. He headed the United States delegation to the Fifth Pan-American Congress at Santiago, Chile, in 1923.

FLETCHER, JOHN GOULD (1886-). An American author born at Little Rock, Ark., and educated at Phillips Academy (Andover, Mass.) and Harvard. He later made England his home. He has written *Fire and Wine* (1913), *Irradiations—Sand and Spray* (1915), *Goblins and Pagodas* (1916), *Japanese Prints* (1918), *The Tree of Life*, (1918), *Breakers and Granite* (1921), and *Paul Gauguin, His Life and Art* (1921). He was one of the first to essay free verse successfully and together with Amy Lowell was considered as leading the so-called Imagist school of modern poetry.

FLETTNER RUDDER. See NAVIGATION.

FLEWELLING, RALPH TYLER (1871-). An American philosophy professor, born at De Witt, Mich., and educated at the University of Michigan, Alma College (Mich.), the Garrett Biblical Institute (Evanston, Ill.), and Boston University. He was ordained in the Methodist Episcopal ministry in 1896, holding pastorates from 1903 to 1917, and in the latter year becoming professor and head of the department of philosophy in the University of Southern California. In 1918 he was at the Sorbonne, Paris, and was appointed head of the department of philosophy at the American Expeditionary Force University at Beaune, France. He is the author of *Christ and the Dramas of Doubt* (1913), *Personalism and the Problems of Philosophy* (1915), *Philosophy and the War* (1918), and *Bergson and Personal Realism* (1919). He also contributed to the *Hastings Encyclopædia of Religion and Ethics* (1917), and founded and edited *The Personalist* (1920). In 1919-20 he was president of the Celtic Club.

FLIGHT. See AERONAUTICS.

FLINT. A manufacturing city of Michigan. Its population increased 137.6 per cent in 10 years, from 38,550 in 1910 to 91,599 in 1920; to 117,968 by estimate of the Bureau of the Census for 1923, and to 135,000 by city estimate in 1924. This rapid expansion necessitated wholesale building operations and extensive public improvements. A civic building association built 3000 houses in 1916 and as many more in 1918. A city plan was elaborated, and in 1920, a programme for improvements costing \$2,215,000 was entered upon by the city; and in 1924, expenditures of \$13,325,000 for streets, sewers, schools, parks, etc., and \$10,800,000 for public service facilities were undertaken. Work was begun on a new State armory and athletic field. Three grade schools and a high school were completed in 1923 at a cost of \$2,250,000. Industrial building costing \$19,810,000 was undertaken in 1924. The number of employees in the factories increased from 8722 to 28,481 and the assessed valuation of

the city from \$35,267,451 to \$141,253,600 between 1914 and 1923.

FLOATING DOCKS. See DOCKS.

FLOODS AND FLOOD PROTECTION. The years immediately following the War were responsible for increased attention in many parts of the world to the great problems involved in reducing the damage and danger from floods caused by the overflow of rivers and sudden freshets. In China this problem has always been a pressing one, but as damage by flood always had been considered inevitable, but slight effort had been made to reduce the hazards by engineering plans and construction. In France the overflowing of the Seine and other rivers has brought temporary inconvenience and damage, and in 1910 after the City of Paris had experienced severe floods due to the rise of the Seine, a careful investigation was made of the best methods of protecting the city from the canal danger. By 1917 a comprehensive report dealing with this subject had been prepared and officially accepted, and from that time on various measures were taken to construct suitable protection works.

In the United States the spring floods had often brought about vast inundations of farming and other lands, while the sudden rise of waters had produced great damage and loss of life in not a few instances. In addition to the usual spring floods there were numerous cases where a cloudburst or protracted rain had developed swollen streams which had overflowed their banks, and in many cases had carried away bridges, dams and other works.

In this latter connection great danger has been increased, as where towns have been located on river banks they have often encroached upon the channel of the stream, and while the waterway would be ample in ordinary seasons yet at time of flood it would be too restricted to accommodate the suddenly increased flow. Furthermore, by the construction of bridges the channel often was seriously reduced by the piers and abutments, so that not only were these structures damaged, or at times entirely carried away, but the water was backed up with manifest injury when it overflowed the banks, particularly where cities or villages were located in proximity.

The great flood of 1913 in the United States along the Mississippi and its tributaries naturally led to the discussion of remedial measures, and in the interval between that time and 1924, important work in securing increased safety from the sudden rise of waters in the spring was put under way through strengthened levees and otherwise. Inasmuch as it was not every year that conditions of flood and disaster were experienced, it was quite difficult to arouse public sentiment to the necessity for preventive works, involving considerable outlay, which might not be actually brought into use for a number of years. Nevertheless there was more general appreciation of the seriousness of the matter and in many districts adequate measures were put on foot to secure the needed protection. Many investigations were made of the conditions of rainfall, watersheds, etc., and plans were developed suitable for the territory protected.

The flood danger in the United States ranged all the way from that experienced on the lower Mississippi, where a system of levees and other works had been maintained for a number of

years, to the Ohio and other tributaries where in addition more or less comprehensive projects for protection had been worked out. In many cases there was involved a system of retarding basins or reservoirs formed by dams and dykes which would collect and temporarily restrain the run-off due to melting snows or spring rains, and also straightened and enlarged channels which would take care of the great volumes of water by regulating the flow.

A notable instance of this was the work of the Miami Conservancy District which was completed in 1922, and by means of a system of dams and improved river channels afforded adequate protection to a considerable territory. Projects more or less similar were also advanced in other parts of the country, particularly those that had experienced flood damage, but even where danger was realized it was difficult to secure adequate attention to the danger, as these works involved heavy outlay which had to be met by bond issues or some form of taxation. Nevertheless, the country was thoroughly alive to the importance of the matter.

The Miami Conservancy scheme was designed particularly to afford adequate flood protection to the city of Dayton, above which city three large retarding basins were built, the Taylorsville on the Miami River, the Huffman basin on the Mad River, and the Englewood basin on the Stillwater River. Further up on the Miami was the Lockington reservoir while on Tivin Creek emptying into the Miami below the city of Dayton the Germantown retarding basin was built. Each of these reservoirs or basins was formed by a large earthen dike or dam pierced by conduits through which the water passed normally, but which at times of flood temporarily restrained the extra water until it could be discharged properly at the capacity of the channel which by straightening and levees was increased. This work was carried on by the Miami Conservancy District and in addition to the construction of dams and channels also involved extensive changes of location of railways and roads.

The protective works of the Miami Conservancy District experienced their first serious test in the flood following the rainfall of Mar. 27-28, 1924. Water was stored back of all the dams to the following depth above the conduit floors: Germantown 41.6 feet, Englewood 40.6 feet, Lockington 27 feet, Taylorsville 23 feet and Huffman 22 feet. Conduits ran full at all dams except Huffman. Maximum discharges at the dams were as follows: Germantown 6650 second-feet, Englewood 8400 second-feet, Lockington 5350 second-feet, Taylorsville 23,000 second-feet, and Huffman 13,000 second-feet.

In addition to the dams the improved channels, which were an important part of the project, received a test when gauge heights of 12.3 and 13 feet were reached at Dayton and Hamilton, respectively. At the former point the maximum discharge was 36,000 second-feet, while at Hamilton it was 42,000 second-feet. The flood handled, while in no way approaching the actual capacity of the system, demonstrated the ability of the flood control works to meet any emergency. It was estimated that without the protective measures the gauge height at Dayton would have been five or six feet higher, as under previous

conditions, and while it would not have caused much serious trouble, yet it would have developed considerable alarm among the low lying sections which was no longer felt.

FLORIDA. Area and Population. Florida is the twenty-first State in size (58,666 square miles), and the thirty-second in population; capital, Tallahassee. The population increased from 752,619 in 1910 to 968,470 in 1920, a gain of 28.7 per cent. The white population rose from 443,634 to 638,153; the Negro, from 308,669 to 329,487; the native white, from 409,792 to 595,145; and the foreign-born white, from 33,842 to 43,008. The urban population of the State increased from 219,080 to 355,825; the rural, from 533,539 to 612,645. The growth of the principal cities was as follows: Jacksonville (q.v.), from 57,699 to 91,558; Tampa, from 37,782 to 51,608; Pensacola, from 22,982 to 31,035; and Miami, from 5471 to 29,571.

Agriculture. Although Florida is not one of the leading cotton-producing States, cotton-raising is an industry of considerable importance. In the decade 1910-20, Florida was affected, like other Southern States, by the ravages of the boll weevil, which was well established in the State by 1916-17. (See COTTON.) The extent of this damage is indicated by a comparison of the acreage and production for several years: In 1913, 188,000 acres and 59,000 bales; in 1916, 191,000 and 41,000; in 1920, 100,000 and 18,000. The production in 1922 was 25,000 bales; the estimate for 1923, 13,000 bales.

While the population of the State increased 28.7 per cent in the decade, the number of farms increased 8 per cent (from 50,016 in 1910 to 54,005 in 1920); the acreage in farms from 5,253,538 to 6,046,691, or 15.1 per cent; and the improved land in farms from 1,805,408 acres to 2,297,271. The total value of farm property showed an apparent increase of from \$143,183,183 to \$330,301,717 or 130.7 per cent; the average value per farm, from \$2863 to \$6116. In interpreting this statement, however, and, indeed, all statements of comparative values in the decade 1914-24, the inflation of currency in the latter part of that period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The percentage of the total area in farms increased from 15 in 1910 to 17.2 in 1920; the percentage of improved area in farms from 5.1 to 6.5. In 1920, of the total of 54,005 farms, 38,487 were operated by owners, 1829 by managers, and 13,689 by tenants; while corresponding figures for 1910 were 35,399, 1275 and 13,342. The white farmers in 1920 numbered 41,051, compared with 35,295 in 1910; colored, 12,954, as compared with 14,721. The farms free from mortgage in 1920 numbered 25,010 and those under mortgage, 8102. In 1910, those free from mortgage numbered 29,614 and those under mortgage, 5160. The number of beef cattle was 518,350 in 1920 and 845,188 in 1910; dairy cattle, 120,631 and 116,041; sheep, 64,659 and 113,701; swine, 755,481 and 810,069. The estimated production of the principal farm crops in 1923 was: Corn, 10,497,000 bushels; oats, 426,000 bushels; potatoes, 1,826,000 bushels; sweet potatoes, 2,830,000 bushels; tobacco, 4,158,000 pounds; hay, 89,000 tons, and peanuts, 49,920,000 bushels. For cotton, see above.

Comparative figures for 1913 are: corn, 10,125,000 bushels; oats, 900,000; potatoes, 912,000; tobacco, 4,000,000 pounds; and cotton, 59,000 bales. The increase in production of citrus fruits, from 1909 to 1919, was: oranges, 4,852,967 to 5,930,422 boxes; lemons, 12,367 to 31,204; grapefruit, 1,061,537 to 3,158,431.

Mining. Florida is not an important mineral-producing State. Phosphate rock is obtained in large quantities; and other resources include clay products, fuller's earth, mineral waters, and sand and gravel. The production of phosphate rock in 1914 was 2,138,891 long tons, valued at \$7,354,744; in 1918, 2,067,230 (\$6,090,106); in 1920, 3,369,384 (\$19,464,362); in 1921, 1,780,028 (\$10,431,642). The total value of the mineral products of the State was \$8,497,688 in 1914. It increased steadily from \$4,886,010 in 1915 to \$22,923,780 in 1920; but fell to \$12,597,948 in 1921.

Manufactures. Florida is not one of the important industrial States, although its manufactures have shown a steady increase in the last three decades. There are six cities with a population of more than 10,000 inhabitants: Jacksonville, Tampa, Miami, Pensacola, Key West and St. Petersburg. From these, in 1919, 47.8 per cent of the value of the State's manufactured products were reported. The total number of establishments in 1909 was 2159; 1914, 2518; and 1919, 2582; and the persons engaged in manufacture in those years numbered 64,810, 63,204, and 82,986. The capital invested was \$65,290,640, \$88,318,983, and \$206,293,570, respectively. In 1909, the value of the products was \$72,889,659; 1914, \$81,112,291, and 1919, \$213,326,811; but this increase was in a great measure due to changes in industrial conditions brought about by the War. The increase shown in the number of establishments and the average number of wage earners, however, is an index of decided growth in the manufactures of the State. The principal industries are those connected with lumber and timber products, with products valued at, in 1909, \$20,863,000; 1914, \$21,457,000; and 1919, \$50,409,000. Tobacco, cigars and cigarettes were second in value: in 1909, \$21,576,000; 1914, \$19,386,000; and 1919, \$37,926,000. Shipbuilding, especially during the War, acquired great importance, the value of the product rising from \$697,000 in 1909 to \$804,000 in 1914, and \$8,428,000 in 1919. Florida is first among the States in the production of turpentine and rosin; in 1909 the value of these products was \$11,938,000; 1914, \$9,573,000, and in 1919, \$21,509,000. Tampa is the first of the cities in manufacturing importance, with 182 establishments and products valued at \$13,804,000 in 1909; 202 and \$14,039,000, in 1914; and 263 and \$42,461,000 in 1919. The manufacturing establishments of Jacksonville increased from 114 in 1909 to 173 in 1914, and 244 in 1919; the value of the product, from \$6,722,000 to \$10,148,000, to \$31,212,000.

Education. Florida has been one of the most progressive of the southern States in the development of the educational system. This has been especially evident since 1892, when the school system of the State was reorganized. Elementary instruction has been greatly extended. Compulsory school attendance, educational campaigns, self-improvement associations, better and more adequate school buildings, grounds, equipment and teachers, and the transportation to and from school of pupils at public

expense, have been among the features that have contributed to progress. The advance made in high school education has been still more noticeable. Provision has been made for more adequate and suitable school plans and the employment of a larger and more efficient teaching staff. Vocational education has been greatly developed in the fields of both industrial and commercial study; and stress has been placed also on instruction in home economics. The Legislature of 1923 passed a teachers' examination certification law, which aimed at improving the grade of teachers employed. The general progress of this period is indicated by a comparison of the figures of enrollment for several years. In 1912-13, the total school enrollment was 164,727; in 1917-18, 196,405; in 1919-20, 225,160. Enrollment in the white schools in 1912-13 was 106,777; 1917-18, 137,826; 1919-20, 157,666. Enrollment in the negro schools in 1912-13 was 57,050; 1917-18, 58,579; and in 1919-20, 67,494. Attendance in the high schools of the State rose from 4264 in 1912-13 to about 8000 in 1921-22. Expenditures for public schools increased from \$2,713,390 in 1912-13, to \$4,837,045 in 1917-18, and to \$7,003,188 in 1919-20. The percentage of illiteracy in the State was diminished from 15.5 in 1910 to 10.9 in 1920. Among the native white population it decreased from 5.7 per cent to 3.7 per cent; among the foreign-born white, from 10.5 per cent to 6.6; and among the colored, from 28.8 to 24.8.

Finance. See STATE FINANCES.

Political and Other Events. During the decade 1914-24, while the State continued Democratic in national elections, in domestic politics there was a serious break in the party alignment which resulted in the defeat, in 1916, of the Democratic candidate for governor. In 1914 elections were held for minor State officers and for United States Senator. Duncan U. Fletcher was the successful candidate for the latter post, and the Democrats were uniformly successful in electing their candidates. No elections were held in 1915. In the election of 1916, when a new Democratic primary law was for the first time put into effect, Sidney J. Catts, candidate on the Prohibition-Independent ticket, defeated W. V. Knott, the Democratic candidate, for governor, and Park Trammell, Democrat, was elected United States Senator. In the presidential election of this year, President Wilson received 55,984 votes and Charles E. Hughes 14,611. A proposed "grandfather clause" amendment to the constitution, designed to prevent Negroes from voting, was defeated at this election, as was also an amendment to reapportion the Legislature. In 1917 the Seminole Indians of the State were for the first time assigned a reservation by the Legislature. They were granted an area of 100,000 acres near the Ten Thousand Islands. In the 1918 elections for Representative in Congress and for minor State officers, the Democrats were uniformly successful. At this election an amendment to the constitution providing for State-wide prohibition was adopted. In the 1920 elections, Cary A. Hardee, Democratic candidate for governor, was successful, and Duncan U. Fletcher was reelected to the Senate; in the presidential election of that year, James M. Cox received 90,515 votes and W. G. Harding 44,853. Alleged peonage in the lumber camps of the State resulted in investigations by grand



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FERDINAND FOCH

MARSHAL OF FRANCE AND GENERALISSIMO OF THE ALLIED ARMIES IN THE WORLD WAR

juries and other bodies in 1922-23. On Apr. 18, 1923, the Assembly voted to abolish flogging at county convict labor camps, and on April 20 the Senate passed a bill ending the loan of public convicts to private corporations. On April 26 the State Senate, in executive session, ordered the removal of Sheriff J. R. Jones of Leon County, charged with beating prisoners at the county convict camps. On May 14 the Legislature finally ordered the abolition of whipping at the convict labor camps, and this bill was signed by Governor Hardee.

Legislation. The Legislature in Florida meets biennially. Following are among its important accomplishments in the decade 1914-24. In 1915 several measures regulating the liquor traffic were adopted. A special session in 1918 passed measures to enforce the prohibition amendment to the State constitution and also ratified the proposed Federal prohibition amendment. The State tax commission was abolished. The Legislature of 1919 passed a measure providing for the compulsory school attendance of children under 16. In 1921 a tax of \$.01 a gallon was placed on gasoline used in the State, the revenue thus derived to be used for the building and maintenance of State highways. This measure was attacked in the courts. A constitutional amendment to be submitted to the people in 1922 was passed, providing for the reapportionment of legislative representation and increasing the membership of both the Senate and the House; measures were passed substituting electrocution for hanging; the infliction of cruel or inhuman treatment upon inmates of State institutions was forbidden; and a bill was passed to facilitate the coöperative marketing of agricultural products. The Legislature in 1923 adopted a measure declaring that "Darwinism, atheism, and agnosticism" should not be taught in the institutions of the State.

FLORIDA, UNIVERSITY OF. A State institution at Gainesville, Fla., founded in 1905. The student enrollment increased from 349 in the year 1913-14, and 140 in the summer of 1913, to 1287 in the year 1923-24, and 1075 in the summer of 1923, and the faculty was increased from 63 to 76 members. A gymnasium was built in 1919. The auditorium unit of the administration building was under course of construction in 1923-24. It was estimated that this building, when completed, would cost approximately \$750,000. President, Albert Alexander Murphree, LL.D.

FLOTILLA LEADER. See VESSEL, NAVAL.
FLYING BOAT. See AERONAUTICS.

FLYNN, WILLIAM JAMES (1867-). A chief of the United States Secret Service, born in New York, where he was educated at the public schools. He entered the Secret Service Department of the United States government in 1897. In the period 1912-17, he was chief of the Secret Service; in 1918, chief of the Secret Service of the United States railroad administration, and director of the Bureau of Investigation of the Department of Justice, 1919-21.

FOCH, FERDINAND (1851-). Marshal of France and commander-in-chief of the Allies' armies during the War. He was born at Tarbes and was educated at the Catholic College of St. Clément at Metz and at the Ecole Polytechnique. He entered the army and advanced rapidly. As a writer he devoted himself to the science of military tactics; his published works

include *Les Principes de la Guerre*, *De la Conduite de la Guerre*, and *Eloge de Napoléon*. He was appointed generalissimo of the Allies' armies by Clemenceau after the American government had asked for a unified command. He drafted the armistice terms which put an end to hostilities between Germany and the Allies on Nov. 11, 1918. After the War he was chosen one of France's forty Immortals and also a member of the Academy of Science. He received the highest honors and an enthusiastic popular welcome on his visit to the United States in 1921. Marshal Foch was married to Mlle. Julie Bienvenue. Three children were born of the union, including one son who was killed on the field of battle. See WAR IN EUROPE.

FOG SIGNALS. See LIGHTHOUSES AND RADIO TELEGRAPHY.

FOKKER, ANTHONY H. G. (?-). A Dutch aircraft constructor who has had a great influence on new developments in American airplane construction involving welded steel tubing in fuselage construction. Mr. Fokker built his first all steel fuselage in 1911—built up of steel tube longerons to which are welded vertical and horizontal steel tube struts and which are cross-braced by wires held taut by turnbuckles. One of the newest Fokker planes is a convertible bomber and torpedo dropper. The engine takes up a very small place in the fuselage. The plane has a high speed (115 miles per hour) and carries 5000 pounds. It was built for the Netherlands air force. Argentine and Portuguese world cruisers are of a similar type.

FOLINSBEE, JOHN FULTON (1892-). An American landscape painter born in Buffalo, N. Y., and educated at the Art Students' League in New York and the Woodstock School of Art. He was a pupil of John Carlson, F. V. DuMond and Birge Harrison. He is known especially for his winter landscapes, painted in straightforward impressionistic technique, and is represented in the Corcoran Gallery at Washington, in the Syracuse Museum and in the National Arts Club of New York. His long list of awards includes the Carnegie and J. Francis Murphy prizes from the National Academy of Design in 1921, and the first Hallgarten prize of the National Academy of Design in 1923. He was elected associate of the National Academy of Design in 1919.

FOLK, JOSEPH WINGATE (1869-1923). An American lawyer and public official (see VOL. VIII). From 1914 to 1918 he was chief counsel for the Interstate Commerce Commission.

FOLK PSYCHOLOGY. See SOCIAL PSYCHOLOGY.

FOOD AND NUTRITION. Ideas as to what constitutes a complete food have changed considerably since the early years of the century. The start of this change was perhaps the discovery that proteins are unlike in composition, and that they are complete or incomplete and of good or poor biological value in so far as they do or do not contain in sufficient amounts certain of the amino acids or "building stones" of which they are composed. Fortunately the essential amino acids which must be supplied in the food are few in number, and in an ordinary mixed diet the deficiencies in one protein are compensated by an abundance of the necessary constituents in others. It is essential, however, to bear in mind that all proteins are not of equal nutritive value. In general the

cereal grains contain proteins of lower value than do meat, eggs, and milk, and should not be used as the exclusive source of protein. It is thought by many that the chief cause of pellagra is a deficiency of certain amino acids in the diet in sections of the country where the disease is common. Dietary changes involving only the quality of the protein, such as an increase in milk and fresh meat, have been remarkably successful in preventing and curing pellagra.

Vitamines. The study of the relative nutritive value of the different proteins led to the most important nutritional discovery of the decade 1914-24; in addition to proteins of proper quality and quantity, fats, carbohydrates, and salts, a perfect food must contain a sufficiency of certain substances, as yet unidentified, occurring in natural foods in very small amounts and in a very unstable form as compared with other food constituents. These are the so-called vitamins. Our present knowledge of vitamins comprises the existence of at least three groups, differing in physical, chemical, and physiological properties. Since their chemical constitution has not yet been determined, they are for convenience designated vitamins A, B, and C. Vitamine A is to be found in green leafy vegetables, in milk and butter, in egg yolk, and in animal fats, particularly in liver fat or oil, of which cod liver oil is the best example. It is soluble in fats and fat solvents, it resists saponification, and is comparatively stable to heat except in the presence of oxygen or air. Unlike the other vitamins, a considerable amount of vitamine A can be stored in the body. Consequently the symptoms following its lack are not so quickly manifest. After a short period of deficiency of this vitamine, loss in weight and decreased resistance to infections of different kinds, particularly bronchial and lung trouble, appear. A characteristic eye condition known as xerophthalmia or ophthalmia is apt to develop as the result of extreme deficiency in this vitamine, and for this reason it is sometimes known as the antixerophthalmic vitamine. Closely associated with this vitamine in occurrence and properties is the antirachitic vitamine, or the vitamine which assists in the metabolism of calcium and phosphorus and thus in the prevention of rickets. Certain substances such as cod liver oil and egg yolk appear to be rich in both the antixerophthalmic and antirachitic vitamins; others such as spinach contain the former but not the latter. The chemical property which serves to distinguish it from the antixerophthalmic vitamine is its stability toward oxidation. Cod liver oil which through oxidation has lost its property of curing or preventing ophthalmia retains nevertheless the power of curing rickets. Unlike the other vitamins, the effects produced by it can be duplicated by other measures such as light treatment.

Vitamine B, like vitamine A, may also represent a group of factors rather than a single substance. This group is widely distributed in nature. Whole cereal grains, vegetables (both leafy and root), fruits, milk, and meat contain it in varying amount, but it is absent from highly refined cereal products, fats, sugars, and starches. It is soluble in water, in alcohol up to fairly concentrated solution, and in various organic solvents. It is comparatively stable to heat, but less stable in alkaline than in acid or neutral solution. It is less affected

by oxygen than the other two groups. The term vitamine B includes the antineuritic vitamine, which prevents polyneuritis in pigeons and beriberi in man, and the so-called water-soluble, growth-promoting vitamine. The most characteristic and earliest symptom resulting from lack of vitamine B is loss of appetite. This is followed by lowering of body temperature, rapid loss in weight and finally loss of motor control and symptoms of paralysis. An insufficiency of this vitamine is thought to be responsible for gastro-intestinal disturbances of various kinds and weakened resistance to infection. The latter is attributed by some to the lowered body temperature.

Vitamine C, or the antiscorbutic vitamine, is found chiefly in fresh fruits, particularly citrus fruits, in sprouted grains, and in certain vegetables, both leafy and root. Oranges and tomatoes are the most commonly used sources of this vitamine. It is the least stable of the three and is easily destroyed by heat, particularly in the presence of oxygen. In acid medium it is less easily destroyed than in alkaline. Lack of this vitamine results in the well-known symptoms of scurvy. An insufficiency not great enough to cause signs of scurvy causes a weakened resistance to infection, and in children irritability, a general lack of stamina, and retardation of growth. In addition to these three groups of vitamins, investigation up to 1924 had obtained evidence of another rather more limited in its scope. This was known as vitamine X, necessary for successful reproduction. Present evidence points to its presence in certain leafy vegetables such as lettuce, in cereal grains, and in meat. Abundant proof of the necessity of these vitamins in human nutrition was afforded by the result of restriction and limitations in the food supply of the world during and after the War. Perhaps the most striking illustration of the effect of lack of vitamine A is to be found in the incidence in almost epidemic form of eye trouble resulting in blindness among the children of Denmark in the early years of the War, when, through large exportations of butter, only skim milk was available. Shortly after the blockade, when butter could no longer be exported and whole milk and butter became available, the trouble disappeared, only to turn, though less malignantly, when the export trade was renewed. Cases of eye trouble and blindness probably attributable to lack of vitamine A are of common occurrence even in the United States.

A striking illustration of the direct connection between diet and the deficiency diseases, beriberi and scurvy, was afforded by the development during the siege of Kut-el-Amara in Mesopotamia of beriberi among the English troops and scurvy among the Indian troops in the same garrison. The English were protected from scurvy by large quantities of fresh meat (horse and mule) which the Indians, through religious and other scruples, refused to eat. The Indians on the other hand were protected from beriberi by the coarse whole-grain bread included in their ration in place of the white bread of the English ration. The effects of vitamine insufficiency are to be seen in the deplorable state of undernutrition and weakened resistance to infection in the great mass of European children during and since the War. An interesting opportunity to apply the experimental methods of the laboratory to human

nutrition was afforded a group of English scientists, headed by Dr. Harriet Chick, who in certain wards of the university Kinderklinik in Vienna undertook to build up the undernourished children by systematic vitamine feeding. With the same diet as that furnished in other wards, ample in its calorific-protein supply, the addition of orange juice and cod liver oil wrought such prompt and beneficial changes as to convert those who were most skeptical of vitamine theories.

In the United States the increasing evidence of minor symptoms, particularly lack of stamina, a tendency to digestive disturbances, and a lowered resistance to infection, resulting from an insufficiency of vitamins, makes their consideration a matter of great importance. There is no evidence that excess of any of the vitamins is harmful, and since the absolute requirement for human nutrition is as yet unknown and any excess of vitamine A is kept in reserve for future use, it is well at all times to furnish an abundance of vitamine-containing foods, particularly of those rich in vitamine A. In this respect milk is an ideal food. It contains an appreciable amount of vitamine C, is a fairly good source of vitamine B, and an excellent source of vitamine A, and is furthermore the best source of calcium for growing children. Plenty of milk and an abundance of green vegetables and fruits will insure an adequate supply of all three vitamins. See also VITAMINE OR VITAMINES.

No less striking than vitamins in respect to the small amount necessary to turn the balance from failure to success in nutrition is iodine. The incidence of goitre (q.v.) in certain sections of the United States and Europe is now attributed to the lack of iodine in the water and natural foods, particularly the former. A remarkable success has been obtained, in districts where goitre is endemic, by the administration of iodine compounds for very brief periods during the year. In certain places an attempt is being made to furnish the necessary iodine by adding it to the water supply.

A recent scientific achievement which has an important bearing on nutrition is the successful separation from the pancreas of insulin, the substance which controls directly or indirectly the metabolism of carbohydrates in the body. To the physician this discovery is of significance in offering the means of keeping under subjection the troublesome disease, diabetes; to the physiological chemist the centre of interest is the light which experimentation with it may throw on the mysteries of the intermediary metabolism of carbohydrates and fats; to the nutrition worker and dietitian it opens up a wide field in the calculation of diets, for in the insulin treatment of diabetes, dietary control is of even greater importance, and mistakes are of more direful consequence, than when insulin is not used. In connection with diabetes the successful preparation of an odd-carbon fat, intarvine, which can be safely oxidized by the diabetic organism, should be mentioned as an important recent contribution.

In the rationing of the armies and in the system of rationing of the entire civil population of the allied countries, proposed shortly before the close of the War, the energy requirement served as the basis. The consensus of scientific opinion regarding food requirements may be seen from the decision of the Inter-

Allied Scientific Food Commission concerning the apportionment of the food supplies of the Allies. The Commission decided to use as the basic standard for the food requirement of each nation the quantity of food which would be taken by an average man. The proper diet of the average man was fixed as furnishing 3000 calories "as utilized," or, allowing for waste, 3300 calories as purchased, and 75 grams (about three ounces) of fat daily. It is of interest that a minimum of fat rather than of protein was specified. The commission decided that meat was not a physiological necessity, especially when milk, cheese, and eggs were available in addition to vegetable protein. In estimating the relative needs of food according to age and sex, the following percentages of the requirement per man were used: up to six years of age, 50 per cent; from six to 10, 70; from 10 to 14, 83; 14 and over (women), 83, and men, 100. These values are based upon the more recent studies which have emphasized the relatively high food requirements of growing children.

Increasing attention is being given, particularly in the United States, to the nutrition of school children. Various indices of nutrition have been proposed and are being used to determine the extent of malnutrition. Among these standards are the Wood standard of height and weight for age, the Dreyer standard based on trunk length and chest circumference, and the Pirquet pelidisi standard. These standards, while not infallible, serve to indicate roughly the nutritional status of the child, and considerable success has been attained in correcting malnutrition, as thus detected, by supplementary feeding. 1924 saw only the beginning of this work, for which much was to be expected.

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FOOD BOARD. See UNITED STATES, History.

FOOT-AND-MOUTH DISEASE. See VETERINARY MEDICINE.

FOOTBALL. This branch of sports comprises several different games such as college

football as played in the United States, Rugby, association and soccer. Rugby, association and soccer football are chiefly confined to the British Isles and Europe although soccer, following the close of the World War, has gained steadily in popularity in the United States, particularly the mid-West and along the Atlantic seaboard. Some of the Pacific Coast universities have organized Rugby teams in recent years but this type of football has failed to arouse much interest in the American public.

The regular college game of football vies with baseball in popularity in the United States, contests between prominent elevens attracting as many as 80,000 spectators. Within the last few years all the larger American universities have been obliged either to increase the seating capacity of their stadiums or build larger ones to meet the constantly growing demand for seats.

The mammoth Yale Bowl, the Harvard Stadium, Palmer Field at Princeton and the Ohio State University Stadium with accommodations for from 40,000 to 80,000 spectators were all constructed during the period 1914-24.

Unlike professional baseball there is no way of determining which college eleven deserves first ranking each year. No contests for the championship are played, the schedules of the various colleges being restricted to not more than ten games each season. All attempts to hold post-season contests in an endeavor to decide superiority have in the past been frowned upon by the authorities of the colleges concerned.

The ten years ending with 1924 were marked by a larger number of intersectional college games than formerly and this fact enabled the students of football to compare and appraise the coaching methods and types of play in vogue in various parts of the country. The critics generally agree that whereas the more open style of game is played by the universities of the Middle West, the all-round strength of teams there averages no higher than in the eastern States or on the Pacific Coast.

Few changes in the playing rules of the college game have been made since the introduction of the forward pass and the elimination of mass formations. The present game appears to give satisfaction and to its development year by year is undoubtedly due the wonderful popularity college football is enjoying.

Professional football has gained a foothold in certain cities of the Middle West, the elevens being recruited from former college players. The university authorities, however, are doing everything possible to discourage this movement and attempts to arouse the interest of the public in games between professional teams have generally been unsuccessful.

Soccer, both professional and amateur, is making considerable headway in the United States. The American Soccer League (the professional) has clubs in Greater New York (three), Newark, Philadelphia, Bethlehem, Fall River and Providence. St. Louis, Chicago and Baltimore also are leading soccer centres with both professional and amateur clubs playing regularly arranged schedules. Many former star players on various English and Scotch league elevens have appeared in American soccer line-ups in recent years.

FORAIN, JEAN LOUIS (1852-). A French caricaturist, etcher, and painter (see Vol. VIII). During the War, his weekly car-

toons in *L'Opinion* were notable. Later he executed an important series of etchings on war subjects. In 1923 he was elected to the French Academy. Although most widely known as a penetrating illustrator of French manners, in which capacity he continued to contribute to numerous periodicals, as an etcher he was styled incomparable, and his work in painting was delicate and delightful. Additional works that may be mentioned are *Nous, vous, eux; La Vie; and De la Marne au Rhin*.

FORAKER, JOSEPH BENSON (1846-1917). An American Republican politician and legislator (see Vol. VIII). He was defeated by President Harding in the Republican primaries for a seat in the Senate in 1914. A year before his death he published *Notes on a Busy Life*.

FORBES, JOHN (?-). A playwright, born at Salem, Ont. He came to the United States in 1884 and was successively dramatic critic, editor, and press representative. He organized and directed the formation of groups of professionals sent to Europe to entertain the American Expeditionary Forces during the War, organized the first stock company of actors to play in repertoire in France, and originated the plan of organizing other actors who were serving in the army into stock companies. His most recent plays include *The Commuters; The Travelling Salesman; The Show Shop; and The Famous Mrs. Fair* (1919).

FORBES, WILLIAM CAMERON (1870-). An American public official (see Vol. IX), who was appointed by President Harding to the Wood-Forbes mission to investigate conditions in the Philippine Islands in 1921. He was overseer at Harvard, 1914-20. In June, 1923, he was elected honorary president of the China Society of America.

FORD, GEORGE BURDETT (1879-). An American architect and specialist in city planning, born at Clinton, Mass., and educated at the Massachusetts Institute of Technology and the Ecole des Beaux-Arts in Paris. He began practice in Boston in 1901, afterward continuing in New York City. As a specialist in city planning he was consultant, at various times, for New York City, Passaic, Jersey City; Omaha, Neb.; Springfield, Mass.; Cincinnati; Mansfield, Ohio, and many other cities. In France he was consultant to the French government for the reconstruction of cities in the devastated regions.

FORD, HENRY (1863-). An American manufacturer (see Vol. IX). In December of 1915 he chartered a ship to send a party of peace enthusiasts to Europe with the object of organizing a conference to influence the belligerent governments to cease warfare. The party went to Christiania, Norway, and thence some members proceeded to Stockholm, Copenhagen, and The Hague, but the entire movement ended unsatisfactorily; it was not officially recognized abroad, and dissension arose in the ranks of the members themselves. Mr. Ford was a Democratic candidate for the United States Senate in 1918. In 1916 he brought a libel suit against the *Chicago Tribune* for \$1,000,000, because he had been called an anarchist in one of its editorials. The court awarded him a verdict of \$.06 and the cost of the trial. A controversy arose in 1918 over the results of the senatorial election between Truman H. Newberry, Republican, and Mr. Ford, Democrat.

Ford charged his Republican opponent with excessive expenditure in his campaign. Newberry was charged and convicted, but on appeal to the Supreme Court, the decision was reversed in January, 1922. Mr. Ford resigned as president of the Ford Motor Company in 1920 and was succeeded by his son. About the same time he bought the *Dearborn* (Mich.) *Independent*, in which from time to time he severely criticized the Jews. See **MUSCLE SHOALS**.

FORD, HENRY JONES (1851-). An American journalist and professor of politics (see **VOL. IX**). In 1920-21 he was a member of the Interstate Commerce Commission. He published *The Scotch-Irish in America* (1915), *The Natural History of the State* (1915), *Woodrow Wilson, the Man and His Work* (1916), *Washington and His Colleagues* (1918), and *The Cleveland Era* (1919).

FORD, JAMES LAUREN (1854-). An American humorist (see **VOL. IX**). He wrote *Waitful Watching* (1916) and *Forty Odd Years in the Literary Shops* (1921) and edited *The Porcupine*, 1917-18.

FORD, WALTER BURTON (1874-). An American mathematician, born at Oneonta, N. Y. He graduated from Harvard in 1908 and took post graduate courses at that university and in Europe. From 1900 to 1903 he was instructor of mathematics at the University of Michigan, and from 1904-5 at Williams College. From the latter date he was again a member of the faculty of the University of Michigan, serving as professor of mathematics until 1917. He was a member of several scientific societies and wrote *Plane and Solid Geometry*, 1913; *First Course and Second Course in Algebra*, 1919.

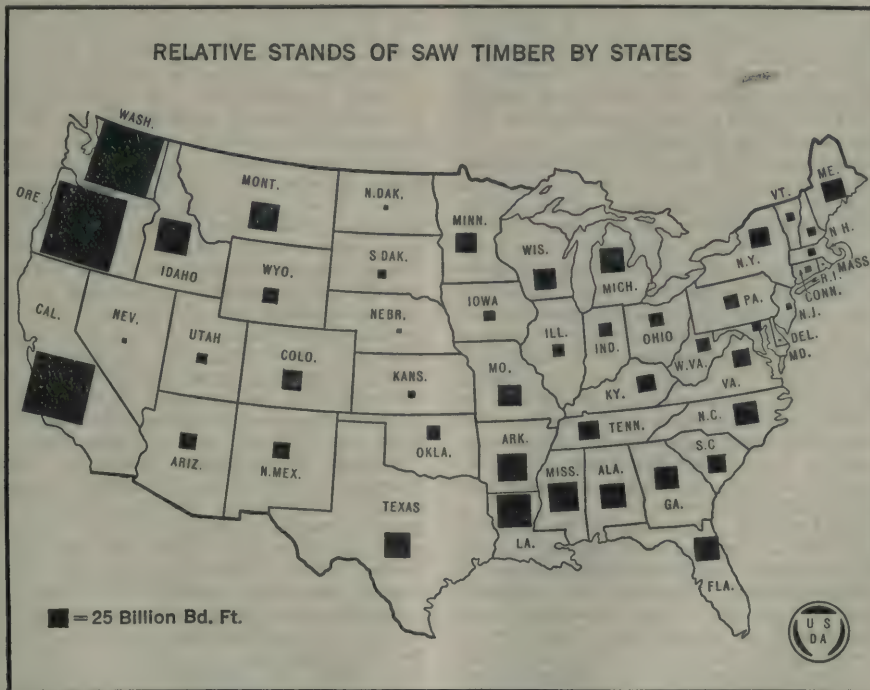
He also contributed various articles to scientific journals.

FORDHAM UNIVERSITY. A Roman Catholic institution at Fordham, New York City, founded in 1841. It is under the Society of Jesus and is the largest Roman Catholic institution in America. Fordham increased its student enrollment from 1500 in 1913-14 to 4866 in 1923-24 plus 500 in the summer school of 1923; increased its faculty from 140 to 190, and its library from 72,700 to 115,000 volumes and 38,000 pamphlets. In 1924 it claimed the largest law school in the United States with a student body of 1442 plus 140 pre-law students. A gymnasium was built in 1923, and a new library building was to be erected in the spring of 1924. Thomas J. McClusky, S.J., who was president in 1914, was succeeded in 1915 by J. A. Mulry, S.J., who held office until 1918, when E. P. Tivnan, S.J., Ph.D., became president.

FORDNEY-McCUMBER TARIFF BILL. See **TARIFF IN THE UNITED STATES**.

FOREIGN EXCHANGE. See **FINANCE AND BANKING**.

FORESTRY. In no single equal period of the world's history were the forest resources of the world so heavily drawn upon as in the decade 1914-24. Not only the needs of ordinary population growth but the enormous demands of war caused an unprecedented use of lumber, especially the very finest grades. The seriousness of the situation in the United States was indicated in the 1921 report of the Chief Forester, who stated that three-fifths of the virgin timber was gone, and, worse yet, the people were using the remainder at a rate four times that of production. The one redeeming feature of



(From U. S. Department of Agriculture, "Timber: Mine or Crop?" 1922.)
Most of the remaining timber in the United States is in the South and West, far away from the great industrial and farming States of the Middle West and Northeast, where the need for timber is greatest. Destructive lumbering has greatly reduced the forests of this region. One of the most urgent economic problems is reforestation—the growing of timber on the immense areas of rough land best suited for forests.

the situation was the growing realization throughout the civilized world at large and in the United States in particular that forest resources must be strengthened, restored, and conserved in every possible manner. The War clearly showed how vital the forests are to a nation's existence. Without the systematically managed forests of France the successful prosecution of the War might have been grievously delayed. Likewise, it was equally true that the forests of Germany enabled that nation, surrounded as it was by blockading fleets and armies, successfully to endure much longer than it could have without them. One of the peculiar results of the War in relation to forestry was the shutting off for a time of the vast Russian timber supplies from the nations of western Europe. English forests suffered severely during the War. It is roughly estimated that over 1,000,000 acres of private woodlands were cut down for war needs.

Lumber. Despite the stimulus of war, there has been a consistent decrease in lumber production in the United States since 1906, when a maximum of 46,000,000,000 board feet was reached. This decline in the face of rapidly increasing population meant a drop in per capita consumption from 500 board feet in 1906 to 320 board feet in 1920. Taken in connection with a rapid westward movement of the source of supplies, resulting in ever increasing transportation costs, the lumber situation became increasingly serious. In an effort to reduce waste resulting from the use of a multiplicity of grades and sizes, a committee on lumber standardization, representing the lumber trade and similar committees from the United States Departments of Agriculture and Commerce, proposed in 1923, as the result of joint studies, a series of standard grades for yard lumber and structural timber of all important species. The United States Forester repeatedly warned the people of the country of the decreasing supply and urged that efforts be made to stimulate timber production in the United States.

Reproduction. The decade ended 1923 saw considerable expansion in forest planting throughout the world. England, suffering from the loss of 1,000,000 acres of woodland during the War, began actively planting on a large scale and establishing forest nurseries in various parts of England and Scotland. In the United States not only the Federal government but many States and municipalities saw the wisdom of encouraging forest planting, and many private corporations in Canada and the United States engaged in various forms of lumber operation began planting on a large scale. New York State developed nurseries having an annual capacity of 15,000,000 trees. Pennsylvania distributed trees to private owners at the rate of 4,000,000 per annum.

National Forests. The area of the national forests showed a net decrease approximating 7,000,000 acres from June 30, 1914, to June 30, 1923, a loss explained in part by the consolidation of small areas and by the release of lands adapted primarily to agriculture. That the national forests are an important source of income to the Federal government was shown by an aggregate income, during the year ending June 30, 1923, of more than \$5,000,000. The value of the forests as recreation places for the people is beyond calculation. It was estimated that four-fifths of the forest land of the United

States was privately owned, and that, since it is subject to no constructive programme, it may become a national liability rather than an asset.

Pulpwood. The enormous use of wood for the manufacture of paper and paper products constituted a very serious drain on the nation's timber resources. In the year 1920 alone over 6,000,000 cords of pulpwood were used in the United States, of which over 1,000,000 were imported from Canada. Canadian alarm at the increase in pulpwood exports to the United States was manifested by the authorization in 1923 of the Government in Council to place an embargo on the export of pulpwood from privately owned lands in the Dominion. In expectation of future shortages, the United States Department of Agriculture Forest Service studied the possibility of growing more pulpwood and also of utilizing species which hitherto had been considered useless. The discovery by the Forest Products Laboratory at Madison, Wis., of methods of de-inking print paper was expected to result in the use of vast quantities of waste material. See PAPER AND WOOD PULP.

Alaska's Forest Resources. The decline in the forest resources of the mainland of the United States created interest in other possible sources of supply, notably Alaska. A popular opinion of the vastness of the Alaskan forests was dispelled by the 1921 report of the United States Forester, which stated that the national forests of that territory comprise 20,000,000 acres, containing an estimated stand of 75,000,000,000 board feet of usable timber, a quantity which, though large in itself, would not long supply the nation's needs, for production in the United States in the year 1923, for example, attained the enormous quantity of 32,000,000,000 board feet. In that the national forests of Alaska represent 85 per cent of the Territory's lumber supply, it may be readily seen that they are not inexhaustible. In order to encourage the rational use of Alaskan timber, the Federal Forest Service offered inducements to reliable corporations to establish pulp mills in the national forests, on a basis of permanent production. It was estimated that the Tongass Forest alone could thus supply an annual yield of print paper equal to one-third of the present United States consumption. The effort of Secretary Fall to obtain the transfer of the Alaskan forests from the Department of Agriculture to the Department of the Interior created considerable excitement, but no such action was taken. Alaska's cause gained much from the whole-hearted indorsement of conservation policies by President Harding following his return from the ill-fated tour of inspection.

Forest Experiment Stations. Under the stimulus imparted by the consciousness of the rapidly diminishing forests, research received greater consideration during the period subsequent to the War, especially in the eastern United States, where the pinch of high priced lumber was most severely felt. That there was a significant awakening was concretely manifested in the establishment of four new Federal forestry stations: (1) Southern, New Orleans, La., 1922; (2) Appalachian, Asheville, N. C., 1922; (3) Northeastern, Amherst, Mass., 1923; and (4) Lake States, St. Paul, Minn., 1923. In opening stations in the large timber producing sections of the East, the purpose of the United States Department of Agriculture For-

est Service was to determine the best silvicultural practices for each of the regions served and in the Lake States to encourage the reforestation of vast cut-over lands now idle, which only a few decades ago were covered with a splendid growth of white pine.

Forest Fires. Fire, long conceded to be the greatest enemy of the forests, continued during this period to exact its toll not only of timber but also of human life. Conspicuous among the serious fires was that of the fall of 1918 in northern Minnesota, where hundreds of square miles of forests, many towns, and several hundred lives were lost, and the 1923 California fire, which destroyed a large part of the city of Berkeley. Consistent and effective work on the part of newspapers and periodicals in directing attention to the fearful results of forest fires did much to present to the general public the seriousness of the situation and to warn tourists and hunters of the danger of careless practices. The first national fire conference ever held in the United States was convened at Sacramento, Cal., during the summer of 1921. All aspects of forest fire control were discussed. Serious attempts made by both the Canadian and the United States governments to utilize the airplane as a means of controlling forest fires pointed to the probability that airplanes would be most effective in detecting rather than in subduing forest fires. The Weeks Law, providing \$400,000 Federal funds annually to assist the States in fighting forest fires, aided materially in the reduction of loss. It was generally conceded by expert foresters that fire control is really the most vital factor in forestry, since all efforts in replanting and improvement are canceled by failure to suppress fires. The average loss in the United States for the six years ending with 1923 was 7,000,000 acres of burned-over land per annum. The value of effective fire protection was demonstrated in western Washington when, despite the destruction of 6,000,000,000 board feet of timber by a tornado which swept the west side of the Olympic Peninsula on Jan. 29, 1921, no fire losses were reported from the tangled mass of highly inflammable material.

Insects and Disease. Not fire alone, but insects and diseases exacted a heavy toll from the forests of the United States and of all the world during the decade. Perhaps the most insidious enemy of all was the chestnut blight, which, gaining a foothold on the Atlantic coast of the United States, practically eliminated the chestnut from the eastern United States forests. The white pine blister rust, long an enemy of the white pine forests of the eastern United States, became established in the western white pine forests of British Columbia and Washington. The gipsy and brown-tail moths continued their slow but consistent spread throughout New England. The tremendous areas involved in forest pest control rendered suppressive measures exceedingly difficult.

Land Classification. The agricultural depression following the War forced the attention of thinking agriculturists, foresters, and business men to the considerable amount of land in the United States which, though utilized for agriculture, was for the time being of essentially greater value for the growing of forest trees. The Secretary of Agriculture named a committee to classify the lands of the United States according to their probable value, in the

effort to prevent the vain and futile attempts of pioneers to establish homesteads on land primarily unfitted for agriculture.

Miscellaneous. The organization in 1920 of the British Empire Forestry Association, connecting all the scattered forest units of the vast Empire, was a very important step. Two conferences, one held in London, England, in 1920 and the other in Ottawa, Canada, in 1923, did much to cement together the forestry interests of the British Empire. In addition, the publication of a quarterly journal by the association, the first number of which appeared in March, 1922, promoted friendly relations between the various units of the service. The *Journal of Forestry*, published by the American Association of Foresters, continued to develop as an important medium for the exchange of thought and knowledge on American forestry problems. The Yale Forestry School held its second decennial reunion in December, 1920, bringing to mind that scientific forestry in the United States is of comparatively recent origin.

Necrology. Of various prominent foresters who died during the decade may be mentioned Bernard Fernow, Feb. 26, 1923, first Forester of the United States and at the time of his death dean emeritus of the School of Forestry of Toronto University; J. T. Rothrock, June 2, 1922, affectionately known as the father of forestry in Pennsylvania; and Arnold Engler, 1923, director of the Swiss Forestry Experiment Stations.

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FORMAN, HENRY JAMES (1879-). An American author and editor. He was educated at Harvard and at the Ecole des Hautes Etudes Sociales, Paris. He was attached to President Roosevelt at the Russo-Japanese Conference as a special correspondent. Earlier in his career he was literary editor of *Appleton's Magazine* and political editor of the *Literary Digest* (1905-06), associate editor and general manager of the *North American Review* (1906-10), a member of the editorial staff of *Collier's Weekly* (1913-14), its managing editor (1914-18), and United States propaganda agent abroad (1917). His works include *In the Footprints of Heine* (1910), *The Ideal Italian Tour* (1911), *London—An Intimate Picture* (1913), *The Captain of His Soul* (1914), *Fire of Youth* (1920), and *The Man Who Lived in a Shoe* (1922).

FORMOSA, or TAIWAN. An island in the western Pacific, belonging to Japan; area, 13,839 square miles; population, in 1920, 3,654,398 as compared with 3,341,217 in 1910. The Japanese increased from 50,000 to 153,330. The great mass of the population thus remained Chinese.

The chief town, Taihoku, had 162,782 inhabitants in 1920 as against 95,000 in 1910.

Industry and Trade. Rice production showed consistent advances, its yield (two crops) in 1922 being 27,434,900 bushels as compared with 25,526,500 in 1913. Sugar, which engaged 60 mills on the island, and tea, jute, and sweet potatoes, similarly were on the increase. The production of camphor, though a government monopoly, failed to maintain the progress shown during 1904-12, for the yield fell from 7,077,100 pounds in 1912 to 2,933,333 pounds in 1919-20. A greater application to the natural resources showed itself in increased returns from mining. The total value of minerals, principally coal, gold, copper and silver, was 11,167,426 yen in 1919; in 1913, it was 4,015,102 yen. Japan continued to absorb the greater part of the Formosa trade, though China and the United States occupied fairly important positions. Discounting the unfavorable years of the War, the advance was consistent. In 1914, imports from foreign countries totaled 13,013,937 yen and from Japan, 39,879,148 yen; in 1921, imports from foreign countries were 40,433,290 yen and from Japan 93,521,168 yen. Similarly exports showed: 1914, to foreign countries 12,982,314 yen, to Japan 45,738,116 yen; 1921, to foreign countries 23,541,021 yen, to Japan 128,896,879 yen. Thus the favorable balance was 5,827,345 yen in 1914 and 18,484,042 yen in 1921. Means of inland communication were pushed. Railroad mileage increased from 290 miles in 1913-14 to 369 miles in 1920-21.

Government and History. Under Japanese administration, the island's welfare improved materially. From the point of view of civil liberties, however, it must be recorded that the government remained absolute. The cost of administration mounted over the period. In 1913-14, expenditures were 44,473,781 yen; in 1922-23 (estimate) 106,002,034. Receipts were derived from inland taxes, customs, public undertakings, and Japanese subsidies (from 5,000,000 to 9,000,000 yen annually). Monopolies were maintained over camphor, salt, tobacco, opium, sake, and other spirits. As a result of this action, the use of opium gratifyingly fell off, and the number of licensed smokers declined from 169,064 in 1900 to 44,922 at the end of 1920.

FÖRSTER, FRIEDRICH W. (1869-). A German pacifist and social philosopher, born at Berlin. He studied philosophy, sociology, and political economy at the universities of Berlin and Freiburg. After teaching philosophy at the Zurich Polytechnikum, he became in 1912 professor of philosophy at the University of Munich. He resigned his chair in 1920 and retired to Switzerland. Unlike the famous 93 professors, Förster opposed the German government's policy all through the War. After the Armistice, he became one of the spiritual leaders of the new Germany. In the manner of the idealistic philosophers of classical Germany, he published an appeal to the people's conscience, an appeal which though without immediate practical results yet carried the prophetic conviction of the future. In his *World Politics and World Conscience* (*Weltpolitik und Weltgewinnen*, 1919), he made a penetrating attack on the militaristic policy which Germany had followed since 1870. He pleaded for the return to pacific federalism, and urged Germany not to sow dissension among

her late enemies but to strive disinterestedly for the creation of a European conscience. Förster's outspoken stand against the old order earned for him the enmity of a large fraction of the professorate; it was for that reason that he retired to the neutral haven of Switzerland. He published there an autobiographical account of his long struggle with German militarism (*Mein Kampf gegen das Militarismus Deutschlands*, 1920). Förster's other works include *Technik und Ethik* (1905); *Schule und Charakter* (1907); *Sexualethik und Sexualpädagogik* (1907); English translation, *Christianity and Sex*, (1908); *Christentum und Klassenkampf* (1908); *Autorität und Freiheit* (1910); *Schuld und Sühne* (1911); *Politische Ethik und Politische Pädagogik* (1919); and *Christentum und Pädagogik* (1920).

FORSTER, HELENE VON (1859-1924). A prominent Bavarian welfare worker. She investigated child mortality, studied the occupational problems of women, and was instrumental in carrying on reforms. She was a member of the municipal council of Nuremberg.

FORT, PAUL (1872-). A French poet styled since 1912 "the prince of poets," who in many ways continued the tradition of the symbolist school of the 1880's and 1890's. On the publication of his *Ballades Françaises* he was hailed by Rémy de Gourmont as "the most curious figure of the second generation of symbolists" and one whose talent was "a manner of thinking as well as a manner of expression." His verse style reflects this peculiarity; it is a sort of rhythmic prose without any of the ordinary transpositions. The author's justification for this is that it enables his thought to pass freely from prose to poetry without the usual barriers. Fort was honored officially by a ribbon of the Legion of Honor but otherwise obtained neither the reputation nor the public which eminent critics believe he deserved. His works include *Ballades Françaises*; *Montagnes, Forêts, Planes, Mers*; *Le Roman de Louis XV*; *Les Idylles Antiques*; *L'Amour Marin, Les Nocturnes*; *Visions Romantiques*; *Réponse de l'Aube et de la Nuit*; *Coccombe, ou l'Homme tout Nu Tombé du Paradis*, and *Vivre en Dieu*.

FORT WORTH. A city of Texas. The population rose from 73,312 in 1910 to 111,536 in 1920 and to 143,821 by estimate of the Bureau of the Census for 1923. A filtration plant was built and the dam across the Trinity River, begun in 1913, was completed during the decade; on the lake so formed a municipal bathing beach was opened in 1917. During the War, Camp Bowie and three flying fields were built close to the city. Shortly afterwards the discovery of oil fields near-by brought the headquarters of the big production companies and a boom to the city, so that by 1924 the petroleum products turned out by the nine refineries in the city were valued at \$52,000,000 annually. The United States helium gas plant was established at Fort Worth, costing, up to 1924, \$5,000,000, and the city was named one of the four stations for dirigible airships. In 1919, building permits reached nearly \$19,000,000. Several large office skyscrapers and many minor buildings were erected; in the area that had been Camp Bowie, 3500 houses were built. The area of the city was considerably enlarged by the annexation of closely built up territory at the outskirts of the city.

FORTY-EIGHT, COMMITTEE OF. An organi-

zation founded for the purpose of establishing a new national Liberal or Progressive party, which held its first national conference at St. Louis in 1919. Its platform called for the abolition of special privilege, through public ownership of the railroads, public control of natural resources, public control of money and credit through government and coöperative banks, preservation of all civil rights guaranteed by the constitution, and the prevention of judicial abuses. The Committee played an active part in the Congressional elections of 1922, and formed a new party in Idaho, Nebraska, Pennsylvania, Delaware, and North Dakota, in addition to the party already established in South Dakota and Minnesota. In 1924 it broke with the National Farmer-Labor-Progressive Convention held at St. Paul to nominate a candidate for president, because communists were to be seated as delegates, and threw its entire support to the Convention of the Conference for Progressive Political Action held at Cleveland July 4, and recommended to its affiliated bodies that they take similar action. A regular press service was initiated in 1920 which in 1924 served 500 or 600 newspapers, periodicals and magazines. The monthly organ of the Committee, *The Liberal*, which was founded in 1921, was sent to all members. Five pamphlets were published in 1923 for the information of the voters.

FOSDICK, HARRY EMERSON (1878-). An American clergyman and professor, born at Buffalo, N. Y., and educated at Colgate University, Union Theological Seminary, and Columbia University. He was ordained to the Baptist ministry in 1903, holding a pastorate at Montclair, N. J., until 1915, when he was named professor of practical theology in the Union Theological Seminary, in New York City. His works include *The Manhood of the Master* (1913); *The Assurance of Immortality* (1913); *The Meaning of Prayer* (1915); *The Challenge of the Present Crisis* (1917); *The Meaning of Faith* (1917); *The Meaning of Service* (1920); *Christianity and Progress* (1922); a Spanish translation of one of his books, as *La Personalidad del Divino Maestro* (1923); and *Twelve Tests of Character* (1924).

FOSTER, BEN (JAMIN) (1852-). An American landscape painter (see VOL. IX). In his later works, among which may be mentioned "Late Summer Moonrise," "Litchfield Hills," "Hazy Moonrise," and "From Hill to Hill," his interest in the misty effects of dawn and twilight and moonlit nights was still conspicuous. In 1917 he was awarded the Altman prize, National Academy of Design, and the gold medal and prize, National Arts Club.

FOSTER, SIR GEORGE EULAS (1847-). A Canadian statesman (see VOL. IX). In 1914 he was a representative of the British Government at the Economic Conference in Paris. After the Armistice he was Canadian representative at the Peace Conference (1919) and later Vice-President of the League of Nations.

FOSTER, JEANNE ROBERT (MRS. MATLOCK FOSTER) (1884-). An American editor and author, born at Johnsburgh, N. Y., and educated at Boston University, in Harvard courses, and the Stanhope-Wheatcroft Dramatic School in New York. In 1910, after various newspaper experience, she identified herself with the *Review of Reviews* and later became editor of its literary department. Her works

include *Wild Apples* (1916), *Neighbors of Yesterday* (1916), and *Rockflower* (1922); all of these are poetry.

FOSTER, MAXIMILIAN (1872-). An American author born in San Francisco and educated at Andover Academy (Mass.). His career started in the newspaper field, which he abandoned for magazine work. Since 1902 he has published several plays and novels, which include *Keeping Up Appearances* (1911), *The Whistling Man* (1913), *The Trap* (1920), *The Silent Partner* (1923), and others. During the War he was official correspondent for the United States government in France.

FOSTER, WILLIAM TRUFANT (1879-). An American educator (see VOL. IX). He resigned from the presidency of Reed College in 1920 and accepted the directorship of the Francis D. Pollak Foundation for Economic Research (1920-). He wrote *Should Students Study?* (1917). In 1923 he wrote *Money*, on the gold policy for the United States, with Waddill Catchings.

FOUGNER, G. SELMER (1884-). An American journalist, born in Chicago, Ill. He was educated at the Sorbonne, Paris, and began his newspaper career as a member of the editorial staff of the *Paris Herald* (1906-09). He was later with the *New York Press* (1909-12), the *New York Sun* (1912-17), correspondent at the mediation conference between the United States and Mexico (Niagara Falls, 1914), London correspondent for the *New York Sun* (1915), manager of the Press Bureau of New York for the Liberty Loans (United States Treasury, 1917-20), director of newspaper publicity for the second, third, fourth and fifth loans, and for many organizations and committees of the War. He also edited *Paper*, *The Publisher's Guide*, and *L'Exportateur Américain*.

FOULKE, WILLIAM DUDLEY (1848-). An American civil service reformer (see VOL. IX). In September, 1923, he was head of a delegation which visited President Coolidge and urged reform of the methods of appointing postmasters. In 1923 he was elected president of the National Civil Service Reform League.

FOULOIS, BENJAMIN DELAHAUF (1879-). An American army officer, born in Connecticut. He enlisted in the army as private and in 1901 was commissioned 2d lieutenant. He became 1st lieutenant in the Signal Corps in 1908, and in 1914 was appointed captain of the Aviation Section of that corps. From that time he was constantly on aviation duty and was the senior military aviator in the point of service. He commanded the air service troops on the Mexican border in 1916-17 and in 1917-18 was Chief of the Air Service, A. E. F. He was the American member of the Aviation Committee of the Supreme War Council from 1917 to 1919, and from 1920 was assistant military observer for the American Commission at Berlin, Germany. He was promoted to be brigadier-general in the Service Corps in 1917.

FOUNDATIONS. The interval between 1914 and 1924 did not witness striking developments in the method of constructing foundations though there were naturally many improvements in the organization and execution of the work, due to better appliances and incidental improvements. The tendency more freely to employ steel and concrete piles in a large measure replaced wooden piles, while steel inter-

locking sheet piling was found more useful than timber sheeting. In foundation construction reinforced concrete had become an indispensable construction material as it was able to withstand tension more than granite masonry or timber. The foundation work of the most important character naturally had to do with large office or public buildings, such as hotels, State or municipal buildings, opera houses or similar structures, and foundations for bridge piers where it was necessary to build these either in the stream or in lowland.

In modern building construction the foundation not only supported the skeleton steel frame which with modern construction was constantly increasing in height, but also had to be considered in connection with the increased space in the basement and cellars for machinery for other purposes. As a result there were involved not merely the piers to carry the main columns of the structure, but also a continuous exterior wall which not only served as a foundation for the exterior columns but also acted as a retaining wall or coffer dam to resist the pressure of soil or soil and water on the outside of the wall and permeate the cellar excavation to be carried below water level. A typical instance of such modern construction was shown in the Federal Reserve Building completed in New York in 1924, where 2,910,000 cubic feet of space, or 182,000 square feet of floor area was provided below curb level for machinery, vaults for securities, storage of various kinds and other general purposes. The deepest pier in this building went down 118 feet below the high curb on Nassau Street and the deepest floor was 80 feet below the same level.

In bridge foundation construction possibly the most notable work in the period between 1914 and 1924 was that in connection with the anchorages and piers for the suspension bridge across the Delaware between Philadelphia and Camden. An essential element of the Camden anchorage was two reinforced concrete cribs, each 40 feet by 140 feet in plan, which by means of excavation were sunk through silt, sand and gravel of the river bank to rock 110 feet below high water level on the Delaware River. For the river piers pneumatic caissons were employed which were fitted with horizontal locks and galleries in the body of the pier so as to afford safety and more convenient access to the working chamber. These pneumatic caissons were built of steel and reinforced concrete 70 feet by 180 feet, and were sunk to a depth of over 75 feet. This did not show a very striking development either in size or method as the caisson for the New York and Brooklyn suspension bridge, though made of timber, was 172 feet by 102 feet, while that for the Eads Bridge at St. Louis was of boiler plate, 60 feet by 82 feet.

By 1924, however, a great deal of the practice had been standardized, an important addition to the modern caisson being a patented excavating lock through which an ordinary bucket could pass in and out of the compressed air without being detached from the hoisting rope. There was employment of improved air compressors. However most of the improvements in caissons for deep foundations involved such adjuncts as telephones and electric lights in the working chamber, and a better understanding of the physiological effects of compressed air. There was also developed the use

of the hospital lock so that the workmen were better protected and less exposed to danger, notwithstanding the fact that their employment under conditions of air pressure was regulated and restricted by local statutes or ordinances.

The modern tendency in using piles in foundations was to substitute those of concrete for timber piles, and several types of the former were being used extensively. One leading advantage was that the concrete pile when properly made was absolutely permanent under practically all conditions of use including both wet and dry service. Obviously their use did away with the possible danger of decay in case of water level below the cut-off level which was likely to happen under conditions where much subterranean construction acts to alter the natural water level. The simplest form of modern pile was one of reinforced concrete pile which had been cast and seasoned before driving and was used in the same manner as one of timber. There was also developed a steel shell and driving mandrel which was left in the ground and acted as a form in which the concrete could be poured. Still another type was a pipe which was closed at the bottom by a loosely fitting cast iron point. This pipe was sunk in the ground and then after being filled with concrete was removed, leaving the concrete pile and the point in the ground. Another system employed an open pipe which was driven in the ground and the material inside excavated by using a jet of compressed air. The vacant space thus formed could be filled with concrete, both pipe and concrete filling being left in the ground. For driving such pipes a hydraulic jack was employed and the method was found to be particularly useful in underpinning buildings.

"FOURTEEN POINTS." See WAR, DIPLOMACY OF THE, War Aims.

FOWLER, CHARLES EVAN (1867-). An American engineer, born in Bartlett, Ohio. He studied engineering at the Ohio State University and in 1887 began active practice. He designed and built many important railroad and other bridges and was consulting engineer for the Williamsburg Bridge in Manhattan. He also built many large plants and performed other work in Manila, Mexico, Cuba and many cities of the United States. He was a member of several scientific engineering societies and wrote much on building construction, including *Engineering and Building Foundations* (1919); *World Ports and Harbor Data* (1921).

FOX, DIXON RYAN (1887-). An American historian and professor, born at Potsdam, N. Y., and educated at Columbia University. He became assistant professor of history there in 1919. His works include *Decline of Aristocracy in the Politics of the United States* (1919), *Historical Atlas of the United States* (1920), and an *Outline of Early American History* (1922).

FOX, FONTAINE (TALBOT, JR.) (1884-). An American newspaper cartoonist born in Louisville, Ky., best known for his creation of "Fontaine Fox's Funny Folk," "Fontaine Fox's Cartoons," "The Tunnerville Trolley," all collected in book form, and many other cartoons. He has been connected with the Wheeler Syndicate since 1915, and since that year has been furnishing humorous cartoons to some 100 newspapers.

FOX, PHILIP (1878-). An American astronomer, born in Manhattan, Kan. He grad-

uated from the Kansas State Agricultural College in 1897, and from Dartmouth in 1902, taking postgraduate courses in Berlin. After serving on the faculty of Dartmouth College, he became Carnegie research assistant at the Yerkes Observatory at the University of Chicago in 1903, and from 1907 to 1909 was instructor in astro-physics at the University of Chicago. From 1909 he was professor of astronomy and director of the Dearborn Observatory at Northwestern University. He served in the War as major of infantry, and as assistant chief of staff in the 7th Division.

FOX, WILLIAM (1879-). A motion picture producer born in Hungary and brought to the United States in infancy. He began his career as a theatrical manager in Brooklyn in 1904 and became president of the Fox circuit of theatres and the Fox Film Corporation. His best known productions include *Les Misérables*, *Tale of Two Cities*, *Romeo and Juliet*, *A Daughter of the Gods*, *Salome*, *Cleopatra*, *Evangeline*, *Over the Hill*, *The Queen of Sheba*, etc. He did excellent work for the Red Cross in its drives during the War.

FRAENKEL, SIEGMUND (1868-). An Austrian biochemist, known for his exhaustive works. Born in Krakau, he received the degree of M.D. from the University of Vienna and was appointed professor extraordinary of medical chemistry there. His *Arzneimittelsynthese*, devoted to the synthetic medical drugs and the relations between chemical constitution and physiological action, appeared in 1901, and has gone through several editions and a translation into English. *Descriptive Biochemie* appeared in 1907 and *Dynamische Biochemie* in 1911. His latest volume, *Prakticum der Medizinische Chemie*, was published in 1918.

FRAMPTON, SIR GEORGE JAMES (1860-). An English sculptor (see VOL. IX). Among his later works, marked by the decorative quality and fine modeling that distinguish his productions, were the Edith Cavell Memorial, London, the statues of Queen Mary for Victoria Memorial Hall, Calcutta, and for Government House, Delhi, and the portrait busts of King George and Queen Mary for the Guildhall.

FRANCE. A country of Western Europe, bordered on the south by the Mediterranean Sea and Spain, on the east by Italy, Switzerland and Germany, on the north by Belgium and Luxemburg, and the English Channel, and on the west by the Bay of Biscay and the Atlantic Ocean. Since the Treaty of Versailles its territory has been increased by the addition of Alsace and Lorraine (q.v.), which had been in the possession of Germany since 1870. Before the War, France was divided for administrative purposes into 87 departments (including the territory of Belfort, the remnant of the Haut-Rhin department left to France after the Franco-Prussian war of 1870). The Treaty of Versailles in 1919 restored Alsace-Lorraine to France, adding the three departments, Haut-Rhin, Bas-Rhin, and Moselle. The area of France was 207,054 square miles in 1913, and has been increased by the restoration of Alsace-Lorraine to 212,659 square miles. The population of France (the old area) in 1911 was 39,604,992, with a population density of 191 persons to the square mile, but war losses brought the population down to 39,209,518, with an average density of 184 to the square mile, in spite

of the new territories added, which had in 1921 a population of 1,709,749, with a density of 305 to the square mile. Of the total area of France in 1916 (136,101,760 acres) 52,694,680 acres were arable, 11,528,111 acres were natural pastures, 24,084,143 acres forest and woodland, 10,960,417 acres uncultivated, and the remainder cultivated in miscellaneous ways.

Population. The capital and largest city of France, Paris, had a population of 2,906,472 according to the census of 1921. The Department of the Seine, which comprises Paris and its suburbs, had a population of 4,411,691 in an area of 185 square miles, approximately the same as the area included in the City of Chicago. Other important cities are Marseilles (population 586,341 in 1921), the chief Mediterranean port and in most respects the leading port of France; Lyons (population 561,592 in 1921), the centre of French silk manufacture, at the confluence of the Rhone and Saône Rivers; Bordeaux (population 267,409), the chief port of southwestern France, the outlet of the Garonne valley; Lille (population 200,952), the textile and industrial city of northern France, before the War one of the most rapidly growing French cities, and in 1924 quickly recovering from war-time devastation; Nantes (population 183,704), on the Loire River near its mouth, the outlet for the valley of central France; Toulouse (population 175,434), an inland city on the upper Garonne River, in the centre of an important agricultural and viticultural region; St. Etienne (population 167,967), an important centre for silks, ribbons, and other industries; Strasbourg (population 160,767), formerly in German territory, an important river port and manufacturing city on the Rhine; and Le Havre (population 163,374) at the mouth of the Seine, a port of entry for Paris, of rising importance. The population of France, even in times of peace, tends to increase with extreme slowness. Several years in the period before the War showed excess of deaths over births; for instance, those of 1890, 1891 and 1892, and 1911. In 1920 and 1921 the birth-rate increased, the excess of births over deaths being 160,000 and 117,000 respectively. In 1922, however, the excess dropped to 71,000, making a percentage of increase of less than two-tenths of one per cent. There is no state religion in France, but the dominant faith is Roman Catholicism. The higher clergy in France numbered 2500, of whom 153 were in Paris. There were 31,500 curates and 9000 vicars in the country, besides 4000 ecclesiastics teaching in the universities and in the Catholic institutions. Protestantism in France was represented chiefly by synodal Presbyterianism. There were 850 associations of the Protestant faith in France, served by more than 1000 pastors and evangelists. The Protestant population of France was estimated at about 1,000,000. Judaism and Mohammedanism (the latter chiefly in Algeria) were also represented in France.

Education. Educational freedom is provided for by law in France. There were, consequently, a number of private schools maintained by individuals and associations, but all had to conform to national standards of learning and morality, and the state alone had the right to award diplomas and degrees, through examination of the aspirants. The public schools formed the bulk of the French educational system; together they made up the so-

called "Université de France," divided into three orders—primary education, secondary education, and higher education. The most elementary schools in France were the *écoles maternelles*, a sort of kindergarten; in 1912-13, there were 3976 of these schools, and in 1921-22 only 3431, due to the slowness of reestablishing schools of this type in the devastated regions; the number of pupils attending was 608,315 in 1912-13 and 246,985 in 1921-22. Next were the primary schools proper, numbering 83,095 with 159,982 teachers and 5,669,251 pupils in 1912-13, and 79,347 with 119,316 teachers and 4,452,000 pupils in 1920-21. In 1912-13, there were 83 primary normal schools each for males and females, with 4629 male and 4959 female pupils; while in 1922-23, there were 86 normal schools for males with 4538 students, and 86 for females with 5093 pupils. Secondary education for boys was given in 343 schools in 1913 to 100,203 students and in 367 schools in 1922 to 114,910 students, while secondary education for girls was given in 138 schools in 1913 to 33,282 students, and in 154 schools in 1922 to 45,047 students. Higher education was given to 41,109 students in 1913, of whom 16,763 were under the law faculty, 8247 students studying medicine, 6639 science, and 6398 letters. In 1924, there were 17 universities in France, at Aix-en-Provence, Algiers, Besançon, Bordeaux, Caen, Clermont-Ferrand, Dijon, Grenoble, Lille, Lyon, Montpellier, Nancy, Paris, Poitiers, Rennes, Strasbourg and Toulouse. The oldest was the University of Paris, founded in 1200, the newest that at Algiers, founded in 1885. The only illiteracy statistics available for France were those in connection with conscription for the army. In 1912, the percentage of illiterate conscripts was 4.18 and in 1921 it was 4.07. In the earlier year, 7694 could neither read nor write, and in the latter year, 6660.

Agriculture. France is preponderantly an agricultural country, notwithstanding the great importance of French manufactured products, but the proportion of rural inhabitants was steadily, though gradually, decreasing. According to the 1911 census, the rural population was 22,096,000 out of a total of 39,605,000, and according to the 1921 census, for the same area, the rural population was 20,119,000 out of a total of 37,500,000; for the new area of France in 1921, the rural population was 21,004,000 out of a total of 39,210,000. The proportion of persons actually engaged in agricultural work was slightly less; in 1911, the working population of France was 20,931,000, while the agricultural workers numbered 8,517,000. Thus in 1911 the ratio of agricultural workers to total workers was 407 to 1000, and the ratio of rural population to total population 568 to 1000. Wheat production, though increasing, was still below pre-war in France. Other crops were also slightly below normal, but generally greater in 1923 than in 1922. The table gives the relative acreage and quantities of the principal French crops, in 1923 and before the War.

Crops	Area (1000 acres)		Production (1000 metric tons)	
	1913	1923	1913	1923
Wheat	10,163	13,650	8,692	7,905
Oats	9,877	8,541	5,183	5,470
Rye	2,956	2,170	1,271	939
Barley	1,889	1,744	1,044	1,023
Potatoes	5,792	8,542	13,586	9,534
Sugar beets	577	865	5,989	8,222

Wine production fluctuated greatly from year to year but the acreage of vines did not change very rapidly. In 1913, the area devoted to vines in France was 3,803,000 acres, and the wine production 1,167,764,000 gallons (an unusually small production); in 1923, the acreage was reduced to 3,506,000 acres while the crop reached 1,509,314,000 gallons. Forage crops in 1913 covered 37,836,000 acres with a production of 96,000,000 metric tons; the area was increased by the addition of Alsace-Lorraine to 39,064,000 acres in 1921, with a production of only 58,000,000 metric tons. The number of horses in France on Dec. 31, 1922, was 2,778,000 compared with 3,222,000 on Dec. 31, 1913, but represented a considerable recovery from the war-time figure of about 2,250,000. Beef cattle on Dec. 31, 1922, numbered 13,576,000, compared with 14,788,000 on Dec. 31, 1913, but this also was a recovery from the war slump to 12,250,000. Sheep have been gradually declining in number for many years; at the end of 1882, there were 16,131,000, and at the end of 1922, only 9,782,000; during the War, however, the number went as low as 8,991,000. Raising of swine was also less important than formerly, but was increasing after the end of the War. On Dec. 31, 1913, there were 7,036,000 swine in France; on Dec. 31, 1918, there were 3,980,000; and on Dec. 31, 1922, there were 5,196,000. Milk production in France, while still below pre-war, was gradually approaching that level. In 1913, the total amount of milk produced was 128,072,800 hectolitres (1 hectolitre equals 26.42 gallons); in 1921, it was down to 106,503,550 hectolitres; but increased to 117,038,120 hectolitres in 1923. Milk for feeding calves was used to the extent of 28,986,430 hectolitres in 1913 and 25,536,830 hectolitres in 1923. Butter-making consumed 43,639,180 hectolitres in 1913 and 38,972,540 hectolitres in 1923, while cheese consumed 14,589,430 and 22,330,270 hectolitres, respectively.

Fisheries. The French fishing industry was greatly damaged by the War, not only by the requirement of fishermen for service in the army, but also by the requisitioning of boats and equipment. At the end of 1921, the number of vessels was only 23,301, in spite of increases since 1918, as compared with 29,451 in 1912. The number of steam and motor vessels was increasing, but sailing craft still predominated. Statistics of the value of the catch were not available for a post-war year. In 1912, the value of fresh fish was about 88,000,000 francs, as follows: cod, 26,000,000 francs; herring, 13,000,000 francs; sardines, 9,000,000 francs; mackerel, 7,000,000 francs; tuna fish, 5,000,000 francs; and oysters, about 28,000,000 francs.

Food Imports. Imports of foodstuffs, in spite of smaller crops after the War, except in the case of potatoes, did not equal pre-war quantities. See table on page 495 for quantities imported and exported in 1913, 1922, and 1923.

Minerals. The leading minerals produced in France were coal, iron, gold, lead, zinc, silver, copper, antimony, manganese, tungsten, bauxite, iron pyrites, mineral oils, salt potash, and stone of various kinds, but not all of these were produced in important quantities. Coal production in 1913 reached 40,844,000 tons, and during the War dropped to hardly more than half that amount. After the War the production of coal in the Saar Valley (q.v.), which

Commodity	IMPORTS			EXPORTS		
	1913	1922	1923	1913	1922	1923
	(Quantities in metric tons)					
Wheat	1,555,651	675,198	1,416,795	1,605	18,399	13,247
Oats	580,481	360,018	129,763	2,697	6,656	38,252
Barley	116,038	52,864	69,730	9,525	10,466	21,547
Rye	46,638	258	37,179	158	21,701	7,883
Maize	590,817	584,556	563,759	2,367	8,019	2,719
Wheat flour	10,053	2,603	6,891	20,498	42,544	44,785
Potatoes	193,580	371,092	296,003	181,096	140,025	219,406

was to be administered by France for a period of 15 years, and which amounted to about 10,000,000 tons a year, was added to French production. Even so, this did not greatly exceed pre-war production, though the latter half of 1923 showed an average of about 4,500,000 a month, which, had it characterized the whole year, would have made the yearly total 54,000,000 tons; the actual 1923 production, however, was only 47,832,000 tons. All of these figures included lignite, production of which reached about 900,000 tons per year. In January, 1924, French coal production, exclusive of the Saar, was 3,794,000 tons, compared with a monthly average of 3,404,000 tons in 1913. This was one of the first and the most striking instances of an advance over pre-war coal production within the actual confines of France. Production of iron ore in France after the War included the production of Alsace-Lorraine, which in 1913 was 21,133,600 tons. In 1913, France produced 21,918,000 tons of iron ore, but it was extraordinarily great in that year, having been 19,160,000 tons in 1912 and 16,639,000 tons in 1911. In 1923, production reached 23,325,564 tons, including the production in Alsace-Lorraine. French gold production after the War was negligible; in 1913, about 150,000 tons of ore were mined, yielding 2250 kilograms of gold (1 kilogram = 2.2 pounds); in 1920, only 4137 tons of ore were produced. The amount of lead ore produced in 1913 was 17,081, and in 1920 was 4808 tons. Zinc ore production was 46,577 tons in 1913 and fell to 4247 tons in 1920. Copper ore production was very small, being 521 tons in 1913 and 373 tons in 1920. France ranked second to China in antimony production, with 21,672 tons of ore in 1914, rising to 33,462 tons in 1917, and sinking to 4411 tons in 1921. Bauxite (the ore of aluminium) was produced in fairly large quantities in France. In 1913, French production was 309,000 tons out of a world production of 536,000 tons. In 1921, it had dropped to 139,902 tons, but was again increasing. In the first 10 months of 1923, 269,600 tons were mined. In 1913, production of iron pyrites was 311,167 tons, and in 1921, 172,370 tons. Mineral oil production in France was 49,584 tons in 1913, and in 1921, with the addition of the production of Alsace-Lorraine, it was 55,574 tons. Salt was produced from sea water and was also mined in France; the production of mined salt dropped from 900,000 tons in 1913 to 541,000 tons in 1915, but increased again to 1,048,000 tons in 1922; sea salt production was 382,000 tons in 1913 and 433,000 tons in 1920. Potash production, owing to the acquisition of Alsace-Lorraine, where the most important beds were found, was much greater than before the War; in 1913, the production of potash salts was 355,341 tons, with 56,000 tons of pure potash content, this figure representing a considerable increase from previous years; in 1923, production was 1,026,400 tons containing 248,523 tons of pure potash.

Industries. French metallurgical industries were, by 1924, fairly active, and the addition of the Alsace-Lorraine industrial area increased the amount of French production. In 1913, French pig iron production was 5,208,000 metric tons; in 1923, it was 5,304,000 tons, and in January, 1924, reached the high monthly mark of 586,000 tons, compared with a 1913 monthly average of 434,000 tons. Crude steel production advanced similarly; 4,692,000 tons were produced in 1913, 4,980,000 tons in 1923, and 540,000 tons in January, 1924. Exports of French metallurgical products in 1913 amounted to 1,008,000 tons; in 1919, exports had dropped to 367,000 tons; but by 1923 they had risen again to 2,536,000 tons, more than twice their pre-war amount. The number of blast furnaces in operation at the end of 1923 almost reached the pre-war figure, with 125, as against 129 in 1913. The machine tool industry in France was recovering, especially in 1923, from the depression it experienced immediately after the War. During the War a large stock of machines was imported from Great Britain and the United States which had to be disposed of gradually before the native industry could resume normal operations. Imports from the United States, because of the high dollar exchange, were restricted in 1923, and imports from Germany also declined considerably, though for very different reasons, among them the stagnation of German industry, the difficulty the Germans had in making deliveries, and the prejudice against German goods. In this way the French industry was greatly stimulated and an increasing proportion of such machinery was being bought in France. The local market for metal-working machinery has been stimulated by the revival of a number of industries requiring the machines. Automobile manufacture was also gaining in volume, with increasing sales both at home and abroad. The following table shows the development of the export trade in automobiles, with the advance over pre-war volume as well as prices:

Year	Weight (metric quintals)	Value (millions of francs)
1913	258,000	227 (gold)
1919	59,000	125 (paper)
1920	514,000	884 "
1921	376,000	666 "
1922	341,000	557 "
1923	407,000	812 "

The chemical industries of France, always important, were becoming more so from an international standpoint. Production and exportation of perfumes and soaps also reached a level above pre-war. The foreign trade in chemicals and in perfumes and soaps is shown in the table on page 496.

The textile industries did not, in 1924, vary greatly in amount of equipment from pre-war, notwithstanding the setback given to the cotton, wool, and linen industries of northern France by the wanton devastation of the Ger-

man occupation. In 1913, with a total of 16,000,000 sheep, the French production was about

EXPORTS OF CHEMICAL PRODUCTS (in metric quintals)		
Year	Miscellaneous chemicals	Perfumes and soaps
1913	11,126,000	514,000
1919	4,019,000	302,000
1920	9,197,000	527,000
1921	9,645,000	466,000
1922	15,506,000	544,000
1923	16,463,000	658,000

30,000,000 kilograms of wool, an average of 1.875 kilograms per head. In 1922, when the number of sheep was about 9,500,000, the production was estimated at 19,000,000 kilograms, an average of 1.930 a head. The Roubaix-Tourcoing district on the Belgian border was the principal woolen manufacturing district of France. In 1913, a monthly average of 4955 metric tons of wool tops was recorded in this region, and in 1923 a monthly average of 5451 metric tons; other production in this region (yarn, noils, etc.) brought the total monthly average for 1913 to 8714 metric tons, and to 8330 metric tons for 1923. Imports of raw wool, by 1924, were at a higher rate than before the War, as were exports of woolen cloth, which reached about 25,000 metric tons in 1923, compared with 23,000 in 1912. Exports of woolen yarns were also increasing over recent years, but comparable figures for 1913 were not published. The equipment of the woolen industry at the end of 1922 was as follows: spindles for woolen yarns, 679,131 (against 712,000 in 1913); spindles for worsted yarns, 2,292,409 (against 2,500,000 in 1913); mechanical looms, 55,000, the same as pre-war (there were also several thousand hand looms in operation but the exact number was unknown); combing units, 1757 (against 2500 in 1913). The total output of woolen goods was estimated at 66,000,000 pounds in 1922, compared with 30,000,000 pounds in 1921, showing the considerable recovery in this industry. The cotton industry was still considerably below normal in output and the year 1923 did not show any pronounced increase in activity over the previous year. Cotton spinning in 1922 was not more than two-thirds of the 1913 amount, and approximately the same was true of 1923. Weaving in 1922 improved distinctly over the years immediately preceding, but was still considerably below the degree of activity shown in 1914. In 1922, the average monthly production per loom in lengths of approximately 100 meters was 5.07, compared with 7.70 in May, 1914. There were 9,605,000 spindles for spinning cotton in France at the end of 1922, and 1,223,214 for twisting. Mechanical looms numbered 180,560 and hand looms 27,800. Culture of raw silk and silk manufacture were both important industries in France, but, while the former had been declining for a long period, the latter continued to maintain, and tended to increase, its importance. Production of silk cocoons was at a maximum in 1867, when a weight of 14,083 metric tons was reached; by 1913 the weight of cocoons had declined to 4423 tons; while in 1915 the low point of 1739 tons was reached. In 1923, a return to 3130 tons was achieved. The value of finished silk goods increased greatly in the past few years, due mainly to the depreciation of the franc and the increased prices even in terms of gold values. In 1913, the

value of the production of silk goods in the Lyon district was 467,700,000 francs (\$93,540,000 with the franc at about five to the dollar); in 1923, it was 2,812,000,000 francs (\$187,500,000 with the franc at about 15 to the dollar). In the latter total is included artificial silk to the value of 370,000,000 francs. In 1922, there were in France 600 factories with a total of 1,200,000 spindles for silk spinning and throwing, and the total silk conditioned was 6613 metric tons. Export trade in textile goods is shown in the table, revealing the practically complete recovery in silk and wool, with a considerable deficiency still existing in the cotton goods trade.

MANUFACTURED GOODS AND FABRICS EXPORTED (quantities in metric quintals)			
Year	Cotton	Wool	Silk
1913	554,000	234,000	62,000
1919	350,000	55,000	60,000
1920	479,000	143,000	76,000
1921	587,000	156,000	57,000
1922	437,000	183,000	63,000
1923	447,000	255,000	76,000

Ship construction in France in 1923 was at a low ebb both as compared with the two previous years and as compared with 1913. There were certain favorable features, however, toward the end of the year. Formerly French shipyards were largely dependent on orders from the government, and building for private interests might be called supplementary. In 1924, with the low cost of the franc, French builders had contracts for vessels from a number of foreign companies, including orders from Holland, Norway, Egypt, and even Great Britain. The monthly average of gross tonnage launched in 1923 was 8054, compared with 15,376 in 1922, and 14,674 in 1912. Tonnage under construction at the end of 1923 was 110,725 gross tons, compared with 188,525 on Dec. 31, 1922.

Unemployment in practically all French industries was negligible in 1923. In fact, there was a continual influx of labor from other countries less favorably placed. No statistics were available comparing the situation with the pre-war period.

Foreign Trade. French foreign trade in 1923 made a very favorable showing. Imports were valued at 32,614,560,000 francs (equivalent to \$1,982,965,000 with the franc at the average for the year, \$0.0608), compared with 23,930,600,000 francs (equivalent to \$1,950,849,000 with the franc at \$0.0820) in 1922, and with 8,421,300,000 francs in 1913 (equivalent to \$1,625,311,000 with the franc at par of exchange, \$0.193). Exports in 1923 were valued at 30,431,510,000 francs (equivalent to \$1,849,141,000), compared with 20,642,000,000 francs in 1922 (equivalent to \$1,692,640,000), and with 6,880,200,000 francs in 1913 (equivalent to \$1,327,879,000). Thus the unfavorable balance in 1923 was \$133,824,000 or 7 per cent, compared with \$267,209,000 or 16 per cent in 1922, and with \$297,432,000 or 22 per cent in 1913. From the point of view of visible trade balance, therefore, France was by 1924 considerably better off than before the War. Itemized into main classes of commodities, the foreign trade of France in 1923 showed a tendency to revert to the normal distribution; i.e. exports of manufactured goods far outweighing foodstuffs and raw materials, and imports of raw materials being by far the most important group in the

incoming trade. The accompanying table gives the figures in francs for the three years, 1913, 1922, and 1923. In considering actual values, the average of the franc in the three years, as shown in connection with the trade totals, should be borne in mind. Of the imports of raw materials, 583,997,000 francs covered coal, coke, etc., in 1913, to the amount of 22,866,967 metric tons; 2,397,763,000 francs in 1922 to the amount of 28,987,108 tons; 3,644,794,000 francs in 1923 to the amount of 30,672,847 metric tons.

FRENCH IMPORTS

Kind of merchandise	1913	1922	1923
	(values in thousands of francs)		
Foodstuffs	1,817,579	5,833,887	7,478,917
Raw materials	4,945,732	14,014,485	20,781,890
Manufactured articles	1,658,021	4,050,956	4,353,753
Totals	8,421,332	23,930,328	32,614,560

FRENCH EXPORTS

Kind of merchandise	1913	1922	1923
	(values in thousands of francs)		
Foodstuffs	838,898	1,882,007	3,189,268
Raw materials	1,858,091	5,807,208	9,348,456
Manufactured articles	3,617,046	12,271,586	16,232,406
Parcel post packages	566,182	1,418,142	1,660,990
Totals	6,880,217	21,378,943	30,431,510

The 10 leading countries receiving French exports are shown in the order of their importance in 1923 in the accompanying table (this disregards products of French colonies and the Saar Valley, which are listed with the foreign countries in the French statistics.)

COUNTRIES RECEIVING FRENCH EXPORTS

	1923	1922	1913
	(values in thousands of francs)		
Great Britain	6,154,663	3,960,500	1,453,700
Belgium-Luxembourg*			
Economic Union	5,805,836	4,015,454	1,108,500
United States	2,490,644	2,006,754	422,600
Switzerland	2,113,007	1,001,007	406,100
Italy	1,181,352	795,090	805,800
Germany	1,085,566	1,959,878	866,800
Spain	907,351	518,099	151,200
Netherlands	630,551	395,752	82,700
Argentina	612,643	314,245	199,900
Brazil	251,938	158,412	86,400

* For 1913 the statistics cover Belgium alone, as the Union was not formed until 1922.

A similar table shows the principal sources of French imports.

PRINCIPAL SOURCES OF FRENCH IMPORTS

	1923	1922	1913
	(values in thousands of francs)		
Great Britain	5,272,169	3,407,420	1,109,400
United States	5,049,060	3,863,873	894,700
Belgium-Luxembourg*			
Economic Union	2,404,112	1,736,892	556,300
Argentina	1,271,620	796,366	869,300
Italy	1,223,758	803,587	240,500
Germany	1,048,331	1,297,513	1,068,800
Netherlands	1,002,288	700,475	113,800
Brazil	691,303	464,041	174,300
Spain	607,911	349,792	281,600
Switzerland	601,635	540,097	135,200

* See note regarding exports.

The principal classes of commodities in the import trade of France were coal, which occupied first rank with a value of 1,925,991,000 francs in 1922, but was in third place in 1913; raw cotton, second in 1922, with a value of 1,710,872,000 francs, and also second in 1913; raw wool, third in 1922 with 1,669,038,000 francs, but in first place in 1913; raw silk, fourth in 1922 with 1,295,176,000 francs and

fifth in 1913; machinery made of iron and steel, fifth in 1922 with 890,897,000 francs, and seventh in 1913. Except the last item, all of the foregoing principal commodities have been the raw materials for French manufactures; the fact that the manufactured product, machinery, which in 1913 came seventh, was in fifth place in 1922, is an indication that in some respects France had not entirely regained her position as a manufacturing nation. In sixth place in 1922 were imports of oilseeds and oil fruit, with a value of 837,336,000 francs, which had been in fourth place in 1913; in seventh place in 1922 were wines, with 798,991,000 francs, eighth in 1913; in eighth place in 1922, crude and refined mineral oils, with 748,575,000 francs, thirteenth in 1913; in ninth place in 1922, coffee, with 636,209,000 francs, tenth in 1913; in tenth place, woods for building, with 602,059,000 francs, eleventh in 1913. Wheat had dropped to twelfth place as an import item, with a value of 443,644,000 francs, whereas it had occupied sixth place with 335,884,000 francs in 1913. The leading commodity in the French export trade in 1922, which was also leading in 1913, but by a much narrower margin, was silk fabrics, with a value of 1,377,847,000 francs; second came women's clothing, with a value of 1,065,000,000 francs, having risen from tenth place in 1913; third were cotton fabrics, with 1,059,521,000 francs, falling from second place in 1913; fourth, pig iron, iron and steel, with 1,003,445,000 francs, rising from relative insignificance in 1913, as a result of the addition of Alsace-Lorraine with its important metallurgical industries; fifth, wool fabrics, with 850,658,000 francs in 1922; falling from fourth place in 1913; sixth, paper and paper manufactures, with 793,034,000 francs, eighth in 1913; seventh, raw wool, with 679,346,000 francs, third in 1913; eighth, machinery with 573,945,000 francs, twelfth in 1913; ninth, manufactured rubber (including automobile tires) with 535,928,000 francs, sixteenth in 1913; and tenth, tools and metal goods, with 500,529,000 francs, thirteenth in 1913. The general trend seemed to be toward an even greater concentration of the export trade on manufactured commodities than before the War.

Trade with the United States. Raw cotton continued to be by far the most important commodity imported by France from the United States, but the percentage of imports of American cotton to total French cotton imports declined from 79 per cent in 1921 to 69 per cent in 1922 and to 62 per cent in 1923. The value of cotton imports from the United States in 1923 was 1,929,602,000 francs, out of a total importation from the United States in that year amounting to 5,049,060,000 francs, or practically two fifths of the total. The United States was still the chief source of French supplies of crude and refined mineral oils, which formed the second most important item in the trade in 1923. The proportion supplied by the United States rose from 74 per cent in 1921 to 77 per cent in 1922 to 81 per cent in 1923. Imports from the United States of copper, the third item in the trade, formed about three-fourths of the total French imports of copper. The share of the United States in the French cereal import trade was constantly diminishing, amounting to only 17 per cent in 1923, compared with 30 per cent in 1921, but imports from the United States were still very impor-

tant, exceeding every other single country except Argentina. All kinds of machinery were imported from the United States in considerable quantities. In 1923, coal was also among the leading commodities imported from the United States, but this was abnormal, due to the unsettled conditions in Germany, and the strikes in England during a portion of the year which restricted imports of coal from that country. The other commodities of importance among French imports from the United States were sugar, in which, however, the United States was losing ground in favor of the Dutch East Indies; salted and preserved meats, of which in 1923 the United States sent 66 per cent of the total French importation; raw hides and skins, the United States ranking fourth as supplier; automobiles, of which this country furnished nearly 90 per cent of the French imports; and lumber, with our share steadily increasing, yet amounting only to 6 per cent in 1923. French exports to the United States of greatest importance were for the most part those leading in the exports of France to all countries. There was no commodity of such outstanding importance, however, as was cotton in the case of imports. The United States was the second best customer of France for silk and artificial silk fabrics—the most important item in the trade in 1923, with a value of 386,513,000 francs—and next to Great Britain. Ready-made clothing occupied second place with a value of 331,959,000 francs in 1923, and this amount was far from representing the total American purchases of French clothing, as it did not take into account the extensive purchases of French clothing made by American tourists in France, and carried home in their trunks. Other leading items in order of their importance in 1923 were published matter, cinema films, etc., raw hides and skins, cotton fabrics, and woolen fabrics, each of which was valued at more than 100,000,000 francs; synthetic perfumes and essential oils, articles of leather or artificial leather, and rags, with values over 50,000,000 francs; and chemicals (excluding potash), perfumes and soaps, raw silk and silk floss, seeds for sowing, paper and table fruits, with a value of more than 30,000,000 francs each.

Reconstruction. The chief difference between pre-war and post-war France lay in the condition of northern and northeastern France, overrun by the German forces from 1914 to 1918. The extent of the damage and of the reconstruction accomplished and to be accomplished was dealt with in publications issued by the ministry of the liberated regions, but it was impossible for any statistical publication to convey an idea of the amount of work and expense necessary to restore the region to its former degree of productivity, if indeed complete restoration was possible. Outside of the cost of the War itself, no factor was so potent in creating the harassed situation of the French treasury as the cost of reconstruction, which the impossibility of obtaining reparations threw wholly on the shoulders of France. In 1914, the population of the devastated departments of France was 4,690,183; by the Armistice it had dropped to 2,075,067, the population having been largely driven to other sections, thus placing a burden on those sections and on the French government. The reflux of the population to the devastated provinces was nearly

complete, by 1924, if war deaths are taken into account. In January, 1924, the population of the region was 4,253,677. The number of buildings in the district in 1914 was 1,190,066 and of these 893,792 were damaged or destroyed during the War, comprising 866,844 houses and agricultural structures, 17,616 public edifices, and 9332 industrial establishments, employing at least 10 workmen. About 39 per cent of the buildings were totally destroyed, and 61 per cent damaged to a greater or less degree; the destruction was greatest in the Nord department, where the important cotton wool textile factories were, and again are, located; 33 per cent of the factories damaged were in this department. To January, 1924, the number of establishments entirely restored was 438,710 (slightly over 50 per cent), of which 423,145 were houses and agricultural structures, 7602 public edifices, and 7963 factories, the latter approaching the nearest to pre-war conditions. Much of the reconstruction was carried out through "Coöperatives of Reconstruction"; advances made to these societies amounted to 2,015,559,347 francs in 1921; 2,253,495,517 in 1922, and 2,304,920,000 in 1923. Municipal life was suspended in 3255 communes during the War, and was resumed in 3239, leaving only 69 permanently deleted. The number of public schools (primary, secondary, and advanced) in the devastated regions was actually greater than in 1914, being 7846 on Jan. 1, 1924, compared with 7400 in 1914, but the number of pupils declined from 668,000 to 497,477; the number of private schools sank from 1060 to 849, and pupils from 131,700 to 88,385. The amount of money allotted by the Republic to refugees and for temporary succor reached a total of 1,161,087,936 francs, and this amount must be considered in addition to all sums spent for reconstruction. Donations received by the French administration from private persons and associations in France were valued at 6,473,609 francs, and from foreign sources at 8,484,755 francs, besides money gifts of 23,111,311 francs from France and 17,396,874 francs from abroad, making a grand total of 55,466,549. The total amount of the damage to French property was estimated, in January, 1924, at 85,000,000,000 francs, of which 25,420,000,000 covered industrial property, 20,213,599,000 francs farm property, and 39,366,401,000 francs other property. To this total should be added the following:

	Francs
1. Interest on the 1914 value of the damage, ...	3,000,000,000
2. Labor and purchases made directly by the state, ...	5,500,000,000
3. Rebuilding of railways, ...	2,650,000,000
4. Reorganization of public services, ...	2,700,000,000
5. Assistance rendered to persons, ...	1,400,000,000
6. Expenses of administration, ...	1,200,000,000

This brought the total above 100,000,000,000 francs. Up to Jan. 1, 1924, the amount of work actually accomplished was estimated at 52,658,930,313 francs. With this staggering expense to add to the cost of the War, it was scarcely remarkable that the financial situation of the government had become unenviable, or that the failure to receive the reparations decreed against Germany had caused serious distress, as well as extreme distrust and dislike of the German people.

Finance. Before the War, French budgets

had a practical balance of receipts and expenditures, though in some years expenses showed a greater or less excess. The accounts for the "fiscal period" 1913 (i.e. amounts properly attributable to the year 1913, whether received or spent in that year or in 1914) showed revenues amounting to 5,103,000,000 francs and expenses amounting to 5,349,700,000 francs, with an excess of expenses amounting to 246,700,000 francs. The budget for the year 1914 provided for a slight surplus, but war expenses upset the calculations, and initiated the period of large budgets which continued ever since. The table shows expenses from 1914 to 1921, distributed according to their character, whether military expenses, interest and sinking fund on the debt, civil or ordinary expenses, reconstruction expenses, and the debit balance of special accounts.

and foreign loans about 20 per cent. The French budget after the War was made up of three main divisions, the general budget (covering ordinary and extraordinary receipts and expenses), the annexed budgets (covering the various state monopolies and services), and the special budget of expenses called "recoverable," arising from war and reconstruction costs, which were chargeable against German reparations. It should be noted that in view of the failure to receive reparations due, these "recoverable" expenses up to 1924 only served to increase the deficit. The general budget for 1922 showed expenses amounting to 24,687,958,948 francs and revenues amounting to 24,702,059,912 francs, giving a surplus of 14,100,964 francs, while the general budget for 1923 showed expenses of 23,402,487,556 francs and receipts of 23,437,954,832 francs, with a surplus

FRENCH EXPENSES FROM 1914 TO 1921

Year	Debt Charge	Other Civil	War	Reconstr'n	Debit Balance Spec. Accts.	Total
	(values given in millions of francs)					
1914	1,860	2,005	6,894	4	108	10,371
1915	2,479	1,835	16,594	15	1,197	22,120
1916	3,434	2,817	26,348	845	3,904	36,848
1917	4,965	4,129	31,895	689	2,983	44,661
1918	7,189	5,482	41,370	495	2,113	56,649
1919	8,089	9,758	23,375	9,604	3,387	54,213
War period	26,872	26,670	146,476	11,152	13,692	224,862
1920	15,201	11,855	10,286	15,709	5,092	58,143
1921	16,000	10,778	8,702	13,829	2,714	52,023
Post-war period	31,201	22,633	18,988	29,538	7,806	110,166
Grand total	58,073	49,303	165,464	40,690	21,498	335,028

The most striking features of the tabulation were the steadily increasing burden of the public debt, and the steady contraction of military expenses after the end of the War. Receipts in the same period are indicated below:

Revenue receipts	
1914-1919	37,821
1920 and 1921 (viz., 1920, 19,821; 1921, 21,543)	41,364
Total revenue receipts	79,185
Receipts from borrowing to Dec. 31, 1921	
Permanent loans	104,092
Floating debt	
Bank of France	24,600
Treasury bills, etc.	61,741
Total internal loans	190,433
Foreign loans—realized and to be repaid at par of exchange	35,563
Total borrowing receipts	225,996
Grand total receipts	305,181
Authorized expenditure in excess of receipts.	29,847

In the absence of final data, the two sides of the account, expenditures and receipts, cannot be reconciled. Apparently the excess of "expenditures authorized" above "receipts realized" represents expenditures authorized but not made and for which it was therefore not necessary to provide resources. (The tables and data which are given above are from *French Public Finance* by Harvey E. Fisk.) The resources with which to meet the expenses of the war period were derived 18½ per cent from taxation, 65.17 per cent from borrowing at home, and about 16.33 per cent from foreign loans. The Bank of France furnished 15.27 per cent of the amount, national defense bills 28.77 per cent, other temporary loans 35.93 per cent

of 35,467,276 francs. The tables on the next page itemize expenses in the two budgets.

Economies in expenses of various kinds, and increases in ordinary and permanent sources of revenue alone prevented a considerable deficit from appearing in the general budget for 1923. The annexed budgets, 12 in number, balanced at 3,661,094,017 francs for 1922 and at 5,225,890,356 francs for 1923; surpluses or deficits in these budgets were transferred to the general budget, increasing receipts or expenses there as the case might be, leaving them always in balance. The "special budget of recoverable expenses" for 1922 showed expenses of 10,558,534,377, with order and miscellaneous receipts amounting to 1,309,855,000 francs, leaving approximately 9,250,000,000 francs to be raised by borrowing. The special budget for 1923 showed expenses amounting to 13,581,690,114 francs, with revenues of 3,508,660,000 francs, leaving 10,073,000,000 francs to be met by borrowing. In addition to the above items were amounts set aside for the "upkeep of troops of occupation in foreign countries," set at 520,816,700 francs for 1922 and 1,030,936,710 francs for 1923. No receipts were shown against these expenditures, but according to the law of Dec. 31, 1918, the expenses were to be added on the reparations due from debtor governments.

The public debt of France was large even before the War. It was divided into the following categories: perpetual debt (also called consolidated), term or amortizable debt, floating debt, and annuities (*dette viagère*). In 1913, the perpetual debt amounted to 21,922,000,000 francs, the amortizable debt to 3,388,000,000 francs, and annuities (*dette viagère*) to 6,146,000,000 francs, making a total funded debt of

31,456,000,000 francs; treasury bills amounted to 410,000,000 francs, other floating debt to 1,671,000,000 francs and surety bonds to 100,000,000 francs, making the total unfunded debt 2,181,000,000 francs; as there was in 1913 no foreign debt, the total public debt amounted at that time to 33,637,000,000 francs, or about \$6,500,000,000 at par of exchange. No foreign debt was recorded at this period, the whole amount being raised within the country. The latest available statement of the French public debt was that of Dec. 31, 1923. At that time

Bank of France was 3,342,800,000 francs in gold and 629,300,000 francs in silver, making a total of 3,972,100,000 francs. The average note circulation of the bank in the same year was 5,665,300,000 francs, making the percentage of metallic reserve to note circulation just over 70. On Dec. 20, 1923, the gold reserve in the bank was 3,676,000,000 francs, that held abroad, 1,864,000,000 francs and the silver reserve 296,000,000 francs, making a total reserve of 5,836,000,000 francs. On the same date the note circulation was 37,630,000,000 francs, and the per-

ESTIMATES OF GENERAL BUDGET EXPENDITURES, 1922 AND 1923

Items	1922	1923
	Francs	Francs
Ministry of Finances:		
Public debt	12,647,161,236	12,008,378,586
Other services	1,832,515,331	1,824,605,467
Ministry of Justice	169,385,096	166,299,384
Ministry of Foreign Affairs	153,630,891	122,860,953
Ministry of the Interior	244,026,116	224,411,762
Ministry of War	3,426,284,959	3,566,765,327
Ministry of the Navy	797,804,914	1,028,237,008
Ministry of Public Instruction and Fine Arts	1,428,567,213	1,586,928,075
Ministry of Commerce and Industry	28,331,562	24,736,140
Ministry of Labor	160,729,241	156,902,600
Ministry of Colonies	237,096,708	231,913,717
Ministry of Agriculture	168,514,560	177,804,405
Ministry of Public Works	2,704,345,798	1,533,029,266
Ministry of Liberated Regions	186,323,000	174,895,000
Ministry of Pensions, Premiums, and War Allotments	206,857,000	173,368,000
Ministry of Hygiene, Assistance, and Social Welfare	296,385,323	401,321,866
Total	24,687,958,948	23,402,487,556

ESTIMATES OF GENERAL BUDGET RECEIPTS, 1922 AND 1923

Items	1922	1923
	Francs	Francs
Taxes and revenues	15,753,084,327	17,101,602,616
State monopolies and industries	2,910,179,748	1,997,978,290
State domains	183,330,900	236,222,400
Order receipts	797,943,937	805,829,426
Miscellaneous budget receipts	176,461,000	260,990,100
Special receipts	4,870,000,000	3,025,000,000
Algerian receipts	11,110,000	10,332,000
Total	24,702,059,912	23,437,954,832

the total internal debt was shown as 270,708,103,000 francs of which the major items were: *rentes* of various categories (consolidated perpetual and amortizable issues), 110,515,995,000 francs; national defense bills (short term), 55,848,000,000; 2 to 10 year treasury bonds (also short term), 24,516,000,000; long and short term Credit National issues (forming part of the reconstruction debt), 23,978,000,000 francs; and advances from the Bank of France (floating debt), 23,300,000,000 francs. The external debt amounted to 38,794,936,000 gold francs, but owing to the depreciation of the franc this was the equivalent of 140,800,000,000 paper francs at the value of the paper franc in on that date. The total debt, internal and external, on Dec. 31, 1923, therefore, was approximately 417,508,000,000 paper francs, equivalent, with the franc at \$0.051 as quoted in New York on that date, to \$21,293,000,000. It was a curious fact that although the debt rose from 349,585,000,000 paper francs on Dec. 31, 1922, to 417,508,000,000 paper francs a year later, the greater depreciation of the franc on the latter date caused the amount of the debt in gold dollars to sink from \$25,600,000,000 to \$21,293,000,000. Aside from budget deficits and the increase in the public debt the chief reason for the depreciation of the French currency in 1924 was the large note circulation of the Bank of France as compared with the metallic reserve. In 1913, the average metallic reserve of the

percentage of metallic cover to note circulation 15½.

Transportation. France was well provided with means of communication, internally by means of railways, rivers, and canals, and externally by the same means and also through harbors and ports and with the help of an extensive merchant marine. The principal railway systems of France (pre-war boundaries) were state railways, 5623 miles in 1923; Paris-Lyon-Méditerranée, 6078 miles; Nord, 2380 miles; Orléans, 4641 miles; Est, 3122 miles; and Midi (south), 2536 miles; making a total of 24,430 miles in 1923, compared with 24,417 miles in 1913. The railways of Alsace-Lorraine, 1405 miles in length, should be added, making a total length of 25,835 miles in 1923. Passengers carried numbered 547,886,000 in 1913 and 591,664,000 in 1921, a total distance of 19,410,000,000 kilometers in 1913, and 24,138,000,000 kilometers in 1921. The amount of slow freight carried was 208,019,000 tons in 1913 and 23,905,000,000 kilometers in 1921. Statistics for local railways were not available after 1912; in that year, their length was 6158 miles and the number of passengers carried 48,170,000; tramway lines had a length of 4218 miles and carried 37,143,000 passengers. Car loadings in 1913 averaged 60,741 daily and in 1923, 56,865 daily. However, the average load was 12 tons per car in 1923 and only 9.1 tons in 1913. On Dec. 31, 1920, the French merchant

marine comprised 13,292 sailing vessels of 433,441 net tons, with crews of 48,449 men, compared with 15,824 vessels, 601,983 tons, and 67,453 men on Dec. 31, 1913; and 2246 steam vessels, with 1,084,511 tons, 20,268 seamen, and 13,402 mechanics and stokers in 1920, compared with 1895 vessels, of 980,433 tons, with 18,552 seamen, and 12,725 mechanics and stokers in 1913. The amount of idle tonnage in French ports steadily decreased in 1923 from 530 vessels of 845,254 tons on Jan. 15, 1923, to 334 vessels of 448,000 tons on Jan. 15, 1924. The net tonnage entering French ports was 2,979,000 in 1922 compared with 2,876,000 in 1913 and departing tonnage 2199 compared with 2176. Goods tonnage discharged averaged 2,383,000 tons per month in 1922 compared with 2,657,000 in 1913, while goods loaded averaged 583,000 tons compared with 868,000. The table shows the cargo traffic of the principal French ports in 1913 and 1923.

Port	CARGO TRAFFIC OF FRENCH PORTS			
	1913		1923	
	Entered	Departed	Entered	Departed
	(in metric tons)			
Dunkirk ...	2,880,400	1,005,600	4,619,900	522,800
Le Havre ...	2,747,900	920,500	3,554,500	929,500
Rouen ...	5,147,700	449,900	8,550,000	344,800
St. Nazaire ...	1,490,900	252,200	1,317,700	205,400
Nantes ...	1,611,300	352,400	1,887,400	207,600
Bordeaux ...	3,302,900	1,302,500	3,317,900	1,504,500
Marseilles ..	5,886,200	3,052,400	5,327,500	1,907,200

The length of navigable rivers in France was 4211 miles and the length of canals 3280 miles. In 1913, shipping tonnage on the rivers totaled 21,057,000 tons and on the canals 20,840,000 tons; in 1923, river tonnage was 17,799,000 tons and canal 16,085,000, both representing satisfactory increases over 1922 though less than 1913.

History. On Dec. 1, 1913, the moderate Barthou cabinet was overthrown. The Radical-Socialists who had been most instrumental in forcing Barthou out of office filled seven of the 12 ministerial posts in the new cabinet formed by Gaston Doumergue. Joseph Caillaux, to whom still attached the stigma of the Morocco settlement of 1911, and who for this reason was impossible as prime minister, became Minister of Finance and was directing genius of the cabinet. Although Premier Doumergue was in fact an active Radical-Socialist he did not, in view of the forthcoming elections, adhere strictly to the principles which the Radical-Socialist Party had recently enunciated at its Unification Congress of Pau, and concentrated his attention on the financial proposals of Caillaux rather than on the delicate question of the Three Years Law. Nevertheless the impending electoral combat had produced a clear-cut cleavage between the two most powerful political groups: the Radical-Socialists and the Unified Socialists cooperated toward the reduction of military service from three to two years, while in opposition to this "pacifist" bloc Barthou, Millerand, and Briand had organized the Federation of the Left with a programme of electoral reform and of national defense based on the Three Years Law. In March, 1914, the cabinet became involved in scandal. The shooting of Gaston Calmette by Madame Caillaux and the subsequent disclosures revealing an old financial scandal forced both Caillaux and his lieutenant Monis (Minister of Marine) to resign during the latter part of March.

Meanwhile the electoral campaign was on, centering for the most part on the question of the Three Years Law. The elections held in May produced the following line-up in the new Chamber: Unified Socialists 102; Independent and Republican Socialists 30; Unified Radicals 136; Alliance Democratique 100; Independent Radicals and Left Republicans 102; Progressists and Republican Federation 54; Action Libérale 34; Right 36; Independents 16. The bloc of the Radicals and Socialists had more than held its own. Nevertheless the Doumergue cabinet, in accordance with custom, resigned before the meeting of the new Chamber. A ministerial deadlock ensued in the course of which a Ribot cabinet was smashed by the Radical-Socialist bloc within 24 hours of its formation. After a fortnight of difficulties René Viviani succeeded in forming a new cabinet on the basis of a policy of national defense. The success of his policy, faced as it was with strong Radical-Socialist opposition, would have been greatly in doubt had not the revelations as to the unpreparedness of the French army, which were made in the Senate on July 13, sufficiently aroused the Chamber to support the Premier and vote the military credits.

While the French public was deeply absorbed in the sensational trial of Madame Caillaux during the latter part of July, President Poincaré, accompanied by Premier Viviani in his capacity as Foreign Minister, set out to visit France's ally, Russia. The Kronstadt Conference brought a further cementing of the alliance between France and Russia. The French statesmen returned to Paris on July 29, just after the Austrian ultimatum had been delivered to Serbia. When war between Russia and Germany seemed unavoidable the German government requested of the French government a definite answer as to the attitude of France in case of a Russo-German conflict. In view of her alliance with Russia, France felt compelled to answer that she "would consult her interests." Orders for mobilization were issued in France and Germany on August 1, and two days later war was declared by Germany on France. See WAR IN EUROPE.

The French people received the news with patriotic fervor. Their outward calmness was marred, outside of a few minor occurrences, only by the assassination of Jean Jaurès, the great Socialist and pacifist, on July 31 by Raoul Villain, who acted under the influence of the extreme Royalists. Confronted with a situation which called for the greatest efforts and sacrifices, the parliamentary factions abandoned all partisan strife and concluded a truce, known as the "Union Sacrée," to which even the Socialists subscribed. The draining of man power from all walks of life took place without friction and a financial panic was averted by a moratorium. Measures were taken to provide for the maintenance of an adequate food supply, and a rigid censorship was imposed. In order to deal more effectively with the unfavorable military situation and to make the government more representative, Premier Viviani resigned on August 26, on the eve of the Battle of the Marne, and formed a new cabinet which was composed of stronger men and included even Socialists. The first steps of the new government were measures for the defense of Paris, which by this time was seriously threatened by the rapid German advance. For

this purpose General Gallieni, a capable and resolute soldier, was appointed military governor of Paris. But the military situation became so threatening that the government moved to Bordeaux, September 2, and returned to Paris only in December, 1914. When Parliament was re-opened in Paris on Dec. 22, 1914, Premier Viviani in a passionate address outlined the war aims of France, declaring that France would not "lay down her arms until she had avenged outraged right, regained forever the provinces ravished from her by force, restored to heroic Belgium the plenitude of her material prosperity and her independence, and broken down Prussian militarism." Soon the deputies manifested that they wished to be consulted as to the methods of realizing these aims and that they intended also to express freely their criticism of the government's conduct of the war. The parliamentary attacks were concentrated on the Ministry of War, which was then in the hands of Alexandre Millerand, and particularly on the Army Medical Service and on munitions supply, which the campaigns of 1914 and the early months of 1915 had proved to be sadly deficient. Millerand, however, withstood stubbornly all attacks and it was another factor, the failure of the Balkan policy, which caused the fall of the Viviani government on Oct. 22, 1915.

A new coalition government, with the motto "Peace Through Victory" was formed by Aristide Briand who gave ministerial posts to members of practically all political parties, inclusive of the Royalists and the Socialists. During the din of the battle raging around Verdun in the spring and summer of 1916 the deputies, acting upon reports of lack of provision in the defense of the fortress, demanded a secret session of Parliament for the discussion of both details regarding effectives and the responsibilities of general officers commanding in the field. Briand was forced to accede to this request and in consequence a very stormy session was held July 16-22, 1916. The Battle of the Somme and Rumania's entrance into the War on the Allied side, which was regarded as a great diplomatic success of the Briand cabinet, served to prolong the life of the government. In December, 1916, Briand reconstructed his cabinet by including a number of capable business men and by giving the Ministry of War to General Lyautey (q.v.), but when the Chamber shortly afterwards drove Lyautey from office and severely criticized Briand's economic policy the cabinet resigned, on Mar. 17, 1917. The succeeding ministry under Ribot differed from the outgoing ministry only in that it contained as Minister of War, a Radical-Socialist, Paul Painlevé, who on May 15, 1917, made important changes in the army command by appointing General Pétain Commander-in-Chief in place of General Nivelle and General Foch Chief of Staff at the War Office.

During the spring and summer of 1917 the seemingly interminable duration of the War and the terrible losses and sacrifices, coupled with grave economic troubles, seriously affected the morale of the French people and produced widespread war-weariness. The symptoms of this state of mind were "defeatism," industrial unrest, and mutinies at the front. Socialists increasingly took a stand of opposition to the War. Caillaux and other Radical-Socialist leaders who had always more or less openly op-

posed the French war policy were carrying on a campaign for a "White Peace," i.e. a peace without victory. The situation became so critical during the summer of 1917 that immediate energetic action seemed imperative to prevent a breakdown. During August Georges Clemenceau made a vehement attack in the Senate on Minister of the Interior Malvy for the way in which he had permitted the spread of defeatism and pacifism. This brought about the fall of Malvy on Aug. 31, 1917, and a week later that of the entire cabinet. Paul Painlevé, a Radical-Socialist, succeeded Ribot as Premier on September 12 and inherited his troubles. Upon the speedy fall of the Painlevé Ministry Clemenceau assumed office and began to clean the Augean stable of treason and of neglect. He abandoned coalition and the political dillydallying of his predecessors and declared that he would pursue but one policy, that of vigorously prosecuting the War. In pursuance of this policy he assumed, aside from the Premiership, the Ministry of War as the all-important cabinet post and filled his ministry for the most part with men who had been little before the public eye but stood out for ability and energy and were thoroughly faithful to his policy. He put a speedy end to the defeatist campaign by ordering the arrest of its more important leaders. At the end of 1917 the prosecution of Caillaux was ordered; the arrest of this former Prime Minister and leader of the great Radical-Socialist Party took place on Jan. 14, 1918. A series of treason trials followed now in rapid succession. The first case to come up before the Paris Court-martial was that of Bolo Pasha, an adventurer of low birth and a shady past, who had attempted to buy the *Journal* with German money and had also invested money in other newspapers for defeatist purposes. The trial resulted, Feb. 14, 1918, in a verdict of death for Bolo Pasha and of three years' imprisonment for his tool Parchère. Two weeks later the *Bonnet Rouge* trial began. Seven persons, including Duval, the editor of the *Bonnet Rouge*, a defeatist newspaper, and Leymarie, Malvy's secretary, were charged with complicity in commerce with the enemy. Upon overwhelming evidence Duval was condemned to death and the others to prison terms ranging from two to 10 years. Duval was executed a few days before the opening of public proceedings against Malvy on July 16, 1918. Malvy, a leader of the Radical-Socialist Party and a lieutenant of Caillaux, had been Minister of the Interior from 1914-1917 in five successive cabinets. In this capacity he had assisted Caillaux and his associates in their efforts to obstruct the prosecution of the War and to bring about an understanding with Germany. It was charged that by his failure to combat the enemy agents in France he had been guilty of negligence in office and had thus favored the cause of Germany and aided in bringing about the formidable mutiny which broke out among 118 battalions at the front subsequent to Nivelle's unsuccessful attack on the Chemin des Dames in 1917. The Senate, sitting as a High Court, dismissed Daudet's charge that Malvy had communicated Nivelle's plan of attack to the Germans, but found him guilty of having failed as Minister of the Interior to combat the plan to destroy the morale of the country and the discipline of the army, in other words of having

committed negligence equivalent to treason. The Court condemned him to five years' exile but without civil degradation. Malvy left immediately for Spain, protesting his innocence. Senator Charles Humbert, an influential member of the Military Committee of the Senate, Pierre Lenoir, and others were brought to trial before the Third Court-martial on Mar. 31, 1919, because of charges in connection with the purchase of the *Journal* with enemy money. Senator Humbert and Sadoux were acquitted, Lenoir condemned to death, and Desouches sentenced to five years' imprisonment. The final act of the treason drama, the trial of Joseph Caillaux, did not take place till the spring of 1920. Although he seemed to be at the bottom of the defeatist campaign and was suspected of having plotted to seize the government by a coup d'état and conclude peace with Germany, the High Court found Caillaux guilty on Apr. 23, 1920, of having had relations with enemy agents and of having given information of the greatest value to the enemy, but exonerated him of having guilty intentions. Caillaux was sentenced to two years' imprisonment, 10 years' loss of civic rights, and five years' residence within a district to be designated by the Court. Since he had served his term already, he took up his domicile in the assigned district, where, with consistency and with his admitted brilliance, he carried on a struggle to recover his former prestige.

The importance of the treason trials lies not so much in the sensational disclosures as to the existence of war-weariness, defeatism, and mutiny in France; or in the trial of former premiers, ministers, and senators, as in the fact that they mark the temporary conclusion of a struggle, started long before the War, between two great French policies. The one policy, led by Caillaux, aimed at peace and conciliation with Germany and on this basis at a concert of the continental European nations under French and German leadership. The other policy, led by Clemenceau, stood for a military victory over Germany, an Entente with England, and the fulfilment of French national aspirations, especially on the eastern frontier. Both Caillaux and Clemenceau were unscrupulous and determined in the pursuit of their policies. Caillaux had been slowly preparing the way for his success ever since the outbreak of the War. The climax came with the war-weariness and the mutinies following Nivelle's abortive attack on the Chemin des Dames early in 1917. It was then that Clemenceau made his great effort for the rooting out of all elements opposed to the most energetic prosecution of the War. The treason trials mark the victory of Clemenceau's policy over the Caillaux policy. Having disposed of the anti-war elements Clemenceau set to work organizing all energy in the country to prosecute the War. He refused to follow his predecessors in the policy of deceiving public opinion and stated to the country the sombre truth as to the military and political situation. He supplied the weakened army with new soldiers by drastically draining offices, factories and fields of dispensable manpower. At the same time he instituted rigorous measures to ensure an adequate food supply. His rationing system had not, however, the same success which similar measures had in Great Britain and Germany because of the disinclination of the French people to submit

to strict alimentary discipline. Clemenceau also dealt sternly with the Socialist and Syndicalist opposition which raised its head during the summer of 1918. French morale improved steadily notwithstanding severe trials, such as the Parisians experienced during the bombardment and air raids in the spring and the summer of the last year of the War. If the desired end, military victory over Germany, was finally achieved it was in no small measure due to the iron rule of Clemenceau.

Immediately after the Armistice the politicians made a determined effort to reestablish the cabinet system and to divest Clemenceau of that one-man power which he had exercised during the War and which had enabled him to hold the country together till the final victory. In opposition to such designs Clemenceau made clear in the debates in the Chamber during November, 1918, that he had no intention of giving up his powers as peace-maker and that, outside of a general outline, he would not take the whole country into his confidence in regard to his peace policy. In this attitude he was sustained by the Chamber by a vote of 398 to 93. Clemenceau conducted the peace negotiations (see PEACE CONFERENCE) in secrecy, aided not by eminent French politicians but by his own faithful and trusted collaborators. This caused considerable resentment in Parliament. Moreover, able as Clemenceau had been as War Premier and as peace negotiator, he had failed in his economic and labor policies. Extremist agitation and the failure of the government to remedy economic distress, and particularly the high cost of living, brought about a number of serious strikes during the first half of 1919. When the Peace Treaty came up for discussion in the Chamber in September, 1919, the Left censured the spirit of harshness in which it had been conceived, while the Nationalist deputies maintained that it did not go far enough in providing France with security, especially since Germany was permitted to retain the left bank of the Rhine. A rejection of the Treaty being out of the question, it was finally ratified by 372 votes against 52.

Great interest centred in the elections of 1919, the first since 1914. With the aid of Alexandre Millerand, Clemenceau organized an electoral phalanx, the National Bloc, composed of the more conservative parties, to combat Socialism and Bolshevism. The elections to the Chamber, held on Nov. 16, 1919, resulted in a decisive victory for the National Bloc and in a defeat for the Socialists and the Radical-Socialists. The balance of power was shifted from the Left and the Left Centre to the moderate Centre and the conservative Right. Moreover, since the two parties which had hitherto opposed anti-clerical legislation, the Progressists and the Action Libérale, made the greatest gains, the election signified, for the time at least, a Catholic revival. It was quite evident from the results that the election was an expression of the spirit of the War and not of peace. The most important business before the new Parliament was the election of a successor to Raymond Poincaré as President of the French Republic. Clemenceau, though not eager, was induced to stand for election, but was defeated by Paul Deschanel in the Republican Caucus ballot which was held before the election. Thereupon the National Assembly chose Deschanel by 734 out of 888 votes on Jan. 17,

1920. On the following day the Clemenceau Ministry resigned and Alexandre Millerand formed a new cabinet, in the composition of which he followed Clemenceau's example of choosing men of practical experience rather than brilliant politicians.

The new government was soon called upon to deal with very serious strikes which began in February, 1920. These were caused by extremist sections in the French labor movement and were unpopular with the great mass of the French people; they failed disastrously by the end of May, dealing a severe blow to the *Confédération Générale du Travail*. The chief aim of the Millerand government was the application of the terms of the Peace Treaty, and toward this end Raymond Poincaré was appointed President of the Reparations Commission on February 20. The successive Conferences at Boulogne, Spa, and Hythe produced very few results. The unsatisfactory trend of the Reparations policy engendered no little discontent in Parliament and Millerand might have had to contend with very strong opposition had it not been for the success of his labor policy and of his Polish policy. In accordance with the French post-war policy of erecting Poland as a strong "buffer" state between Russia and Germany in order to prevent a union of interest between these two former Powers the Millerand government during the summer of 1920 gave successful aid to Poland in its struggle with Soviet Russia. The national approval accorded to this policy made, in conjunction with other factors, Millerand the logical candidate for the Presidency when President Deschanel was forced to resign on account of illness on Sept. 16, 1920. Millerand accepted the candidature and issued a statement declaring that, if elected, he would continue the same policy which he had pursued while Premier. He was duly elected on November 26 by 695 out of 892 votes and immediately thereafter let it be known that he intended to increase the powers of the presidential office and to assume a greater control over foreign affairs than his predecessors had done. A new ministry was formed by Georges Leygues, but this cabinet was clearly intended as a make-shift and gave way in the middle of January, 1921 to a cabinet under Aristide Briand.

The return to power of the parliamentary veteran Briand marked a revival of government by coalition and an attempt to modify the French Reparations policy and above all improve the somewhat strained relations with England. Ever since the Peace Conference there had been gradually increasing disagreement between France and Great Britain (q.v.) as to the application of the terms of the Treaty. The French interpreted the English counsel for moderation as an attempt to whittle down France's share after England had been fully indemnified by the German colonies, markets and ships. They reasoned, moreover, that the English could well afford to be lenient with the Germans since England as a result of the Allied victory had been secured against any possible German aggression, while France, situated on the continent, had to reckon with a rapid recovery of a neighbor possessed of great powers of recuperation. Whatever the merits of this contention were, it produced on the part of the French public and government a tenden-

cy to use the policy of the strong arm in continental European affairs and it brought discord into the Franco-British relations. This estrangement was also fostered by other points of divergence in policy, such as Franco-British differences in the Near East, notably in Syria; the conflict between the French pro-Turkish and the British anti-Turkish policy; the British negotiations for resumption of trade with Soviet Russia and the vehement opposition of the French to Soviet Russia because of the Poles and the Russian debt; the refusal of the British to follow the French in giving unconditional support to the Poles in the Danzig and Upper Silesian questions; etc. Briand made an earnest effort to remove the diplomatic friction between the two countries but from the outset he encountered the opposition of the conservative elements under the leadership of Poincaré. Further dissatisfaction in France was produced by the results of the Washington Conference at the end of 1921. (See WASHINGTON CONFERENCE.) By virtue of the fact that this Conference concerned itself chiefly with problems of the Pacific, France was placed at this meeting in a position of less importance than either the United States, Great Britain, or Japan. The Agreement on Naval Limitation, subscribed to by Briand was felt to be disadvantageous to France. This discontent delayed the ratification of the Five Power Naval Treaty by France until July 7, 1923. The hostility toward Briand in the Chamber, resulting from what was considered his too conciliatory attitude, reached such intensity after the Cannes Conference, Jan. 6-12, 1922, that he deemed it best to resign (Jan. 12, 1922).

The reaction against Briand's policy brought Poincaré into office. The new Prime Minister stated from the outset that he preferred strong methods and the old diplomacy to conciliation and conferences and in consequence a distinct change for the worse took place almost immediately in Franco-British relations. Poincaré had inherited from his predecessor a pledge to attend the forthcoming Genoa Conference (Apr. 10-May 19, 1922), and, while refusing to go himself, he felt bound, in compliance with the obligation entered into by Briand, to send a delegation which was headed by Louis Barthou, the President of the Reparations Commission, as his personal representative. Owing to Poincaré's insistence that neither the Peace Treaty nor Reparations should be subject to discussion at the Conference, the Genoa meeting had at best only a moral effect. The Hague Conference, held in June of the same year, which was intended to be a continuation of the Genoa Conference, likewise ended in failure, since no agreement could be reached with the Soviets. In the Turkish question France found herself during 1922 often in a rather embarrassing opposition to Great Britain and it was only after the sweeping Turkish victory in August, 1922, that the two Powers recognized the harmful effects of their disagreement and arrived at more effective coöperation in regard to Turkey. But the Reparations problem, and the connected problems of the inter-Allied debts and of security for France, tended more and more to produce serious divergence of opinion between France and Great Britain, all the more so in view of Poincaré's reversion to strong methods at the close of 1922. At the conference with

Great Britain, held in Paris during the opening days of 1923, Poincaré announced his intention of seizing from Germany productive guarantees with the view of holding them till Germany fulfilled her obligations under the Peace Treaty. Accordingly French troops were ordered on Jan. 10, 1923, to occupy the Ruhr. (See REPARATIONS.) This action not only caused anger abroad and among France's allies, but also evoked protests from the Left groups in the French Chamber. When it came to a showdown, however, the Chamber, with the exception of the Communists and some of the Socialists, supported Poincaré in his venture. The Ruhr occupation involved a heavy drain on French resources and complicated still further the already very serious French financial situation. During his premiership Poincaré strove with zeal to consolidate French military supremacy by encouraging the afterward discredited Separatist movement in the Rhineland and by cementing France's relations with the Little Entente (q.v.). The French policy toward the latter aimed at the building up of a wall of defense for France out of the succession states which had been constructed by the Peace Conference on the ruins of the former three great Powers of the European continent. By rendering political, military, and financial assistance to these new states France bound them to her in close alliance and thereby sought to prevent the possible rise of these former Powers in challenge to her own hegemony on the European continent. Meanwhile the failure of Poincaré's Ruhr and Rhineland ventures and the comparative isolation of France among the Powers resulting from his policy had greatly diminished his popularity at home. Already during the summer of 1923 a number of by-elections had gone against the government and the Radical-Socialists and the Unified Socialists had formed the "Bloc des Gauches" for the purpose of offering a compact political organization in the forthcoming elections in opposition to Poincaré's and Millerand's "Bloc National." Moreover the Prime Minister was seriously embarrassed in the early spring of 1924 by a domestic crisis due to the dwindling of the value of the franc and the increase in the cost of living. Poincaré's proposal to meet the critical financial situation by an increase in the taxes amounting to 20 per cent, while a credit to his courage, did not improve his chances in the impending elections. In the face of strong opposition the government's tax bill was carried on Feb. 22, 1924. Poincaré took drastic measures to stop the continued fall of the franc but the currency crisis was not remedied until Morgan and Company stepped into the breach with a loan. All these measures were used by the opposition against Poincaré in the Chamber and in the constituencies. When defeated on March 26 on an unimportant issue Poincaré resigned but resumed office two days later with a reconstructed cabinet. In regard to the Dawes Report of Experts Poincaré after some hesitation signified his approval, but raised and left open the all-important question of "sanctions" in case of German default. He also refused to declare his willingness to evacuate the Ruhr. His attitude was, however, of less importance than formerly in view of the results of the elections on May 11, 1924, which indicated a defeat of the "Bloc National" by the "Bloc des

Gauches." The composition of the new Chamber was as follows: Conservatives 11; Republican Entente 137; Left Republicans 92; National Radicals 34; Radical Socialists 127; Independent Socialists 39; Unified Socialists 101; Communists 29. The government strength was roughly 274, while the opposition was able to muster at least 296.

The radical opposition immediately brought strong pressure to bear against Poincaré and Millerand. They aimed not only at the fall of the Poincaré government, which was a foregone conclusion, but at the resignation of President Millerand as well. They charged the President with having gone outside the non-partisan sphere within which the President of the French Republic is confined by tradition and the spirit of Republican French government. The chief reason for their opposition to Millerand was, however, the fact that the latter was, in conjunction with Poincaré, the mainstay of the nationalist policy inaugurated by Clemenceau during the War. Upon the assembling of the Chamber on June 1 the Poincaré government stepped out of office. Determined opposition, however, was encountered from President Millerand, who was not willing to relinquish his office without a serious fight. A tense parliamentary crisis ensued in consequence. Millerand attempted to gain time by appointing the stop-gap cabinet of François-Marsal, on June 8, but the radical opposition, which numbered by this time 307 deputies, would have no relations with it and forced it out on June 10. A message of the President was met by a vote of 329 to 214 in the Chamber and of 154 to 144 in the Senate in favor of the technical motion to adjourn all discussion of the message, whereupon President Millerand resigned his office on June 11. On June 12 the moderate Radical-Socialist Doumergue, President of the Senate was elected President by 515 votes against 309 for the more advanced Radical-Socialist Painlevé, President of the Chamber, and two days later Herriot formed a Radical-Socialist cabinet. Since the Radical-Socialist Party, the Party of Caillaux, was now in power, supported by the Socialists, and since the new Premier had been Caillaux's successor as the leader of this party, the change in the French government may reasonably be regarded as a step in the direction of the policy of Caillaux. This development was signified by the immediate passage of an Amnesty Bill with specific clauses granting amnesty to Caillaux and Malvy. Any rapid and complete overturn of French policy in consequence of the kaleidoscopic events in French parliamentary affairs during the late spring and the early summer was precluded, however, by the rather precarious position of the new government. Its majority depended entirely on the whole-hearted support of the Socialists and even with the aid of the latter its majority was a very narrow one in face of the large Nationalist Bloc in the Chamber. As a result the Herriot government had to take into consideration the wishes of the Nationalists and could not at once abandon the Poincaré policy entirely. On the whole the "Bloc des Gauches" stood for complete accord with England, a betterment of Franco-German relations through conciliatory methods on the part of France, for international action as over against isolated French action in regard to

Reparations, and against the occupation of the Ruhr.¹ The dependence of the government on the Nationalists was amply manifested by the Premier's attitude in his conferences with Premier Macdonald and during the London Conference in July, 1924, which deliberated on the application of the Dawes Report. Under pressure from the Nationalists Herriot, in spite of his admitted conciliatory attitude, defended the French claim to impose "sanctions" in case of German default, opposed the admission of German delegates on an equal basis with the Allies and the immediate evacuation, military and economic, of the Ruhr, and reaffirmed the contention of former Premiers Briand and Poincaré that the 15 year period of occupation in the Rhineland could not be considered to have begun until the Germans had made substantial payments on Reparation accounts. His stand on these questions was, however, generally interpreted as being a temporary concession to the large Nationalist minority in the Chamber. At the end of July it was reported that the London Conference had reached a thorough understanding on the questions of the application of the Dawes Report and that a compromise had been effected between the French and Anglo-American viewpoints whereby adequate machinery would be provided to deal with a possible German default. This report, if substantiated, would indicate that in the future isolated French action against Germany will be superseded by common action on the part of the Powers, and in the last analysis it would mean a victory of the French moderates over the intransigents led by Clemenceau, Poincaré, and Millerand. See also the following articles: FRENCH LITERATURE; SCULPTURE; NAVIES OF THE WORLD; RHINELAND; SAAR BASIN; PEACE CONFERENCE AND TREATIES.

FRANCE, ANATOLE (1844-1924). A French novelist (see VOL. IX). In 1914 he published *La Révolte des Anges* (*The Revolt of the Angels*) and later *Ce que Disent Nos Morts* (1916), *On Life and Letters*, Series IV (1924), and *The Latin Genius* (1924), translated by Wilfrid Jackson. In October, 1920, he married Mlle. Emma Leprévotte. He received the Nobel Prize in literature in 1921.

FRANCIS, DAVID ROWLAND (1850-). An American merchant (see VOL. IX). He became United States Ambassador to Russia in 1916, but returned to the United States when the Bolsheviks overthrew the Czar's government.

FRANCK, HARRY ALVERSON (1881-). An American traveler and author, born at Munger, Mich. He studied at Michigan, Columbia, and Harvard Universities in this country and did graduate work abroad. His travels, interrupted now and then by periods of teaching, have taken him to South America (1911-15), the West Indies (1919-20), and the Orient (1922-). He is the author of *A Vagabond Journey around the World* (1910), *Four Months Afoot in Spain* (1911), *Tramping through Mexico, Guatemala, and Honduras* (1916), *Vagabonding down the Andes* (1917), *Vagabonding through Changing Germany* (1919), *Working North from Patagonia* (1921), and others.

FRANCKE, KUNO (1885-). A German-American scholar and author (see VOL. IX).

¹ In internal affairs it favored chiefly reduction of the taxes and of military service and a resumption of anti-clerical legislation.

He became professor emeritus and honorary curator at Harvard in 1917 and was president of the Modern Language Association of America (1917). He wrote *A German-American Confession of Faith* (1915); *The German Spirit* (1916); *Personality in German Literature before Luther* (1916); *Die Kulturwerte der Deutschen Literatur von der Reformation bis zur Aufklärung* (1922); and *Die Kulturwerke der Deutschen Literatur in Ihrer Geschichtlichen Entwicklung* (1923).

FRANK, GLENN (1887-). An American author and editor, born at Queen City, Mo., and educated at Kirkeville State Normal School and at Northwestern University (1912). In 1921 he became editor-in-chief of the *Century Magazine*. He published *The Politics of Industry* (1919) and is co-author of *The Stakes of the War* (1918), and *The League of Nations—The Principle and the Practice* (1919).

FRANK, REINHARD (1860-). A German jurist and Privy Counselor, born at Reddighäuser Hammer, and educated at the universities of Marburg, Munich, and Kiel. In 1887 he became lecturer at Marburg, and subsequently held professorships at Giessen (1890), Halle (1900), Tübingen (1902), and Munich (1914). In 1920-21 he was rector of the University of Munich. His numerous publications include *Wollfsche Strafrechtsphilosophie und ihr Verhältnis zur Kriminalpolitischen Aufklärung im Achtzehnten Jahrhunderts* (1887); *Naturrecht, Geschäftliches Recht und Soziales Recht* (1891); *Strafrechtliche Fälle zu Akademischem Gebrauch*, 5th ed. (1912); *Schutzstrafe und Vergeltungsstrafe* (1908); *Die Belgische Neutralität* (1915); *Kann Wilhelm II Ausgeliefert Werden?* (1919); and *Sinn und Tragweite des Auslieferungsgesetzes* (1920). He became editor of the *Vergleichende Darstellung des Deutschen und Ausländischen Strafrechts* and the *Pitaval der Gegenwart*. He was also made a member of the *Kommission für das Strafgesetzbuch*.

FRANKFURTER, FELIX (1882-). An American lawyer and educator, born in Vienna, Austria. He came to the United States in 1894 and in 1902 graduated from the College of the City of New York. He studied law at Harvard and from 1906 to 1910 was United States Attorney of the Southern District of New York. From 1914 he was professor of law at the Harvard Law School. During the War he acted as major and judge-advocate, and as secretary and counsel of the President's mediation commission. In 1918 he was appointed chairman of the War Labor Policies Board. He was also a member of the board of directors of the Institute for Government Research, and was the author of *Cases Under the Interstate Commerce Act*.

FRANKLIN-BOUILLON. See TURKEY.

FRANKLIN, EDWARD CURTIS (1862-). An American chemist, born at Geary City, Kan., and educated at the University of Kansas, in Boston, and at Johns Hopkins. He was an assistant in chemistry at Kansas, where in 1899 he attained the chair of physical chemistry. In 1903 he was called to the associate professorship of organic chemistry in Leland Stanford Junior University, where in 1906 he became full professor. Dr. Franklin has had other scientific connections, notably that of professor of chemistry with the hygienic laboratory of the United States Public Health Serv-

ice (1911-13), physical chemist of the Bureau of Standards (1918), and similar posts with other government advisory boards. His original investigations have had to do with liquid ammonia as an electrolytic solvent, the ammonia system of acids, bases, and salts, and various other preparations of which ammonia is an important constituent. These for the most part have been published in the *American Chemical Journal* or the *Journal of the American Chemical Society*. He was chosen president of the American Chemical Society in 1923.

FRANKLIN COLLEGE. An institution at Franklin, Ind., founded in 1834. The number of students increased from 206 in 1914 to 400 in 1924, the faculty rose from 14 to 27 members, and the library increased from 19,100 to 26,048 volumes. The endowment increased from \$312,500 to \$800,000 during the same period, and the total income from \$49,498 to \$155,970. Departments of Biblical literature, sociology and economics, and art were established. A campaign was begun to raise \$250,000 for buildings. C. E. Goodell succeeded E. A. Hanley as president.

FRANZ, SHEPHERD IVORY (1874-). An American psychopathologist (see VOL. IX) attached to the United States Government Hospital for the Insane. After 1914 he edited the *Psychological Bulletin* and was associate editor of *Psychobiology*. He was appointed member of the psychology committee of the National Research Council in 1917 and served as president of the American Psychological Association for the year 1920.

FRANZ, WILHELM (1859-). A German professor of English philology at Jena and Tübingen. His works include *Die Grundzüge der Sprache Shakspeares* (1902), *Orthographie, Lautgebung und Wortbildung in den Werken Shakspeares* (1905), *Shakspeares Grammatik* (1909), *Die Treibende Kraft im Werden der Englischen Sprache* (1906), *Der Wert der Englischen Kultur für Deutschlands Entwicklung* (1913), *Britanien und der Krieg* (1915), *Shakspeare als Kulturkraft in Deutschland und England* (1916), *Die Feindschaft der Angelsachsen* (1917), and *Deutsche Empfindung im Kampf mit Angelsächsischem Kriegswillen* (1918).

FRAZER, SIR JAMES GEORGE (1854-). A British anthropologist and folklorist (see VOL. IX). His work, *The Golden Bough*, originally published in 2 volumes in 1890, rewritten and expanded to 12 volumes (1911-15), was republished in an abridged edition in 1922. He is also the author of *Folklore in the Old Testament* (1918); and *Sir Roger de Coverley and Other Literary Pieces* (1920). He published *Apollodorus*, with an English translation (1921).

FRAZER, JOSEPH CHRISTIE WHITNEY (1875-). An American chemist and educator, born at Lexington, Ky. He graduated from the Kentucky State University in 1897 and took postgraduate courses at Johns Hopkins. From 1901 to 1907 he was assistant and associate in chemistry at that university, and from 1907 to 1911 was chemist at the United States Bureau of Mines. From the latter date he was professor of chemistry at Johns Hopkins, and from 1921 was also B. N. Baker professor.

FREDERICK, PAULINE (MRS. C. A. RUTH-

ERFORD) (1885-). An American actress, born in Boston. She made her début in New York in 1902. She played in many Broadway productions including *Innocent* and *Don't Shoot* and made her screen début in *Mrs. Dean's Defense*. She later appeared in film versions of *Zaza*, *Tosca*, *The Woman on the Index*, *Bonds of Love*, *The Paliser Case*, *Madame X*, and *The Glory of Clementina*.

FREDERICQ, PAUL (1850-1920). A Flemish historian (see VOL. IX). The German government exiled him from Belgium during the War because of his activity in strengthening the morale of the Belgians. After the Armistice he was appointed rector of Ghent University, but weakness from imprisonment caused his death. He was a member of the Académie Royale de Belgique and the Académie des Pays-Bas.

FREE BAPTISTS. See BAPTISTS, FREE.

FREE VERSE. See LITERATURE, ENGLISH AND AMERICAN.

FREEMAN, EDWARD MONROE (1875-). An American botanist, born at St. Paul. He graduated from the University of Minnesota in 1898 and did graduate work there and at Cambridge. He became professor of botany and plant pathology at the University of Minnesota in 1908 and has been dean of the College of Agriculture, Forestry and Home Economics at that university. Professor Freeman is the author of *Minnesota Plant Diseases*.

FREEMAN, LEWIS RANSOME (1878-). An American author, born at Genoa Junction, Wis., and educated at Leland Stanford Junior University. He has spent much of his time in traveling and as foreign war correspondent, with the British, French, and Italian armies (1915-17) and in Germany (1918). He wrote *Many Fronts* (1918), *Stories of the Ships* (1919), *Sea Hounds* (1919), *To Kiel in the Hercules* (1919), *In the Tracks of the Trades* (1920), *Hell's Hatches* (1921), *The Yellowstone to New Orleans* (1922), *When Cassi Blooms* (1922), and other books.

FREEMAN, ROBERT (1878-). An American clergyman, born in Edinburgh, Scotland. After engaging in mission work in Pennsylvania and New York for four years, he was ordained in the Baptist ministry in 1900; thereafter he held various pastorates until 1910. He was moderator of the Synod of California in 1920-21. During the War he directed the first expeditionary division of the Y. M. C. A. and in 1917-18 was director of religious work in France. Other offices which he has filled are director of the San Francisco Theological Seminary and trustee of Occidental College. He is author of *The Hour of Prayer* (1914) and *The Land I Live In* (1921).

FRENCH, DANIEL CHESTER (1850-). An American sculptor (see VOL. IX). He was awarded a medal of honor at the Panama Pacific Exposition, in 1915, and a gold medal of honor by the National Institute of Arts and Letters, in 1918. From 1910 to 1915 he was a member of the National Commission of Fine Arts. His output during 1914-24 was as astonishing in quality as in quantity. It includes "Sculpture" (marble, St. Louis Museum); figures symbolic of Manhattan and Brooklyn on Manhattan Bridge; "Memory" (marble, Metropolitan Museum, New York City), his finest female nude; a statue of Lafayette, Easton, Penna.; the Dupont fountain, Washington, D.

C.; and especially, a colossal bronze Lincoln for the Lincoln Memorial at Washington.

FRENCH, JOHN DENTON PINKSTONE (1852-). A British field-marshal (see Vol. IX). He commanded the English forces in France from the beginning of the War till the end of 1915. His operations were hampered until the last three months by lack of artillery ammunition. He resigned in December, 1915, and was made Viscount French of Ypres and High Lake. He was then made commander-in-chief of the United Kingdom, holding that post till May, 1918, when he was appointed Lord Lieutenant of Ireland. He resigned in 1921 and was made an earl on returning to England. See **WAR IN EUROPE, Western Front**.

FRENCH EQUATORIAL AFRICA. A French possession in west central Africa comprising the colonies of Gabun, Middle Congo, Ubangi-Shari, and Chad. Its area is estimated by the French at 982,049 square miles, excluding the Cameroon (q.v.), of 166,489 square miles, which forms a separate colony joined to Equatorial Africa. By the census of 1921 it had a population of 2,845,936, of whom 1932 were whites. The largest cities had the following populations: Libreville, 20,000; Brazzaville, 40,000; Fort Lamy, 10,000. The tropical products continued the sources of economic wealth. Caoutchouc, lumber, ivory, palm kernels, palm oil, were the principal exports in 1921. Coffee and cacao were beginning to receive attention. Large herds of cattle, sheep, camels, horses, and ostriches were the property of the natives, but the lack of transportation eliminated them from the export trade. In 1920, total exports were 23,524,154 francs as compared with 21,181,768 francs in 1913. Imports in 1920 were 8,807,612 francs as compared with 21,181,768 francs in 1913. The fall of the franc after the War made the actual decrease in trade greater. The territory still lacked railroad communication in 1921. In February, 1921, a line was commenced from Brazzaville to the Atlantic ocean (300 miles). The general budget in 1922 called for an expenditure of 9,358,542 francs. The four colonial budgets included expenditures of 15,673,000 francs. Deficits were characteristic of the period 1912-22, in 1922 a subvention of 4,000,000 francs being necessary for administrative purposes. Colonization continued tardy because of the difficulties of transport. To hasten the country's settlement, the French Chamber passed, in 1920, a measure calling for the expenditure of 171,000,000 francs on railway, port, road, telegraph, and river developments.

FRENCH ESTABLISHMENTS IN INDIA. Five provinces in India belonging to the French empire. These were Pondicherry (170,785 inhabitants in 1921), Karikal (53,583 population), Chandernagore (25,119 population), Mahé (11,218 population), Yanam (4683 population). Total area, 196 square miles; total population, 265,388. Chief towns were: Pondicherry (40,605), Oulgarret (22,307), Villenour (21,033). Principal products were rice, sugar cane, cotton, manioc, cacao, coffee, groundnuts. Imports in 1920 were 25,583,190 francs; in 1913, 10,837,115 francs. Exports for 1913, 1920, 1921, were 43,720,095 francs, 24,554,280 francs, 23,805,649 francs. The budget for 1922 was 2,630,170 rupees.

FRENCH ESTABLISHMENTS IN

OCEANIA. See **PACIFIC OCEAN ISLANDS, Society Islands**.

FRENCH INDO-CHINA. The general name for the French possessions in southeast Asia. It is made up of the following units: (1) Colony of Cochin-China, 22,000 square miles; population in 1921, 3,795,613, of which 7469 were Europeans; largest city, Cholon, 93,947 population; (2) Protectorate of Annam, 39,758 square miles; population in 1921, 5,637,751, of which 1642 were Europeans; largest city, Binh-Dinh, 74,400 population; (3) Protectorate of Cambodia, 57,900 square miles; population in 1921, 2,462,585, of which 1368 were Europeans; largest city, Phôm-Penh, 74,643 population; (4) Protectorate of Tonking, 40,530 square miles; population in 1921, 6,850,453, of which 6332 were Europeans; largest city, Hanoi, 73,948 population (5) Protectorate of Laos, 96,500 square miles; population in 1921, 818,755; largest city, Vien-Tiane; (6) Kwangchow Wan territory, 190 square miles; population, 182,371; (7) Territory around Bat-tambang, population 500,000. Total area, 256,878 square miles; total population in 1921, 19,747,528 (18,000,000 estimated in 1914); number of Europeans, 23,700. The activities were largely agricultural, the country being one of the most important rice districts in the world. Cinnamon, sugar, and tea were also grown in central Annam. Minerals mined were coal and lignite, antimony, tin, wolfram, iron, and zinc. Cotton was becoming important in Cambodia. In 1922, total exports were \$115,700,000 of which 80 per cent was rice; other exports were fish, pepper, hides, coal (almost 1,000,000 metric tons in 1922), cotton, rubber, and sugar. Exports in 1913 totaled \$69,051,800 (conversions made at current rate; the franc was worth \$0.09 in 1922). Imports in 1922 were \$96,900,000 as against \$61,247,600 in 1913. Leading imports were cotton tissues, cotton thread, iron and steel, machinery, and mineral oils. Imports in 1922 were furnished in the following proportions: France, 40.5 per cent; Hongkong, 29 per cent; Singapore, 6 per cent; England, 3 per cent; China, 3.6 per cent; United States, 1.7 per cent; India, 10 per cent. Exports in 1922 were taken in the following proportions: France, 17.3 per cent, Hongkong, 40 per cent; Dutch East Indies, 12 per cent; Singapore, 7 per cent. It was evident that for the first time France was approaching the British Empire in the question of trade. The United States, the Philippines, and Cuba were large purchasers of rice.

In 1922, 775 ships of 1,576,287 metric tons entered the port of Saigon, Cochin-China. Other ports, though of less importance, were Tourane (Annam), Haiphong (Tonking) and Kwangchow Wan. Railways in 1922: 1293 miles (no building since 1914). The general budget for 1921 balanced at 54,878,400 piastres (1 piastre = \$0.52), though excesses, never less than 7,000,000 piastres, occurred annually. The debt of Indo-China in July, 1922, was 383,494,000 francs. Local budgets for the separate areas totaled 71,647,310 piastres in 1923. Money in circulation Sept. 30, 1923, 89,562,408 piastres.

The French colonial policy was consistently enlightened. In 1918 and 1920, new codes of law were promulgated while educational progress steadily made headway. In 1917, the various technical and professional schools were

united to form the University of Indo-China and in 1918, a European college was opened at Hanoi. During the War, France was able to draw upon the region for troops, money, boats, provisions, and raw materials.

FRENCH LITERATURE. The changes in the field of French Literature during the decade 1914 to 1924 can be concretely illustrated by the following tables.

In 1911, V. Giraud, in his *Maîtres de l'Heure*, mentions these eight leaders of French thought: Loti, Brunetière, Faguet, de Vogüé, Bourget, Lemaitre, Rod, France. One must add Maeterlinck and Bergson.

In 1914: drop Rod (inherited from time of realism), Vogüé (identified with Russian literature invasion); Faguet loses, Brunetierism is absorbed by others; France is practically out. Retain Loti (Exotism), Lemaitre (Nationalism), Bourget (Catholic philosophy); Bergson and Maeterlinck (Intuitionism). Add: Barrès and Maurras; Péguy and Psichari; Claudel and Jammes; Régnier and Verhaeren; Romain Rolland; André Gide; and, if you consider the quantity of readers, Henri Bordeaux.

In 1918: drop Faguet, Lemaitre (dead), Loti, Psichari; Bergson and Maeterlinck. Keep: Bourget, Barrès, Maurras; Péguy, Claudel, Jammes (all, with variations, being traditionalists); Romain Rolland, *plus* Barbusse (who won notice by his impracticable pacifism); André Gide, *plus* Rivière and Thibaudet (adogmatic intellectualists); H. Bordeaux. Add no one.

In 1924: drop Romain Rolland, Barbusse. Keep Barrès, Bourget, Maurras; Péguy, Claudel, Jammes; Gide, Rivère, Thibaudet, and Bordeaux. Add: Proust; Dorgelès; Carco; Giraudoux (?); Morand (?); Lasserre (?); Benjamin Crémieux (the solid critic of the *Nouvelles Littéraires*).

From this, it is easy to see that Varillaud and Rambaud's *Enquête sur les Maîtres de la jeune Littérature* (1923), which turns in favor of Bourget, Barrès and Maurras, is not representative; at the same time it shows the persistence of the ideas represented by those three men; the two last are brothers in arms (and so is H. Bordeaux) of Bourget who still remains from the list of 1911. Now let us enter in to some details. There are three periods to study: the pre-war, the war, and the post-war period.

Pre-War Period. Seven months only, during which the movement started during the preceding decade continued normally, namely: away from dilettantism, aestheticism, skepticism and cynicism, towards social reform, national traditionalism, and Catholicism. The following books might be remembered as particularly telling. In poetry Ch. Péguy's *Eve*. In prose M. Barrès's *Grande Pitié des Eglises de France*; and in prose fiction: Juliette Adam's *Chrétienne*—to refute her own *Païenne* of some years before; E. Bauman's *Le Baptême de Pauline Ardel*. Pierre Hamp continues his series *Peine des Hommes* by *Enquête* (about the various trades in France). Lichtenberger's *Le Sang Nouveau*,—the blood of those who are going to win the war. J. des Gachons, *Vive la Vie!* On the stage Claudel scores once more, with *L'Otage*, of the most consistent Catholicism; while Curot, *Devant le Miroir*, and Croisset in *L'Épervier* describe the hypersensitive soul of the generation. Sacha Guitry cultivates the

tone of indifference still dear to some then, and which he is going to keep up all through the War.

War Period. It will start at once on Aug. 3, 1914, but will not stop altogether in 1918; indeed war publications were coming in even in 1924 and promising to continue indefinitely. With the first cannon shot all literature, including periodical literature, stopped for several weeks except only the *Revue des Deux Mondes*, *L'Illustration*, and *Revue Hebdomadaire* (the latter in form of a newspaper); and *Le Temps*, *Les Débats*, *Le Matin*, *L'Echo de Paris*—but they contained articles from the pens of masters, like Barrès (*Echo de Paris*), Maeterlinck, Lavedan, Doumic, Gourmont, Maurras, Masson-Forestier, etc.

Promptly, as soon as the rear was somewhat reorganized, this war prose came out in book form. Some of the most noteworthy of these collections of articles are: Barrès, the series *L'Ame Française et la Guerre* (*Union sacrée*, *Saints de France*, *Croix de Guerre*, etc.); Lavedan, *Grandes Heures*; A. France, *Sur la Voie Glorieuse*; Loti, *La Grande Barbarie*; Maeterlinck, *Débris de Guerre*; P. Adam, Maurras, Abbé Wetterlé; the Socialist Hervé (*Après la Marne*, *La Patrie en Danger*). Tinayre, *La Veillée des Armes* will remain as one of the fine books of the great first hours of the War. Then in 1915 Romain Rolland published in book form his much resented *Au-Dessus de la Mêlée*, of Tolstoian inspiration. In the course of the year 1915, the first soldier diaries began to appear, preceded by the gallant, but hardly very trustworthy volume of fiction *Gaspard*, by René Benjamin. One after the other they came out, especially in 1916, these books which will remain as a stirring testimonial to the horrors of the great War: Paul Lintier, *Ma Pièce* (followed by *Tub*: 1233); *Lettres d'un Soldat* (by the painter Lemercier, but published anonymously); Rédier, *Méditations dans la Tranchée*; Genevoix, *Sous Verdun*; Dupont, *En Campagne*; Major Henches, etc. Hugues LeRoux published the story of his son *Au Champ d'Honneur*. The year 1917 is again very rich: Jean des Vignes Rouges's *Bourru*, *Soldat de Vauquois* is one of the notable war books, and the same year the much discussed *Le Feu* came out, written by Barbusse. (The chief objection to it in France was that it was spreading discouragement at a time when all needed so much courage.) M. Berger, *Le Miracle du Feu* will also remain as one of the best war books; and even more so Adrien Bertrand's *Appel du Sol* (which was awarded the Prix Goncourt—awarded also to R. Benjamin and to Barbusse). Marcel Nadaud's *Chignole* is a remarkably alert account of military aviation. The year 1917 was also the year of Duhamel's *Vie des Martyrs* (later followed by *Possession du Monde*, the Goncourt prize for 1918); the author tells of the heart-breaking scenes he witnessed as a major in hospitals near the firing line. As the struggle lasts the diaries become more pathetic, more shocking, sometimes harder in their moral appreciations of events. We will just give a few names here and refer for titles to the bibliographies named below: Dieterlen, Péricard, Le Bail, Dupont, Tuffrau, Belmont (*Lettres*) Erlande, Milan, Franconi, Binet-Valmer, Grimaut; Julia, Grandvilliers, Malherbe (Goncourt prize 1917 for *Flamme au Poing*), Fribourg (*Croire*), Giraudoux, Fonck, Pirenne, a Bel-

gian (*Vainqueurs de l'Yser*). The volumes of the Brothers Tharaud, *La Relève* and *Randonnée de Samba Disuff*, deserve a special mention here; so does Y. (Larrouy)'s *Odyssée d'un Transport torpillé*. The fourth year of the war is at hand, and the diaries become less numerous, but often more bitter, e.g. Léon Werth (*Clavel soldat*), M. Berger (*Jean Darboise, auxiliaire*), Barbusse (*Clarté*); and, after the Armistice, what in the opinion of many remains the best war book: Dorgelès, *Croix de Bois*. Some sad stories are told by Zavie, *Prisonnier en Allemagne*, Hennebois, *Journal d'un Grand Blessé*, Blanche, *En Représailles*, Max, *Mes Six Évasés*.

Here must be added a reconstitution of the phases of the war by Dumur, in his trilogy in Zola style: *Nach Paris, Boucher de Verdun, Les Défaitistes*. Books not dealing directly with the War and the army, and yet remarkable, are: Isabelle Rimbaud, *Dans le remous de la bataille*; Donnay, *Lettres à une Dame Blanche* (Red Cross); Géraudy, *La Guerre, Madame . . .* (one of the most widely read for some time); Blanche, *Cahiers d'un Artiste* (a diary at the rear). Pierre Hamp will tell us of *Les Métiers Blessés* in consequence of the ruthless destructions by the enemy. In 1818, the poet H. Ghéon gave the story of his conversion in *L'Homme né de la Guerre*. A witty picture of the English in France during the War was given by André Maurois, *Les Silences du Colonel Bramble*.

Among the books which relate war achievements and which betray distinct literary value a few must be retained here: Le Goffic, a series of volumes the first of which is *Dixmude, un chapitre de l'Histoire des Fusiliers marins*; H. Bordeaux, *Les Derniers jours du Fort de Vaux*, and *Les Prisonniers délivrés*. Jean de Pierre-feu (who gave out the daily war bulletins), *Au G. G. G. (Grand Quartier Général)*; M. A. Leblond, *Galliéni*; then Bédier's sober and impressive *L'Effort Français*, and Madelin's *Verdun*.

Of books of more recent years, and which continued to stir the public, let us mention: in 1920, Parmentier's *L'Ouragan*; in 1921, Cl. Anet's *Quand la Terre trembla*; and in 1923 R. Dorgelès's *Le Réveil des Morts* which contributed much to call attention to the improvements that could be made in the work of reconstruction in the devastated regions.

Of the novels which without depicting actual war episodes, take the War as background, these are a few samples: Prévost, *Adjudant Benoit*; Rosny, *L'Enigme de Givreuse* (a case of double personality in a soldier); Bazin, *Les Nouveaux Oberlé*; Estaunié, *L'Appel de la route*; Romain Rolland, *Clérembault*. From minor authors: Villetard, *Monsieur Bille dans la Tourmente*; Ch. de Rouve, *Française du Rhin*; Foley, *Sylvette et son Blessé*; Jeanne Landre, *L'École des Mairaines*; Colette Yver, *Mirabelle de Pampelune* (and other stories). *Les Cousins Riches* (the Americans); Marcel Boulenger, *Charlotte en guerre*. Some humorous stories: De la Foucardière, *Scipion Pégoulade* (a sort of Tartarin de Tarascon); M. Prévost, *Mon cher Tommy*; Boissière, *L'Extravagant Teddy de la Croix Rouge anglaise*; Dekobra, *Rammy, Volontaire Américain*; Valmy-Baisae, *Le Retour d'Ulyssae*.

Short stories were published in fabulous number: *Contes véridiques des Tranchées*, by

many "poilus"; then collections by Arnoux, Bazin, Bordeaux, Farrère, Gus-Bofa, Frapié, Mille, etc., etc.

The theatre of the war period is not extremely important. At first, old plays exalting devotion to the mother-country provided what was needed: Corneille's *Horace*, Sophocles's *Œdipe roi*, Bornier's *Fille de Roland*, Sardou's *Patrie*, Kistemaeker's *Flambée*, Lavedan's *Servir*. Then early in 1915 new plays began to appear: Fronson's *Kommandantur*, depicting the invasion of Belgium (Fronson is a Belgian); Donnay's charming *Impromptu du Paquetage*; Claudel's *Nuit de Noël*; E. Morand's *Les Cathédrales*, spectacular mourning over especially Rheims and Strasbourg. In 1916, Bataille gave an unpleasant description of the effect of war on women in *L'Amazone*; while Hennique and Veber offered a cheerful two-act vaudeville *Le Poilu*. In 1917 came Bernstein's *Élévation*, hailed by many even down to 1924 as the best war play produced; Porto-Riche gave his realistic *Marchand d'Estampe*; F. Porché, his ingenious and very successful allegorical *Les Butors et la Finette*; Farrère and Népoty offered *La Veillée des Armes*. In 1918, there were two good plays again: Kistemaeker, *Un Soir au front*, and Maeterlinck, *Bourgeois de Stilemonde* (which was first represented in America). In 1920, the exquisite *Maison de Dieu* by Fleg; the opportune (or inopportune) *Les Américains*, by Brieux; and the two plays—both painful for different reasons—Donnay, *Chasse à l'homme*, and Méré's *Les Captives*. In 1922, F. de Curel scored with *Terre Inhumaine*.

In the domain of poetry again relatively few collections can be recorded as absolutely above par. It would not be right to leave unnoticed Botrel's *Chants de Rosalie* ("Rosalie" was the bayonet), *Chants du Bivouac*, *Chants de Route*; he was called the "bard" of the trenches. Then: Claudel, *Trois Poèmes de Guerre*. In 1916, Bataille, *La Divine Tragédie*; Zamacoïs *L'Ineffaçable*; Paul Fort, *Poèmes de France*; and especially Verhaeren, *Les Ailes Rouges de la Guerre*. In 1917 the exquisite *Couronne douloureuse*, by H. Ghéon; and two of the most popular productions—rightly so—L. Mercier, *Prêtres de la Tranchée*, and the instantly famous jewel *La Passion de notre Frère le Poilu*. Champsaur's *L'Assassin Innombrable* is quite extraordinary; and even more so is, in 1918, Apollinaire's *Calligrammes, Poèmes de Paix et de Guerre*. The same year came out the very striking poems, *Nous . . . de la Guerre*, by Henry-Jacques; and Mme. Delarue Madrus, *Souffles de Tempête*. In 1919, Rostand's *Vol de la Marscellaise*; and J. Suberville's strong *Fibre de Bernadoux*, and *Posse aux Lions*. In 1921, F. Porché republished with other poems his *L'Arrêt sur la Marne* (in the collection *Commandements du Destin*), and Suberville, *Le Soldat Inconnu*, which won for the author the Grand Prix de Poésie. In 1922, Henry-Jacques had another collection of his original poems *Symphonie Héroïque*. See the anthology of the war poets, Prévost and Dornier, *Le Viroc épique*.

For bibliography on the literature of the War, see: Baldensperger, *Avant-guerre dans la Littérature*; Jean Vie, *La Littérature de la Guerre*; Albert Schinz, *French Literature of the Great War* (New York, N. Y.). For military slang, the best book is Enault, *Le Poilu*

tel qu'on le Parle. Bearing on the question of language in post-war Europe, see Meillet, *Langues de l'Europe nouvelle* (1918).

Post-War Period. Just as the war literature did not stop on Nov. 11, 1918, so did the post-war literature not begin at this date exactly; as early as 1917 there is a distinct tendency on the part of some writers to ignore the monstrous accident of the war.

Poetry. Some volumes from 1917 to the end of 1923 which cannot be passed without mention, if it were only on account of the fame of the authors, are: Rostand, *Cantique de l'Aigle* (posthumous); Gérard Rosemonde (Madame Rostand), *Pipeaux* (crowned by the French Academy); H. de Régner, *Vestigia Flammæ*; Comtesse de Noailles, *Forces Éternelles*; Claudel, *Messe de Là-Bas*; Fr. Jammes, *La Vierge et les Sonnets*; Paul Fort, *Ballades Françaises* (continuation); Jules Romains, *Europe*, and *Puissances de Paris*. Among the best known of the poets of the new generations are Paul Valléry, Superville. To get an idea of the extra-modern poetry, see Paul Morand, *Lampes à Arc*; and the cubists and dadaists, Blaise Cendrars, *Du Monde entier*; A. Salmon, *Prikaz*; Cocteau, *Poésies*.

Drama. In the theatre we witness at first an attempt to go back to pre-war subjects: Claudel is continuing the series of *Annonce faite à Marie*, and *L'Otage*, by *Le pain dur*; Bataille gives *Sœur d'Amour*; Zamacoïs, *César-in*, *Ecrivain Public*; Saint-George Bouhélier, *Vie d'une Femme*. In 1920, pre-war standards still obtain with Currel, *L'Âme en Folie*; Bernstein, *L'Animateur*; Saint George Bouhélier, *Esclaves*; DuBois, *L'Hérodiade*. But attempts at renewal are made successfully by M. Magre, *La Mort Enchaînée*; Pierre Frondaie, *L'Appassionata*; Lenormand, *Les Ratés*; perhaps Vildrac, *Paquebot Tenacity*; Cocteau scores with a disconcerting farce, *Bœuf sur le toit*. In 1921-23, the hold of the younger generation asserts itself. Besides Brieux (*L'Avocat*, *L'Enfant*), Currel (*Comédie du génie*), Bataille (*Chair Humaine*), Bernstein (*Judith*), and the three revivers of *Don Juan*, Rostand (posthumous), Bataille, and H. de Régner, there are those who belong to what may be called an intermediate generation, like P. Fort (*Louis XI*, *Homme Curieux*), Géraudy (*Aimer*), Porché (*Dauphine* and *Chevalier de Colomb*), Ghéon (*Pauvre sous l'Escalier*). The younger group claims attention aggressively: Lenormand (*Managers de Rêves*); Simoun (*Dent rouge*); Natanson (*Enfant Truqué*, *Amants Saugrenus*); Pierre Frondaie (*L'Insoumise*, *Le Reflet*); J. J. Bernard (*Feu qui Prend Mal*); Sarment (*Mariage de Hamlet*, *Pêcheurs d'ombres*); Cromelynk (*Cocu Magnifique*); Cocteau (*Mariés sur la Tour Eiffel*); Régis et Veynes (*Bastos le Hardy*). The most famous theatres open to the young authors in 1924 were: L'Œuvre, Le Vieux Colombier, L'Atelier, La Chimère, La Flamme, with such men as directors as Lugné Poë, Copeau, Dullin, Pitoeff, Baty.

The Novel. Reaching the chapter of the novel since the War, we face such a deluge of works of interest that nothing can be done within the space allotted us except to group the various tendencies, give the names of the most important writers in each group and refer for all details to the *New International Year Books*, 1914-24 (and perhaps to the article "*Le Roman Français depuis la Guerre*," by Albert

Schinz, in *Modern Language Journal*, May, 1923).

Authors representing the great classical literary style, and aiming to create works of lasting beauty: Ch. Géniaux, Estaunié, A. de Chateaubriant (Grand Prix du Roman in 1923, for *La Brière*). Catholics: Bourget, H. Bordeaux, Ardel, Bauman, Mauriac, Renaitour. Novelists dealing with the world beyond: Marcelle Tinayre (*Priscille Séverac*), H. Bordeaux (*Fantôme de la Rue Michel-Ange*), Pérochon (*Les Ombres*). Provincial and regional novelists: Bazin, Pérochon (*Nène*, Prix Goncourt, 1920), J. de Pesquidoux, Bordeu, H. Pourrat, R. Escholier (*Cantegril*), J. des Gachons, and the most famous of them all, L. Hémon, author of the Canadian novel, *Maria Chapdelaine*. Psychologists: André Gide, J. Romains, Marcel Proust (Prix Goncourt, 1919), who had a tremendous following which, however, was already subsiding when he died in 1922; Charbonne (*L'Épithalame*); Lavedan, Martin Du Gard (*Les Thibaut*); Benda, Rivière; Lucien Fabre (*Rabevel*, Prix Goncourt, 1923). Novelists of deep gloom and sentimentality: Arnoux, Jaloux, Chéreau, Josepivici, t'Serstevens; and three women, André Corthis (Grand Prix du Roman, 1921, for *Pour Moi Seule*), Machard, Vioux. Pictures of moral disequilibrium in consequence chiefly of the War: Marcel Prévost (*Don Juanes*), Rosny, Margueritte, Mme. Colette. Novelists depicting the life of characters outside regular society: Carco (Grand Prix du Roman, in 1922, for *L'Homme traqué*), Mac Orlan, Cl. Anet, Berger, Kessel. The "Indifférents" to use the name chosen by one of them, i.e. who take the attitude of interested and amused, sometimes cynical, observers of our present nerve-wrecked world: H. de Régner, Fr. de Miomandre, Giraudoux, Paul Morand (most before the public eye in 1924 for his two collections of stories *Ouvert la nuit* and *Fermé la nuit*). Young Cocteau belongs either here, or to a group of extreme modernists, some of whom had adopted the flag of Dadaism, like Aragon, Ph. Soupault, Delteil. Humorists would be: Duvernois, H. Béraud (Prix Goncourt for *Le Martyre de l'Obèse*, 1922), Bilotey. The great king of the roman d'aventure is Pierre Benoit, author of *L'Atlantide*; Rouquette, Exotism: Loti, Farrère, Rhaïs, and later Barrès (*Jardin sur l'Oronte*); Bordeaux (*Yamilé sous les Cèdres*). A very special place belongs to the Brothers Tharaud with their remarkable knowledge of the Near Eastern, largely Jewish, countries (*À l'Ombre de la Croix* is their masterpiece).

Historical Novels: Louis Bertrand, Tancrède, Martel; H. Béraul (*Vitriole de Lune* crowned by the Goncourt in 1922). Pre-historical novels: Rosny, Forbin, Jean d'Esme.

Other Literary Genres. The most important during the period under consideration was that of personal recollections arranged with a special purpose, and at times with poetical evocations of the past, like A. France's *Petit Pierre*, Loti's *Prime Jeunesse*, Jammes, A. Gide, Willy; or many diaries of young authors who wrote about their years of formation so as to present a picture of their whole generation, or classes at least of their generation. The following claimed attention most: Oudart (*Ma Jeunesse*); L. Werth (*Dix-neuf Ans*); Cazin (*Décadi*); A. Obey, Chadourne (*Inquiète Adolescence*); Benj. Crémieux (*Pre-*

mier de la Classe); Gilbert des Voisins (*L'Enfant prit Peur*); and the sad *Diable au corps*,—written by Radiguet when he was 17 (it is said). He died in 1924. Another genre is the literary biography, brilliantly represented by A. Maurois's *Ariel*, *Vie de Shelley*, and by H. Bordeaux, *Amours du passé*. Accounts of travel have been raised to the level of art in Chadourne's *Pot au Noir*. Again we must mention the Brothers Tharaud with their remarkable descriptions of the Near-Eastern nations of Europe. Then Pierre Hamp continues his series of beautiful books on French trades and industries. The (so far two) series of the famous barrister Me. Henri-Robert, *Les Grands Procès de l'Histoire*, have been much read.

History of Literature and Literary Events. As the year 1924 opened, the first volume of Bédier and Hazard, *Histoire de la Littérature Française illustrée* came from the press—in every way a remarkable achievement. Simultaneously an illustrated edition of Lanson's well known *History of French Literature* was published serially. Most worthy of mention are also the volumes XII and XIII of Hanotaux's *Histoire de la Nation Française*, in 15 volumes (they are called *Histoire des Lettres*). Vol. XII, *Des Origines à Ronsard*, is by Picavet, Jeanroy, and Bédier; Vol. XIII, *De Ronsard à nos Jours*, is by F. Strowski. In America, Nitze and Dargan, of the University of Chicago, published an English *History of French Literature*. For modern times there was Le Goffic, *La Littérature Française au XIX^e et au XX^e Siècle*. A very valuable serial publication concerning contemporary writers is *Vingt-Cinq Ans de Littérature Française, de 1895 à 1920*, under the direction of E. Monfort. Not quite satisfactory is Lalou's little book on *Histoire de la Littérature Française Contemporaine, de 1870 à nos jours*. Mostly an accumulation of names and titles is found in F. Parmentier, *Littérature Française de 1885 à nos jours*; in America, *French Literature of the Last Half Century*, by Cunliffe and de Bacourt. Pierre Vaillant and H. Rambaud's *Enquête sur les Maîtres de la Jeune Littérature* (Bourget, Barrès, Maurras, 1923), has been mentioned already as having failed to inquire from all quarters, which impeaches their findings. A work on a great scale which led the author to the Academy even before the completion is Abbé H. Brémont's *Histoire du Sentiment Religieux dans la Littérature depuis le XVII^e Siècle*. Other important works that space allows us to mention are: Thieme, of the University of Michigan, *Essai sur l'Histoire du Vers Français*; P. Champion, *Hist. de la Poésie au XV^e et au XV^e Siècle*; Nohac, *Ronsard et l'Humanisme*; Ducros, *Rousseau* (3 vols.); Pierre Kohler, *Madame de Staël*; Vincent, *Georges Sand* (4 vols.); Arbelet, *Stendhal* (2 vols., in connection with the new edition of Stendhal's works); J. Larat, *Tradition et Exotisme dans l'Œuvre de Nodier*; H. Girard, *Emile Deschamps* (2 ols.); Estève, *Leconte de Lisle*; Ibrowac, *José-Maria de Hérédia*; Antoine, *Souvenirs du Théâtre Libre*. New valuable editions which render the study of great French authors more and more profitable are: Villon, Ronsard, Montaigne, Pascal, Stendhal, Lamartine (Lanson, *Méditations*), Hugo (*Béré, Légende des Siècles*, Vianey, *Contemplations*). As to language: another volume by Brunot

came out, *Le Français en France et hors de France au XVII^e Siècle* (Brunot has also made an attempt at reviving interest in the teaching of grammar in a large volume *La Pensée et la Langue*), and there was Bonaffé, *Anglicismes et Américanismes dans la Langue Française*.

A time has never been in France without literary quarrels of some sort. During the War there was the Barbusse episode, many maintaining that the book had been dishonestly used for pacifist propaganda; in 1919, Pierre Louys startled the world in ascribing to Corneille some of the best of Molière's plays; in 1920, the accusation was brought against P. Benoit that he had plagiarized Sir Rider Haggard's *She*, for his *Atlantide*; the same year the episode of Dadaism came to a climax in the artistic and literary world; in 1922, it was the shock of Marguerite's *Garçonne*; in 1922-23, the "querelle des manuels littéraires" (well summarized in *Chronique des Lettres Françaises*, January, 1923).

Among the innumerable literary prizes, some are of real importance. Let us recall a very few: Grand Prix de Littérature went to Mme. Gérard d'Houville (1918), the Brothers Tharaud (1919), E. Jaloux (1920), Mme. de Noailles (1921), P. Lasserre (1922), F. Porché (1923). The Grand Prix du Roman went to Camille Mayran (1918), Ch. Géniaux (1919), André Corthis (1920), Villetard (1921), F. Carco (1922), A. de Chateaubriant (1923). The Prix Goncourt went to: Benjamin (1915), A. Bertrand and Barbusse (1914 and 1916), Malherbe (1917), Dubamel (1918), Proust (1919), Péronchon (1920), R. Maran (1921), Béraud (1922), L. Fabre (1923). The Prix de la Vie Heureuse, or Prix Femina went to: Dorcelès (1918), (1919), E. Goyon, a poet (1920), Escholier (1921), Lacretelle (1922), Jeanne Galzy (1923).

Many jubilees were celebrated; with peculiar splendor those of Molière, Pasteur (not only a man of science but also a member of the French Academy), Renan and Pascal. Many deaths occurred in the decade: in 1914, Le maître, Masson-Forestier, Mistral, L. Séché, Ch. Péguy; 1915, Hervieu, R. de Gourmont, Stuart Merrill, J. H. Fabre (the entomologist), Lafon, Paul Acker, Rob. d'Humières; 1916, Faguet, de Ségur, de Vogüé, Verhaeren, Clermont; 1917, A. Bertrand; 1918, G. Ohnet, Rostand, Péladan, Guill. Apollinaire; 1919, Tailhade, Ch. Morice; 1920, P. Adam, Lintilhac; 1921, Montesquiou; 1922, Bataille, Boutroux, Capus, Lavissee; 1923, Aicard, Loti, Barrès.

FRENCH SOMALI COAST. See SOMALI LAND.

FRENCH WEST AFRICA. A single administrative unit of the French colonial empire since Jan. 1, 1921, comprising the following colonies: Senegal, area 74,112 square miles, population in 1921, 1,225,523 (4321 non-African); Guinea, 95,218 square miles, population, 1,875,996 (1357 non-African); Ivory Coast, 121,976 square miles, population, 1,545,680 (835 non-African); Dahomey, 42,460 square miles, population, 261,746 (214 non-African); French Sudan, 617,600 square miles, population, 2,474,580 (983 non-African); Upper Volta, 154,400 square miles, population, 2,974,142 (191 non-African); Mauretania, 347,400 square miles, population, 261,746 (214 non-African); Niger Territory, 347,400 square miles, popula-

tion, 1,084,043 (216 non-African). Total, 1,800,566 square miles, with a population of 12,283,962, of whom 6829 were French and 1826 other non-Africans. Dakar, the seat of the administration and the leading port, had 32,440 inhabitants in 1921, of whom 2331 were French. Other towns were: Saint Louis, 18,117 (620 French); Rufisque, 11,307 (168 French); Bamako, 14,496; Kayes, 11,322; Conakry, 8850. Forest and agricultural products were of greatest economic importance. In Senegal, the Sudan, and Guinea the groundnut was of leading importance. In 1920, from Senegal alone 286,777 tons were exported. Cotton culture, worked by natives, figured largely in Senegal, the Sudan, Dahomey, and the Ivory Coast. The total production in 1918 was 854,000 kilos. Other important activities, as reflected in the foreign trade, were palm kernels, palm oil, logs, gum arabic, hides and skins, and caoutchouc. Agricultural experiments indicated that the following were possible of development: cacao and coffee in Dahomey and the Ivory Coast, tobacco, vegetables, etc. Gold and salt were worked in paying quantities. Exports for the whole government in 1920 and 1921 were 588,694,000 francs and 259,764,000 francs, as compared with 118,567,000 francs in 1912. Imports for the years 1912, 1920, 1921, were 134,782,000 francs, 653,910,700 francs and 372,497,000 francs. In 1920, 8629 vessels of 5,109,573 tons entered the ports of French West Africa, while 8462 vessels of 5,080,965 tons cleared. This compares with the 2431 vessels of 4,172,000 tons which entered in 1911. Communications were facilitated by the navigability of the Senegal and the Niger Rivers. In 1920, 2658 kilometers of railway were in operation. The principal systems included: Dakar-Saint Louis (263 kilometers), Thiès-Kayes (444 kilometers), Kayes-Niger (555 kilometers), Guinea railways (662 kilometers), Ivory Coast railways (316 kilometers), Dahomey railways (375 kilometers). Besides, roads fit for motor traffic totaled 5400 kilometers. Kilometers of telegraph lines in 1922 were 23,278. The general budget for the whole administration was, for 1923, 72,142,000 francs, as compared with 56,250,000 francs in 1911. In 1922, the local budgets for the separate colonies totaled 172,500,000 francs. At Dakar, the governor-general, assisted by a council of native chiefs, administered the affairs of the whole government. Lieutenant-governors were in charge of the individual colonies.

FREUD, SIGMUND (1856-). An Austrian physician (see Vol. IX) and originator of the psycho-analytic method for the treatment of neuroses. The international reputation of Freud increased after the War, and his works obtained a vogue even in such countries as France, where psycho-analysis had been previously regarded as too extravagant in its claims. The pathological cases in the armies during the War put Freud's theories to something like an empirical test, and it was recognized by Freud's own disciples that sex was not the controlling factor. Freud himself in his writings after 1914 tended to make less use of the principle of sexual symbolism and relied more on the direct intuitions afforded by the psychological situations. The conception of the libido continued to play an important rôle but without complete identification with concrete sex experience. See CONSCIOUSNESS AND

THE UNCONSCIOUS; ÆSTHETICS; PSYCHOLOGY, ABNORMAL, AND PSYCHOANALYSIS; PERCEPTION.

Freud's works after 1914 include *Totem and Taboo* (1915); *Wit and Its Relation to the Unconscious* (1916); *Leonardo da Vinci* (1916); *Delusion and Dream* (1917); *The History of the Psycho-analytic Movement* (1917); *Reflections upon War and Death* (1918); *Massenpsychologie und Ichanalyse* (1921; English translation, *Group Psychology and the Analysis of the Ego*, 1922), and *General Introduction to Psycho-analysis* (1921).

FREY, EMIL (1838-1922). A Swiss statesman and former president of the Swiss Confederation (see Vol. IX), who died near Basel, Switzerland, in 1922. After the War he was one of the technical experts attached to the Swiss delegation at the Genoa Conference.

FRIDAY, DAVID (1876-). An American economist and educator, born at Coloma, Mich. He graduated from the University of Michigan in 1908, and was a member of the faculty of that university from 1908 to 1916, when he was appointed professor of economics at New York University. In 1918 he was head of the department. From 1919 he was professor of political economy at the University of Michigan. He served as statistician and expert to many important commissions, and was also adviser to several governmental departments and boards. He was a member of several learned societies and was the author of *Problems in Accounting*, 1915; *Readings in Economics*, 1915; *Profits, Wages and Prices*, 1920.

FRIENDS, RELIGIOUS SOCIETY OF. The Friends, commonly known as Quakers, are composed of four branches: the Society of Friends (Orthodox), Society of Friends (Hicksite), Orthodox Conservative Friends (Wilburite) and Friends (Primitive). The Orthodox branch, which is by far the largest, decreased from 98,356 members in 1914 to 85,612 according to figures supplied in 1923, and the number of meeting houses from 775 to 714, and the number of ministers from 1315 to 1252. During the war the Friends, whose tradition is for non-resistance, were very active in relief work in France, Germany, Holland, Poland and Russia. In 1919 the denomination had 650 relief workers in France, about half of them being American, and half British. They conducted eight general hospitals, one maternity hospital, two convalescent hospitals, a tuberculosis hospital and tuberculosis village, a home for old women and several children's homes. The maternity hospital after the War was presented to the French government. The society also took entire charge of the reconstruction work between Verdun and the Argonne Forest. In 1919 and 1920 there were 15 workers in Serbia and 90 doctors and nurses fighting the typhus in Poland. After January, 1920, the Society took complete charge of the relief work in Germany. Altogether under their auspices over 5,000,000 received one warm meal a day for a greater or less length of time. Relief work was also maintained on an extensive scale in Poland and in Russia.

FRIES, ARCHIBALD (1864-). An American railway official, born in Cincinnati, Ohio. He was educated in the public schools of that city and began his railroad employ in a clerical capacity with the Ohio and Mississippi Railroad. For several years he was employed in

various important capacities by the Baltimore and Ohio Railroad and served as general traffic manager of the Eastern Lines, 1916-18. His jurisdiction was extended over the entire system. During the War he served as traffic manager to the Railroad Administration.

FRIESEKE, FREDERICK CARL (1874-). An American painter (see VOL. IX). Among other recognitions received by him during the period, were a grand prize at the Panama-Pacific Exposition, in 1915, also the Palmer Gold Medal, Art Institute of Chicago, in 1920; and a gold medal, Philadelphia Art Club, in 1922. In his later works, among them "The Blue Gown," "Golden Locket," "Lady in Rose," he was still decidedly the impressionist chiefly interested in representing female figures and the nude.

FRISCHEISEN-KOHLER, MAX (1878-). A professor of philosophy and pedagogy. His works include *Probleme des Ewigen Friedens* (1915), *Grenzen der Experimentalen Methode* (1918), and *Simmel* (1919); he edited Ueberweg's *History of Philosophy* and translated Shaftesbury and Hobbes.

FRITCH, LOUIS CHARLTON (1869-). An American engineer, born in Springfield, Ill. He took an engineering course at the University of Cincinnati and was division engineer of the Baltimore and Ohio Railroad in that city until 1899, when he became superintendent. He acted successively as assistant to the general manager, assistant to the president, and consulting engineer for the Illinois Central Railroad until 1909, when he became chief engineer of the Chicago Great Western Railroad. From 1914 to 1917 he was general manager for the Canadian Northern Railway and was general manager for the S. A. L. Railway, Norfolk, Va., and vice-president of the C. R. I. & P. R. R. from 1918. He was president also of the R. I. and Oklahoma Railway Company and was president of several important corporations.

FROST, ROBERT (1875-). An American poet born in San Francisco and educated at Dartmouth and Harvard. After teaching English in the Pinkerton Academy (Derry, N. H.) and teaching psychology (1911-12) at the New Hampshire Normal School, he went to England and published there his first two volumes of prose. On his return to America he did some active farming at Derry, Conn., and culled therefrom a knowledge of rural life in New England, as was illustrated in his *North of Boston* (1914), which immediately placed him in the front rank of contemporary American poets. In most cases his pictures of Yankee shyness prove an intimate understanding and love of his neighbors which could come only through close contact. And in his hands the folk speech of these people possesses a beautiful and melancholy dignity. In 1916-20, he was professor of English at Amherst College; then was poet in residence at the University of Michigan; and in 1923 returned to the faculty of Amherst. He has also written *A Boy's Will* (1913), *Mountain Interval* (1916), *New Hampshire* (1923), and many poems for the magazines.

FROTHINGHAM, PAUL REVERE (1864-). An American clergyman, born at Jamaica Plain, Mass., and educated at Harvard University. After preaching for some years at New Bedford, Mass., he became minister of the Arlington Street (Unitarian)

Church in Boston in 1900. He was preacher to Harvard University at various periods between 1899 and 1921. He is the author of *William Ellery Channing; His Messages from the Spirit* (1907); *A Confusion of Tongues* (1917); *We Believe* (1917); and *Our Debt to Great Britain* (1919).

FRUIT. See HORTICULTURE.

FRYATT, CHARLES (1872-1916). A British sea-captain, born near Harwich, Essex. In 1904 he became chief officer in the service of vessels of the Great Eastern Railway Company. During the first two years of the War he captained the *Brussels* between Harwich and Rotterdam. In July of 1916 word was received in England that Captain Fryatt's ship had been captured by the Germans and that he had been arrested and was to be tried by court martial on a charge of having attempted to ram a German submarine. Almost immediately after the execution had been carried out at Bruges on July 28, 1916, an order was received from Berlin to postpone sentence. Great indignation was felt by the British, who considered this another act of treacherous murder on the part of the Germans.

FUADI (AHMED FUAD PASHA) (1868-). King of Egypt, son of the late Khedive Ismail Pasha. He became Sultan on Oct. 9, 1917, and after the termination of the British Protectorate over Egypt in February, 1922, he was proclaimed king (March 16). King Fuad is the eighth ruler of the dynasty of Muhammad Ali, who made himself absolute ruler of Egypt by force of arms in 1805.

FUCHS, EMIL (1866-). An Austrian sculptor, painter and medallist. He was born in Vienna and studied under Tilgner and later in the academies of Vienna and Berlin. In 1890 he won a traveling scholarship and spent five years in Rome. In 1896 he won the gold medal at Munich with the group "Mother Love." He then went to London, where he executed a series of important commissions for the royal family, portraits, sculptures, and medals, and became very popular. In the United States he designed medals for the Hudson-Fulton Celebration and Hispanic and Numismatic Societies and the J. Pierpont Morgan Memorial Medal, and painted a number of portraits of distinguished men and of society women. His work is pleasing rather than powerful. An important exhibition of his works was held in New York in 1921.

FUERTES, LOUIS AGASSIZ (1874-). An American illustrator and mural painter (see VOL. IX). In his specialized field, bird and animal life, he illustrated several series for the *National Geographic Magazine*, 1914-19, Burgess's *Bird Book for Children* (1917), and Burgess's *Animal Book for Children* (1920); and executed paintings for the New York Zoological Society.

FULLERTON, GEORGE STUART (1859-). An American professor of philosophy (see VOL. IX). His works after 1914 include *Germany of To-day*, a defense (1915), and a *Handbook of Ethical Theory* (1922).

FUNCTIONALISM. See BEHAVIORISM.

FUNDAMENTALISM. See RELIGIOUS CONTROVERSIES.

FURMAN, FRANKLIN DE RONDE (1870-). An American engineer and educator, born in Ridgely, Md. He graduated from the Stevens Institute of Technology in 1893, and from the same year was professor of mechanism and ma-

chine design at that institution. He was a member of several engineering societies and wrote *History of the Stevens Family of Engineers*; *History of Stevens Institute of Technology*; *Questions and Problems in Machine Design*; *Questions in Engineering Drawing*. He also contributed articles to magazines.

FURNESS, CAROLINE ELLEN (1869-). An American astronomer and educator, born in Cleveland, Ohio. She graduated from Vassar College in 1891 and took postgraduate courses at Columbia. She became a member of the faculty of Vassar College and from 1915 was Maria Mitchell Professor. She performed research work at the Yerkes Observatory and in Europe, and was a member of several scientific and other societies. She was the author of several star catalogues and *Introduction to the Study of Variable Stars* (1915). She also contributed articles to American and European journals.

FURNISS, HARRY (1854-). A British caricaturist, artist, author and lecturer (see VOL. IX). Among his later works were *Our Lady Cinema* (1914); *More about How to Draw in Pen and Ink* (1915); *Deceit* (1917); *Stiggins* (1920). He has been characterized as vigorous, versatile, brilliant in draftsmanship, facile in execution. During this period he also gave numerous humorous lectures throughout England, and wrote many scenarios.

FURSE, DAME KATHARINE (1875-). An English woman, born at Bristol, the daughter of John Addington Symonds. In 1914 she founded and directed the Voluntary Aid Detachment, a department under the Red Cross in France. She was director of the Women's Royal Naval Service, 1917-19. In recognition of her admirable work, she received the Order of the Royal Red Cross (1916) and the Order of the British Empire (1917).

FURTH, HENRIETTE (1861-). Identified with child welfare work at Frankfort. She was a student of labor problems, especially those connected with factory work of women

and with sex reforms. She is the author of *Die Frauen im Kriege* (1917) and *Zur Sozialisierung der Oeffentlichen Wohlfahrtspflege* (1920).

FURTWANGLER, WILHELM (1886-). A noted German orchestral conductor, born in Berlin. Having completed his studies in Munich under Beer-Walbrunn, Rheinberger and Schillings, he began his career in Zurich. From 1911 to 1914 he was principal conductor at the Opera in Lübeck, directing also the concerts of the Verein der Musikfreunde. In 1915 he succeeded Bodanzky in Mannheim, where he remained four years and established a reputation which brought him invitations for guest-appearances with the foremost German and Austrian orchestras. He was regular conductor of the Vienna Tonkünstlerorchester (1919-20) and of the symphony concerts of the Berlin Staatsoper (1920-22), succeeding Richard Strauss. In 1922 he was chosen Nikisch's successor as conductor of the famous Gewandhaus concerts in Leipzig and of the Philharmonische Gesellschaft in Berlin. In 1923 he aroused great enthusiasm in London.

FUTURISM. See PAINTING, SCULPTURE, AND MUSIC.

FYFE, H. HAMILTON (1869-). An English author and journalist, born in London and educated at Fettes College in Edinburgh. His career in journalism started as a reporter in 1889, and after approximately 13 years of holding various positions as reviewer, dramatic critic, etc., he edited the *Morning Advertiser* (1902-03), subsequently becoming dramatic critic for *The World* (1905-10); correspondent of the *Daily Mail* (1907-18), lecturer in Spain and Portugal (1917), attaché in the British War Mission to the United States (1917), etc. He has published many books and plays, which include *The Real Mexico* (1914); *The Meaning of the World Revolution* (1919); *The Kingdom, the Power, and the Glory: A Morality* (1920); *The Widow's Crusade* (1920); *The Making of an Optimist* (1921), and *The Fruit of the Tree* (1921).

GABRILÓVITCH, OSSIP (1878-). A Russian pianist (see VOL. IX). Besides being recognized as one of the greatest pianists of his day, he won fame as an orchestral conductor. From 1910 to 1914 he was conductor of the Konzertverein in Munich, but he did not abandon his career as a pianist. During 1912-13 he won veritable triumphs in several European capitals with his series of six historical concerts illustrating the development of the piano-concerto from Bach to Rachmaninov. After the outbreak of the War he came to the United States, giving the same cycle and arousing the same enthusiasm. In 1918 he became conductor of the Detroit Symphony Orchestra, which under him won a place among the premier orchestras of the country.

GAILOR, THOMAS FRANK (1856-). An American Protestant Episcopal bishop (see VOL. IX). He became chairman of the House of Bishops of the Protestant Episcopal Church in 1916, and president of the Presiding Bishop and Council in 1919. He has received honorary degrees from Oxford (1920) and Oglethorpe University (1921).

GALE, ZONA (1874-). An American writer (see VOL. IX). She wrote *Neighborhood Stories* (1914); *Heart's Kindred* (1915); *A Daughter of To-Morrow* (1917); *Birth* (1918); *Peace in Friendship Village* (1919); *The Secret Way* (1921); *The Neighbors*, a one-act play; and *Miss Lulu Bett*, the dramatic version of which received the Pulitzer Prize of \$1000 as the best play of the year produced in New York (1920). *Mister Pitt*, a dramatized version of *Birth*, was produced in New York in 1924.

GALICIA, EAST. In the determination of the southeastern boundary of Poland, and in particular the disposition of the former Austrian province of Galicia, the Peace Conference was confronted by one of its most vexing problems. In fact it was not until March, 1923, that the matter could be considered as settled, and then only after a fashion. The question of West Galicia roused little controversy; the district was solidly Polish, and the Supreme Council, in assigning it to Poland by the "Certain Frontiers" Treaty of Aug. 10, 1920, was clearly recognizing Polish historical and ethnical rights. But the eastern two-thirds of the province raised other questions. In East Galicia the majority of the inhabitants were Ruthenians, i. e. Ukrainians; the 1910 census showed a population made up of 59 per cent of Ruthenians, 27 per cent Poles, and 13 per cent Jews. Besides the question of race, religious and cultural antipathies existed. The Poles are Roman Catholic; the Ruthenians, Greek Orthodox Uniate. From 1867 on, when Galicia became a single province, the Poles were the leading force in Galician affairs, for they lived in the towns and headed the professions and the trades, while 91 per cent of the Ruthenians were dependent on agriculture. In fact, by 1910, 62 per cent of the Ruthenians were illiterate, against only 23 per cent of the Poles. In spite

of these differences the two groups lived fairly amicably side by side until 1880, when a Ukrainian movement, aided to some extent by Austria, appeared among the Ruthenians and roused fanatical nationalistic animosities. Part of this movement sought the creation of an independent Ukrainia, another part union with the people of the Russian Ukraine in Russia, Ruthenian interest centred in the question of race, while the Poles, in addition to their cultural and commercial dominance, sought East Galicia for military and economic reasons. They stressed the necessity for a common frontier with Rumania and a united front against Soviet Russia; a junction with Rumania would mean Polish control of the headwaters of the Dniester and thus facilitate Polish trade in the Black Sea area; Poles pointed out that they needed the great oil fields of Galicia for the economic well-being of their new state. With the collapse of Austria, the so-called Republic of the West Ukraine was set up and an attempt was made to incorporate the whole of East Galicia in a Ukrainian state. The Poles naturally objected and bitter fighting between irregular troops went on until May, 1919, with the important city of Lemberg as the chief point of contention. In May large Polish contingents appeared in the country; by June the Ruthenian resistance had broken down, and Poland was in possession of the whole as far east as the Zbrucz. The Peace Conference had up to this time tried valiantly to cope with the problem. Undoubtedly, as the British contended, the Ruthenians were entitled to some sort of self-determination, and it was manifestly unfair to cede the territory to Poland outright. No group, however, seemed willingly to consider a transfer of East Galicia east of the Lemberg-Drohobycz line to Russia. But the Poles presented the delegations with a *fait accompli*, and it was no doubt with relief that on June 19 the Poles were authorized to continue their military occupation of the whole country. Plain justice, nevertheless, demanded a consideration of Ruthenian claims, and to the end of 1919 the Supreme Council concerned itself with plans for the guarantee of Ruthenian autonomy. But the French succeeded in blocking all these attempts, so that up to 1923 the province remained legally, according to the Treaty of St. Germain, in the hands of the Allies, while the Poles maintained their *de facto* possession. Undoubtedly the just disposition of the province had presented almost insuperable obstacles; the League of Nations could not handle the task in 1919, for it was not yet functioning, while none of the European powers was in a position to take up the onerous duty of protection and administration in a region where hatreds were so implacable. Something might have been done, commentators agreed, nonetheless, to safeguard the interests of the Ruthenians. As things were, 4,500,000 Ruthenians were under the domination of a Polish minority, with no provision for the protection of their liberties or the ascertainment of their wishes. On Mar. 14, 1923, the capstone was

placed on the situation when the Council of Ambassadors, in definitively laying down the boundaries of Poland, assigned East Galicia to Poland. It was evident that the seeds of a new irredentism had been planted to trouble ultimately the peace of Europe. See POLAND, *History*; WAR IN EUROPE, *Eastern Front*.

GALLAGHER, MICHAEL JAMES (1866-). A Roman Catholic bishop, born at Auburn, Mich., and educated at Mungret College, Limerick, Ireland, and at the University of Innsbruck, Austria. He was ordained priest in 1893, and after filling several pastorates and holding various offices he became bishop of Grand Rapids in 1916. In 1918 he was transferred to Detroit.

GALLI-CURCI, AMELITA (1889-). A brilliant Italian coloratura soprano, born at Milan. Among the world's great singers, present or past, her case is without parallel as the only example of an artist achieving distinction without technical training under a teacher. While studying at the Conservatory in Milan she devoted herself exclusively to the piano, under Appiani, with the ambition of becoming a pianist, and with such success that in 1903 she won the first prize. Later, on discovering that she was gifted with a fine natural voice, she began a unique system of self-instruction. She had records made of her voice, and these she studied carefully, her exceptionally keen ear enabling her to discover and remedy imperfections. However, she acknowledged her indebtedness to Mascagni and William Thorner for advice. In 1909 she made her debut as Gilda in *Rigoletto* at the Teatro Costanzi, in Rome, winning instantaneous success, which secured her appearances at several important Italian opera houses during the same year. The next year she made her first tour of South America, after which she sang again in Italy. In 1912 she was again in South America; in 1914 she made her first tour of Spain, and in 1915 she sang in Havana. Then came her sensational success with the Chicago Opera Association (Nov. 18, 1916), of which she was a regular member until 1924. But all these triumphs were eclipsed by the ovations she received at her first appearance in New York (Jan. 28, 1918), when the Chicago company visited the metropolis for a four weeks' season. These visits were repeated annually till 1922. Beginning with 1923 Galli-Curci appeared every season as guest artist at the Metropolitan Opera House. Strange to say, London did not hear her till the fall of 1924. She was married in 1910 to the painter Luigi Curci, whom she divorced in 1920. In 1921 she married Homer Samuel's, her accompanist.

GALLIÉNI, JOSEPH SIMON (1849-1916). A French general and statesman. See WAR IN EUROPE, *Western Front*.

GALLIPOLI. See WAR IN EUROPE, *Turkish Front*.

GALLOWAY, BEVERLY THOMAS (1863-). An American botanist (see Vol. IX). In 1913-14 he was Assistant Secretary of Agriculture, and in 1914-16, dean of the State College of Agriculture of Cornell University. From the latter date he was pathologist of the office of seed and plant introduction for the United States Department of Agriculture.

GALLOWAY, CHARLES WILLIAM (1868-). An American railway official, born in Baltimore, Md. He began his railway career

as a messenger in the telegraph department of the Baltimore and Ohio Railroad in 1883. He served that road in various capacities and became superintendent of transportation in Baltimore in 1906. He served as general manager of the Baltimore and Ohio from 1912 to 1916 and as vice-president and general manager of the Baltimore and Ohio Southwestern from 1916 to 1918. He was Federal manager for the western lines of several railways during the War, and from 1920 he was vice-president in charge of operation and maintenance for the Baltimore and Ohio system.

GALLSTONE DISEASE. During the decade 1914-24 new methods of diagnosis and treatment of gallstone disease were introduced by Dr. Lyon of Philadelphia and his disciples which were incorporated in his large monograph on non-surgical drainage. By means of the duodenal sound it is possible to obtain bile under all kinds of circumstances and subject it to analysis. The discovery that the bile in gallstone disease may be entirely normal is contrary to the old belief that stones cannot form in the presence of healthy bile. The cholagogue action of various substances can be studied by introducing them into the duodenum through the stomach and watching their action on the flow of bile. It becomes evident that the empirically recognized cholagogue substances are scientifically justified, for magnesium sulphate, olive oil, sodium phosphate and a number of others all appear to possess this property of expelling bile from the gall bladder into the duodenum. It is also possible by means of any one of these substances introduced into the duodenum to cause the escape of stones, or what is better, to prevent their formation by occasional resort to the sound.

The claim that the use of the latter may sometimes precipitate a severe attack of gallstone colic in a patient in whom the stones might never have caused trouble if left alone may be viewed from various angles. Thus we may entirely disbelieve in this possibility in the absence of complete proofs, or we may look on it as a rare event of little practical importance to the public at large; finally, we may regard the expulsion of a quiescent stone as a good thing. Dr. Hedinger of Basel has furnished considerable evidence in support of the belief that gallstones are really amenable to solution, or at least to a partial solution, in their own bile. To what extent therapeutics will profit by such a discovery is at present problematical.

GALLWITZ, MAX C. W. VON (1873-). A German artillery general, born at Breslau, and educated at the Gymnasium and military academy. He entered the artillery service in 1870 and was progressively promoted until he became lieutenant-colonel in 1896. He was made department chief in the War Ministry the following year. His promotions continued, and he became major-general in 1902. In 1903 he had the direction of the army in the war ministry; in 1906 he was made commander of the 15th division; and in 1911, general of artillery and inspector of field artillery. During the entire period of the War he was artillery corps commander. In 1918 he was made commander-in-chief of several armies. He was raised to the nobility in 1913.

GALSWORTHY, JOHN (1867-). An English author (see Vol. IX). Among his lat-

er works are *The Little Man and Other Satires* (1915); *The Freelands* (1915); *A Sheaf* (vol. i, 1916); *Beyond* (1917); *Five Tales* (1918); *A Sheaf* (vol. ii, 1919); *Saint's Progress* (1919); *Addresses in America* (1919); *Tatterdemalion* (1920); *The Forsyte Saga* (1922); and the plays, *The Mob* (1914); *A Bit o' Love* (1915); *The Skin Game* (1920); *Six Short Plays* (1921); *A Family Man* (1921); *Loyalties* (1922), and *Windows* (1922). In all his later works appear the author's usual intellectual fineness and careful and thoughtful weaving.

GAMBIA. A British colony and protectorate at the mouth of the River Gambia in West Africa. Area of colony proper, 4 square miles, (population, 9000); area of the protectorate 4130 square miles (population in 1921, 200,000). The chief export from Gambia was groundnuts, with a total of 64,178 tons in 1923, compared with 66,000 tons in 1914. This made up 96 per cent of the total shipments. Other exports were palm kernels and hides. Total exports for 1923, £884,309 as compared with £926,127 in 1914. The British Empire took 49 per cent of the exports in 1923, France 39 per cent, and Germany 7 per cent. Imports for 1923 were £709,013 as compared with £688,007 in 1914. The British Empire supplied 69 per cent, France 13 per cent, Germany 7 per cent, and the United States 5 per cent in 1923. Most of the sugar imported was from France, and the tobacco from the United States. Kolanuts and cotton goods were other imports. In 1913, 625,132 tons entered and cleared; in 1923, 1,052,982 tons. Revenues in 1913 were £124,990; 1920, £268,788; 1922, £204,244. Expenditures in 1913 were £95,210; 1920, £171,160; 1922, £430,312. The last figure included £200,000 incurred by the demonetization of the five-franc pieces which had so depreciated during and after the War that it was necessary to collect them for shipment to England to be melted down. The United States, during and after the War, supplanted Germany in the Gambian import trade. In 1919 American shipments rose to \$900,000. The natives persisted in devoting themselves exclusively to the groundnut industry to the neglect of food crops. During the War this caused a real food stringency because of the lack of shipping.

GANDHI, MOHANDAS KARAMCHAND 1869-). An Indian nationalist leader, born at Porbander, India. He went to London in 1888 to study law. After careful observation of Christianity and western civilization, he returned to India in 1893, but soon afterward went to South Africa to practice law. He was brutally mistreated by the white men in South Africa, but he bore his burden by developing a philosophy of passive resistance. On the outbreak of the War he raised a volunteer ambulance corps in London of the residents there and in 1917 was active in raising a corps of Indian recruits in Kheda. He went into retreat in 1916 at Ahmedabad and there came under the influence of the teachings of Tolstoi. On the passing of the Rowlatt Act, he encouraged the "noncoöperative" movement and agitation against the British Government and so had much to do with the Punjab disturbance of 1919. Through the union of the Hindus and Mohammedans, Gandhi promised to effect an impregnable native opposition to the British and eventually the demolition of their government in India. When the All-India Congress

met on Dec. 24, 1921, at Ahmedabad, he was appointed sole executive, and thus virtual dictator of the noncoöperative forces.

For his part in the Punjab and other disturbances, he was tried in March, 1922, and sentenced to prison for six years. While many looked on and feared a gigantic uprising in India in defense of the man whom the Indians looked on not only as a reformer but as a saint, Gandhi admonished them not to resort to arms, but to get out their spinning wheels and spin. He went to prison cheerfully, and no disturbance occurred. During his imprisonment, reports from India were that Gandhi's economic policies and philosophical teachings were being discredited. In the early part of February, 1924, Gandhi was released unconditionally by order of the British government. See INDIA.

GANS VON LUDASZY, JULIUS (1838-1923). A prominent Austrian journalist and popular author, born in Vienna. He studied law and medicine, but practiced neither. His becoming a contributor to Vienna newspapers led eventually to his becoming editor of the *Wiener Neue Freie Presse*, a position which he held from 1902 to 1915. His first work was a thesis, *Die Wirtschaftliche Energie: System der Oekonomistischen Methodologie* (1893). He later published *Also Sprach Confucius* (1900). Thereafter he devoted himself to drama and fiction. Among his plays, most of which were produced in Vienna, are *Bessere Leute* (1902), *Der Sonnenstaat* (1904), and *Die Trennende Brücke* (1913); among his stories, *Die Heilige Schlange* (1912), *Die Macht der Schatten* (1914), *Die Grosse Sünde* (1915), *Der Tanzende Stern* (1917), and *Der Turm der Liebe* (1920).

GANT, SAMUEL GOODWIN (1869-). An American surgeon and proctologist, born at Knoxville, Mo., and educated at the Missouri Medical College. He practiced for some years in Kansas City, Mo. In 1899 he removed to New York City to become professor of surgery (proctology) in the New York Postgraduate School of Medicine, succeeding Professor Kelsey. For some years he conducted private surgical hospitals and joined the staff of Broad Street Hospital. He has published numerous works covering diseases of the colon, rectum, and intestinal tract as a whole: *Diagnosis and Treatment of Diseases of the Rectum* (1896; rev. 1902); *Constipation and Intestinal Obstruction* (1909), reissued in 1916 in revised form as *Constipation, Obstipation, and Intestinal Stasis; Diarrhæal, Inflammatory, Obstructive, and Parasitic Diseases of the Gastrointestinal Tract* (1915); and *Diseases of the Rectum, Anus and Colon* (3 vols., 1923).

GANZ, RUDOLF (1877-). A Swiss pianist (see VOL. IX). In 1921 he transferred his main activity from the field of piano playing to that of conducting, when he accepted the conductorship of the St. Louis Symphony Orchestra.

GARBAGE AND REFUSE DISPOSAL.

The net changes in garbage and refuse disposal between 1914 and 1924 left the various processes in much the same relation to each other as at the beginning of the period, although perhaps with some shifting as to preferences shown by the different cities for one method or another and certainly with some marked changes in the processes themselves. In Europe the War resulted in almost complete cessation of this

municipal service in many cities or else in material changes of method. In the United States and Canada the garbage and refuse collection service was not affected in any such degree as it was in Europe, but notable shifts were made in methods of disposal. The latter were designed more particularly to effect the recovery of material from the garbage and refuse, especially food values usable for feeding to hogs. In the many army camps, besides hog feeding through contract service, there was a remarkable salvage of all sorts of camp waste, both that generally associated with municipal refuse and other waste materials peculiar to army camps.

Stimulated by the United States Food Administration, by rigid demands for municipal economy, and by the willingness of contractors to take municipal garbage for utilization, several American municipalities either materially increased the amount of garbage already being disposed of by feeding to hogs or else took up that method of disposal systematically for the first time. Of the latter, notable instances were Newark, N. J., Baltimore, Md., and Buffalo, N. Y. This was due both to the size of the cities and the nature of the contracts entered into, which was characterized at the time as "taking the gamble out of garbage." These contracts provided that the contractor would pay the city for the garbage as delivered to him at a price per ton of garbage based on the wholesale price of hogs on the Chicago market. In England, hog feeding was somewhat resorted to, but apparently not so far as in the United States.

United States Food Administration Statistics. The most extensive statistics on garbage and refuse collection and disposal ever made available in the United States were gathered by the United States Food Administration in 1917. They covered, as far as possible, places of 10,000 population and over. Of 779 of these places for which data were presented, 526 had a systematic collection, 171 had no collection service, and 82 places were not reported. Of 524 cities reporting whether the refuse was collected by the city, by contract, or privately, 84 reported collection by the city alone, 96 by contractors, 36 privately; that is, without contract and presumably with little supervision by the city; 308 had a mixed system of collection. Disposal methods were reported for 698 places with a population totaling nearly 44,000,000. Of these, 345, with a population over 11,000,000, reported disposal by feeding, doubtless mostly to hogs; 102 places with a population of 7,000,000 reported incineration; 37 places with a population of 18,500,000 reported disposal by reduction, or the recovery of grease and fertilizer base; and 214 places with 7,000,000 population gave the method of disposal as burning, burying, or dumping, the former probably meaning for the most part burning waste paper and other combustible material on dumps. It should be understood that these figures are for the total populations of the cities in each class and not the populations actually served by the several methods enumerated, which would probably be very much less. The gross total population of the cities reporting utilization by either reduction or feeding was about 30,000,000. These figures cannot be accepted as even approximate for methods of disposal in 1924, even after al-

lowing for increases in population. After the War some reduction plants were closed, there was probably a material net reduction in the population from which garbage is fed to hogs, and some of the incinerating plants closed during the War were reopened, some closed, and others built. The basic data collected by the Food Administration and reported by cities and States was printed in tabular form in the *Engineering News-Record* for Oct. 17, 1918.

In the United States, probably in much lesser degree in other countries, garbage and refuse disposal is in many respects the most unsatisfactory of the various municipal services. In Europe, work in this field is on a more permanent and generally satisfactory basis than in the United States. It is not so much the collection service that is bad in America, although that is incomplete in a large percentage of municipalities and often poor, as it is the final means of disposal. The incompleteness of the American service, both as to collection and disposal, is in part due to the variety and extent of the demands on American municipal treasuries, but the poorness of the service performed and the constant shifting from one method of disposal to another and the very frequent abandonment or at best the very poor operation of disposal plants is due most of all to the failure of American cities to regard the garbage and refuse disposal service, and for that matter the collection service as well, as essentially an engineering problem. Shift from one method of disposal to another, utterly inadequate operating service of disposal plants, and the abandonment of plants representing large capital investments are common; together they result in the waste of very large sums of money. So seldom does a city turn to an engineer experienced in garbage collection and disposal for preliminary studies to determine the best method to be adopted, for the preparation of plans and specifications, and for supervision of contracts, that there are very few engineers specializing in garbage disposal, compared with the large number of water-works and sewerage specialists.

Methods of Disposal Outlined. The chief methods of garbage disposal in use in various parts of the world in 1924 were dumping on land or into water; earth burial or covering with ashes instead of with dirt; incineration, with or without attempts at heat utilization; reduction, for the recovery of grease and fertilizer base, or in rare cases, for the conversion of garbage into stock food, which must still be considered as in the experimental stage; and fermentation, the end product to be used as a fertilizer, a new method introduced in several Italian cities and tried in a small way in the United States. Although no exact figures are available, it is probable that throughout the world more garbage and other municipal refuse are disposed of by dumping in land or in water than by any other method. Water dumping was long the chief method of disposal practiced by New York City; it was then given up for disposal by reduction for some years but was returned to with a political change in administration for a considerable part of the city. In Richmond and Queens Boroughs most of the New York garbage is disposed of by incineration and early in 1924 a 300-ton incinerating plant was put in use in Manhattan Borough;

at the same time another large plant was under construction, and presumably others were projected for that borough. The land dumping of garbage and refuse, if little or no attempt is made to take the proper care of the dumps, is likely to give offense from odors, from scattering papers, and from smoldering fires on the dumps, but it is possible so to handle the dumps as to keep them from being much of a nuisance. Earth burial or the depositing of garbage in relatively shallow layers and covering it with a few inches of earth, or covering it instead with ashes, may be an eminently sanitary and satisfactory method of garbage disposal. It has been in use for some years at Seattle, Wash., after the abandonment of three refuse destructors or incinerators, and similarly at Ottawa, Canada, and in other places. The change from incineration to dumping and covering with earth or ashes at Seattle was made by the Health Department and was called the sanitary fill method of disposal.

Incineration was for several decades the chief method of disposing of mixed refuse in England, where anything but dumping was used, but much British refuse was worked into the soil for its physical improvement and for such fertilizing value as the refuse might contain. Following the War a marked change was made in British incinerating or refuse destructor practice; instead of sending all the garbage, ashes, and other refuse through the furnaces, the ashes and garbage were screened out for utilization on land; such low grade commercial materials as paper, rags, etc., were picked out on movable belts, and only the coarser clinker and unburned coal was passed for burning. The same general method was practiced for several years at Paris in some degree and was being extended on a large scale to cover the mixed refuse of the entire city.

Municipal Methods. Collectors gather the Paris mixed refuse in a fleet of 700 motor trucks and deliver it to sorting, screening, grinding, and destructor plants operated by another company. The disposal company produces fertilizer and brick from the refuse and utilizes heat from the destructors for the generation of electricity, the latter being sold to the city and utilized to drive pumps of water and sewage pumping stations. The four separate disposal stations were being enlarged in 1923 to a destructor capacity of 122 metric tons an hour and a projected further increase in capacity will bring the latter up to 160 metric tons an hour (see *Engineering News-Record*, Nov. 22, 1923). Tests on the refuse of Munich made by the Bavarian State Institute for the Growth and Protection of Plants led to the conclusion that it would be wasteful to use for fuel the finer portions of refuse having low calorific value but rich in fertilizing material. It was concluded that the most economical use of refuse where soil deficient in humus is at hand is to devote sifted fine refuse to agricultural purposes and to send the remaining refuse only to the destructor (*Zeitschrift des Bayerischen Revisionsvereins*, Nos. 7 and 8, 1921).

Reduction as a means of garbage disposal has been confined almost wholly to the United States, where the method was employed during a considerable number of years in most of the larger cities of the country which have what might be called improved means of garbage disposal. Originally all these reduction works were built and operated by private companies

under municipal contracts, but for some years, one after another was taken over by the city or else, in a few cases, municipal plants were built *de novo* or to replace the old privately built plants. In 1924 there were municipally owned reduction plants in New Bedford, Mass.; Schenectady, Syracuse, and Rochester, N. Y.; Philadelphia and Washington; Cleveland, Columbus, and Dayton, Ohio; Indianapolis, Ind., and Chicago. The Syracuse plant was leased for operation for a few years to the contractor who built it. Other cities where the garbage was being disposed of by reduction in 1924 were Boston, Baltimore, Pittsburgh, and Detroit. Where reduction is practised, only garbage, not mixed refuse, can be disposed of. The same is almost as true of disposal by feeding to hogs, although these animals will do much sorting over of mixed refuse.

Hog feeding as a method of garbage disposal was still in use in Newark and Buffalo in 1924; the Buffalo piggery had been taken over by the city a few years earlier, and the city was under a court injunction brought by the town in which the piggery was located, to close the piggery. The matter of actual closing was in the courts for some time pending investigations and negotiations by Buffalo for a site for disposal by some method not yet decided on up to May 1, 1924; the choice presumably lay between another piggery and incineration. Hog feeding is the general means of garbage disposal throughout New England; it was long practiced at Providence, R. I., and Worcester, Mass.

Fermentation by the Beccari system, named after an Italian, was practised in Florence and some other Italian cities for several years. A demonstration plant was built by American promoters of the process at Paterson in 1921. Late in 1923 a working-scale Beccari plant was put in operation by the village of Scarsdale, N. Y. It consists of four covered concrete cells, each about 8 x 9 feet in plan and 10 feet high, into which the garbage is dumped through openings in the top. A tower or chimney common to the four cells contains overlapping shelves on which is placed material designed to absorb the gases given out by the fermentation process, with a view to recovering any fertilizing value they may contain. The moisture in the garbage is drained out through a false bottom. Means are provided for introducing air to pass through the cells. Reports from the Italian plants are that after the garbage has remained in them for 30 days or so, it has been converted by fermentation to a substance similar to garden soil or humus, with a high fertilizing value. For a description of the Beccari system as used in Italy, see *Engineering News-Record*, Feb. 15, 1923, and for a description of the plant at Florence, see *The American City*, February, 1923.

Collection of mixed refuse generally costs more than the final disposal of the material; for economical service both of collection and of disposal, the two should be carefully correlated after engineering studies, which should be continuous in order to make readjustments necessary for economy and efficiency. Increasingly, motor-drawn vehicles are being used for collection, especially where there is a long haul after loading is completed. Theoretically refuse collection districts should be so laid out that the material collected could be hauled to a central disposal plant in each district; this would ma-

terially reduce the haul as compared with that entailed by the use of only one disposal plant. Great practical difficulty is experienced in American cities when an attempt is made to locate district disposal plants; the people residing or doing business in the immediate vicinity usually protest that the plant will be a nuisance. The arguments advanced may be fallacious, but when brought to hear on the councilmen they are likely to be effective, as was shown by experiences at Philadelphia, Minneapolis, and St. Louis. Most disposal plants in America are located in the outskirts of the city or beyond the municipal boundary lines. In some cases the disposal plant is so remote that special transportation after house-to-house collection has been effected is required, making use either of trailers or even of railway transportation, steam or electric. The latest and most comprehensive book on this whole subject is Hering and Greeley's *Collection and Disposal of Municipal Refuse* (New York City, 1921).

GARBER, DANIEL (1880-). An American painter (see VOL. IX). Among his later awards were the first Altman prize for figure painting, 1917, and the first Clark prize and gold medal, 1921. In "Buds and Blossoms," "A Summer Phantasy," and "The Hawk's Nest," he showed a continuance of interest in nature in her brighter and sunlit moods.

GARDEN, MARY (1877-). An American soprano (see VOL. IX). In January, 1921, she was appointed director-general of the Chicago Opera Association. She assumed control under most unfavorable circumstances, when the company was suffering from complications resulting from a dual directorship with divided responsibilities. That in the one year of her administration she failed to reconcile the warring factions and bring order out of the financial chaos is not surprising. In spite of all handicaps, she maintained the high standard of the performances and even added to the glory of the company with a tour which was an unequivocal artistic success, though it resulted in financial disaster. During her term as director she continued to appear in her usual rôles. When the new Chicago Civic Opera Company was organized in 1922, she was engaged as one of the principal artists.

GARDNER, EDMUND GARRATT (1869-). An English writer (see VOL. IX). Among his later works are *The Book of St. Bernard on the Love of God* (1916) and *The National Idea of Italian Literature* (1921).

GARFIELD, HARRY AUGUSTUS (1863-). An American educator, born at Hiram, Portage County, Ohio, the son of President James A. Garfield. He taught Latin and law and practiced law from 1888 to 1903 in Cleveland, Ohio. Subsequently he became professor of politics at Princeton University (1903-08) and president of Williams College (1908-). President Wilson appointed him United States Fuel Administrator in August, 1917. In this position Garfield did not receive the entire support of the public, because he did not favor public ownership of coal mines but asked for a fair chance for both capital and labor. The coal strike settlement did not receive his approbation, and in 1919 he resigned.

GARIBALDI, GIUSEPPE (1879-). An Italian soldier, son of the great Garibaldi, born in Melbourne, Australia. He took part in the Greco-Turkish War in 1897 and afterwards

fought with the revolutionists in Venezuela. Here he was imprisoned by Castro but escaped. After serving on the Panama Canal under General Goethals, he entered the service of Madero in Mexico and was made chief of staff. He served in the Balkan Wars of 1912, and at the outbreak of the War raised an Italian legion of 14,000, which fought with the Allied troops in France. When Italy entered the war, he joined the Italian army and served with great distinction. He was created brigadier-general in June, 1918, and retired from the army in June, 1919.

GARLAND, HAMLIN (1860-). An American poet and writer (see VOL. IX). Among his publications are *A Son of the Middle Border* (1914) and *A Daughter of the Middle Border* (1921). He became a member of the American Academy of Arts and Letters in 1918.

GARNER, JAMES WILFORD (1871-). An American professor of political science (see VOL. IX). Among his later writings are *Civil Government for Indian Students* (1920), *Idées et Institutions Politiques Américaines* (1921), *International Law and the World War*, 2 vols. (1920). He edited *Essays on Southern History and Politics* (1914). He was Hyde lecturer in the French universities (1921) and Tagore lecturer in the University of Calcutta (1922).

GARNETT, PORTER (1871-). A writer, critic and play producer, born in San Francisco, who has contributed to several San Francisco papers and literary and dramatic periodicals. He edited the Grove Plays of the Bohemian Club in 1918 and has published *The Bohemian Jinks*, *A Pageant of May*, *Descriptions of the Panama-Pacific International Exposition*, and *Stately Homes of California*. He became associate professor of graphic arts at Carnegie Institute of Technology in 1922 and established there in 1923 the Laboratory Press, the first private press devoted to educational purposes.

GAROFALO, RAFFAELE, BARON (1852-). An Italian jurist (see VOL. VIII). His publications after 1913, many of them speeches before the Senate, include *Sull' Ordinamento Giudiziario* (1914); *Le Aggressioni alla Forza Pubblica e i Delinquenti Abituali* (1914); *La Neutralità dell' Italia* (1914); *Per l'Assicurazione Obbligatoria contro gl'Infortuni sul Lavoro in Agricoltura* (1917); "Enrico Pessina, Filosofo e Legislatore" (in vol. xlv of the *Atti della Reale Accademia di Scienze Morali e Politiche*, 1918); and *I Delinquenti Abituali, gli Scioperi, il Bolscevismo* (1919). His *Criminology* was translated into English in 1914 as the seventh volume of *Modern Criminal Science*.

GARRETT, ALEXANDER CHARLES (1832-1924). An American Protestant Episcopal bishop (see VOL. IX), who died at Dallas, Tex., on Feb. 18, 1924. On the death of Daniel Sylvester Tuttle in April, 1923, the Rt. Rev. Alexander Garrett became presiding bishop. At that time he was 91 years old and totally blind.

GARRETT, GARET (1878-). An American economist and journalist, born at Pana, Ill. He was financial writer on the *New York Sun* (1903-05), *New York Times* (1906-07), *Wall Street Journal* (1907-08), *New York Evening Post* (1909-12), editor of the *New York Times Annalist* (1912-14), assistant editor of the *New York Tribune* (1916-19), and financial writer of the *New York Evening Post* (1919-). He has written *Where the Money Grows* (1911), *An Empire Beleaguered* (1916),

The Blue Wound (1920), *The Driver* (1921), *The Mad Dollar* (1921), and many essays of an economic and political nature. Mr. Garrett has been described as a writer of stories with action and the freshness of bare facts. He contributed regularly to the *Saturday Evening Post* and other magazines.

GARRISON, FIELDING HUDSON (1870-). An American physician, known especially as a historian, librarian, and editor, born in Washington, D.C., and educated at Johns Hopkins and Georgetown Universities. He entered the army medical service. Having already served in that capacity in his student days, he was made an assistant librarian in the Surgeon-General's Library. On the retirement of Dr. Billings he succeeded him as head librarian. In 1903 he became editor of the *Index Medicus*. His chief publications comprise *An Introduction to the History of Medicine* (1913), a work of which it is impossible to speak too highly; *John Shaw Billings*, a biography (1915), and *Notes on the History of Military Medicine* (1922).

GARVIE, ALFRED ERNEST (1861-). A British Congregational theologian (see VOL. IX). He added to his numerous publications *The Missionary Obligation* (1914), *The Evangelical Type of Christianity* (1915), *The Purpose of God in Christ* (1919), *The Christian Preacher* (1920), *The Old Testament in the Sunday School* (1921), and other volumes.

GARVIN, JAMES LOUIS (1868-). An English journalist and Imperialist, born at Birkenhead, Cheshire. By his writings for the *Newcastle Chronicle*, the *Eastern Morning News*, the *London Daily Telegraph*, and the *Fortnightly Review*, he made himself popular as a brilliant publicist. He was editor of the weekly *Outlook* (1905-12), the evening *Pall Mall Gazette* (1912-15), and *The Observer* (1908). The circulation and prestige of the latter increased enormously with his editorship. He has published *Imperial Reciprocity* (1903), *Compatriot Club Lectures* (1906), *Tariff or Budget* (1909), *The Economic Foundation of Peace* (1919), and other books, the majority of them giving proof of his affinity with the Unionist party. In 1920 he was appointed to write the official biography of Joseph Chamberlain, whom he had supported since the latter's colonial secretaryship in 1895.

GARY, ELBERT HENRY (1846-). An American corporation official (see VOL. IX). In 1917 he was appointed a member of the United States section of the international high commission. He later resigned from this position.

GARY, HAMPSON (1873-). An American lawyer and diplomat, born at Tyler, Tex., and educated at the University of Virginia. In 1894 he was admitted to the bar and engaged in private practice and politics. In 1913-14 he was standing master in chancery in the United States District Court, and in the latter year became connected with the Department of State as a special war counsel. From 1917 to 1919 he was in Egypt as diplomatic agent and consul general, with the rank of minister resident. In 1919 he was in Paris with the American Commission to Negotiate Peace and in the following year was made Envoy Extraordinary and Minister Plenipotentiary to Switzerland. After 1921 he practiced law in Washington, D.C.

GASES, INERT. See CHEMISTRY.

GAS, IN WARFARE. See CHEMICAL WARFARE; STRATEGY AND TACTICS.

GAS, NATURAL. See NATURAL GAS.

GAS ENGINES. See INTERNAL COMBUSTION ENGINES.

GAS LAW. See CHEMISTRY, PHYSICAL.

GASOLINE. See PETROLEUM.

GAS TURBINE. See INTERNAL-COMBUSTION ENGINES.

GAS WORKS. See MUNICIPAL OWNERSHIP.

GAULT, ROBERT HARVEY (1875-). An American psychologist, born at Ellsworth, Ohio., Nov. 3, 1875, and educated at Cornell and Clark Universities. He has been a member of the faculty of Northwestern University since 1905. In 1911 he became the editor of *The Journal of the American Institute of Criminal Law and Criminology*. After 1914 he also edited *Criminal Science Monographs*. He was part author and editor of the report of the Chicago Council for the Investigation of Crime (1915).

GAUTIER, (CHARLES) LUCIEN (1850-). A Swiss theologian (see VOL. IX). He was president of the Pastorale Suisse (1916-17), central president of the Société Suisse des Vieux Zofingiens (1915-19), and president of the board of delegates of the South African Swiss Mission (1918-20). In 1919 he became a member of the International Committee of the Red Cross. One of his later publications was *Le Prophète Jérémie* (1916).

GAUVAIN, AUGUSTE (1861-). A French editor and publicist, born at Vesoul, and educated in law at the University of Paris and the Ecole des Sciences Politiques. After editing a professional legal journal, he became in 1908 foreign editor of the powerful and conservative *Journal des Débats*. His political articles were widely quoted on both sides of the Atlantic. During the War he was honored by the French government with the cross of the Legion of Honor; he also received honorary decorations from a number of foreign orders. A member of the Academy of Moral and Political Science, Gauvain was a prolific writer on questions of current politics. The list of his writings includes *Les Origines de la Guerre Européenne* (1915), *L'Europe avant la Guerre* (1917), *L'Affaire Grecque* (1917), *La Question Yougo-Slave* (1918), *L'Encerclement de l'Allemagne* (1919), and *L'Europe au Jour le Jour* (12 vols., six of which were crowned by the Institute). Gauvain also wrote Books I and III of the ninth volume of the *Histoire Contemporaine de France* and frequently contributed to the French periodical press.

GAYLEY, CHARLES MILLS (1858-). An American author (see VOL. IX). He was dean of the faculties (1918-20) and administrator (1919) of the University of California. Among his later works are *Shakespeare and the Founders of American Liberty* (1917) and, in collaboration, *Lyric, Epic and Allied Forms of Poetry* (1919).

GAYLORD, FRANKLIN AUGUSTUS (1856-). An American clergyman and social worker, born at Yonkers, N. Y., and educated at Yale University, Union Theological Seminary, and the Collège de France. In 1887-93, he was general secretary of the Young Men's Christian Association at Paris, France. In 1894 he was ordained to the Presbyterian ministry, and from 1895 to 1899, he held the pastorate of Trinity Congregational Church in New York City. He was in St. Petersburg as

the general secretary of the Russian Y. M. C. A. (1899-1911), and in 1911 he was made director of the Russian Society for Moral and Physical Development of Young Men. In 1916 he was secretary of the American Hospital for Wounded Russian Soldiers, and in 1918-19, secretary of the International Committee of the Y. M. C. A., which he also represented in Odessa, Russia (1919-20), and other cities. He is the author of English translations of Russian verse.

GEDDES, SIR AUCKLAND CAMPBELL (1879-). A British scientist and diplomat, educated at Edinburgh University. He was professor of anatomy at Edinburgh, Dublin, and Montreal (McGill University). He served in the South African War, and in the war of 1914-18, he was a brigadier-general in the Territorial Force. Appointed minister of national service in 1917, he showed great efficiency in utilizing the services of the whole nation in the prosecution of the War. In 1919 he was made president of the Board of Trade. In 1920 he was British ambassador at Washington. He resigned from this post in December, 1923.

GEDDES, SIR ERIC CAMPBELL (1875-). A British politician, born in India, and educated at Oxford Military College and Merchiston Castle School in Edinburgh. He first acquainted himself with railways in the United States (Baltimore and Ohio system) and later in England became manager (1906) of the Northeastern Railway Company, of which he was general manager on the outbreak of the War in 1914. After that time he was deputy and director general of munitions supply (1915-16), director general of military railways, and inspector general of transportation. The credit for the efficiency of British communication in France was attributed to him. Lloyd George, wholly ignoring the fact of Sir Eric Geddes' non-parliamentary experience, appointed him to succeed Sir Edward Carson as First Lord of the Admiralty. After the Armistice he was charged with the demobilization of many government departments, and on the formation in 1919 of a new Ministry of Transport, he left the Admiralty to preside over it. He was much criticized (1920-21) for his apparent lack of economy in the new ministry, in the contemplated government return of the railways to the original companies. In the spring of 1921 he introduced a bill for reorganizing the railways, and in the following August he was appointed by the Chancellor of the Exchequer adviser on all questions of national expenditure (August, 1921-March, 1922). Sir Eric was knighted in 1916 and in 1917 was created K.C.B. and G.B.E. In 1923 he was a member of the British War Cabinet and head of the British tire and rubber industry.

GEIKIE, SIR ARCHIBALD (1835-). A British geologist (see VOL. IX). Among his later writings are *The Birds of Shakespeare* (1916), *Annals of the Royal Society Club in the Eighteenth and Nineteenth Centuries* (1917), and *John Mitchell, M.A., F.R.S., of Queen's College, Cambridge (1724-93)* (1918).

GEIL, WILLIAM EDGAR (?-). An American explorer and author, born at Doylestown, Pa., and educated at Lafayette College. He made journeys into Western Asia, China, and Africa, penetrating as far as Mt. Douglas, to study primitive races. He lectured on his observations in Australia, Japan, China, India, Great Britain, and the United States. In 1919-

20 he explored the five sacred mountains of China. Among his works may be mentioned *The Great Wall of China* (1911) and *Adventures in the African Jungle Hunting Pygmies* (1917).

GELERT, GRETE MEISEL-HESS (1879-1922). A distinct personality among the women writers of Germany and Austria. She was born at Prague. Five years were spent at the university of Vienna in the study of philosophy, sociology, and biology; she was also a pupil of Freud. Her first works were novels, *Fanny Roth*, *Annie Bianca*, and *Die Stimme* (1907), and although they were later followed by *Die Intellektuellen* (1911), a picture of German intellectuals, and a volume of stories of the occult, *Geister* (1913), her reputation rests on her works on the sex problem, on woman, and marriage. They are *Die Sexuelle Krise* (1909), which has been translated into English; *Betrachtungen zur Frauenfrage* (1914); *Krieg und Ehe* (1916); *Das Wesen der Geschlechtlichkeit* (1916); *Die Bedeutung der Monogamie* (1917); and *Die Ehe als Erlebnis* (1919).

GELS. See PHYSICAL CHEMISTRY.

GENERAL EDUCATION BOARD. See EDUCATION IN THE UNITED STATES.

GENERAL STAFF. See ARMIES AND ARMY ORGANIZATION.

GENERATORS, ELECTRIC. See ELECTRIC POWER STATIONS AND GENERATING APPARATUS.

GENETICS. See HEREDITY.

GENOA CONFERENCE. See PEACE CONFERENCE AND TREATIES; REPARATIONS. See also RUSSIA, *History*.

GEOGNOSY. See GEOLOGY.

GEOGRAPHICAL SOCIETY, AMERICAN. A society established in 1852 for the dissemination of geographical information. From November, 1917, to December, 1918, it was the headquarters of a body of experts known as the Inquiry, which studied conditions in Europe during the War under the direction of the Department of State; later the director of the Society and some of these experts attended the Peace Conference where they served on various territorial and economic commissions. In 1919 the Society conducted a survey of the boundary between Guatemala and Honduras, at the request of the governments concerned, to be used as the basis for the recommendation of the Secretary of State of the United States for a final boundary in the disputed region. In the following year the Society inaugurated a programme of research in the geography of Hispanic America, the results of which were published in a map of Hispanic America on the scale of 1:1,000,000 accompanied by a series of explanatory monographs and articles. Plans adopted in 1921 for the foundation of a school to train men in modern methods of surveying were well advanced in 1924. The course, opened to qualified students, would require eighteen months; shorter courses would be arranged for students desiring to take them. The Society in 1921 assisted the Department of Justice in the study of the Red River Boundary in dispute between Oklahoma and Texas and in the same year sent W. L. G. Joerg on a mission to Europe for the purpose of studying the status of geography in European universities and geographical institutions.

In 1916 the *Geographical Review* (monthly 1916-1921; quarterly since 1921) superseded the *Bulletin of the American Geographical So-*

ciety as the organ of the Society. In 1916 a new series of publications in book and pamphlet form was begun; of these an average of more than one volume a year was published. The Society's library and map collection, which were considerably enlarged during the past decade, formed probably the most complete collections in America devoted exclusively to the subject of geography. In 1916 John Greenough succeeded Archer M. Huntington as president; Dr. Isaiah Bowman was director after 1915.

GEOGRAPHIC SOCIETY, NATIONAL. An organization founded in 1888 for the increase and diffusion of geographic knowledge. Probably the most important of its activities between 1914 and 1924 was its investigation of the circumstances of the eruption of Mt. Katmai in Alaska, one of the greatest in modern times. Six expeditions sent out under Dr. Robert F. Griggs discovered the huge new crater of the volcano, eight miles in circumference, nearly large enough to engulf Vesuvius, and the remarkable Valley of Ten Thousand Smokes, the greatest fumarole region known. Besides investigating and mapping the valley, the expedition mapped a hundred miles of uncharted or erroneously charted coastline and discovered a new harbor and four large lakes. Collections of incrustations, gases, and lavas were brought back and studied in the laboratory, and the processes of reforestation of the ash-devastated area were studied by botanists. Through these researches it was hoped that new light might be thrown on the composition and condition of the materials in the earth's interior and the problems of vulcanology. As a result of the Society's activities, the region about Katmai was made a national monument by presidential proclamation.

An archaeological expedition under Dr. Hiram Bingham was sent in 1914-15 to Machu Picchu, the ancient capital of the Incas, high in the Andes of Peru. The expedition unearthed a number of buried highways, towns, temples, etc., and showed that the region about the city was probably the most densely populated of the New World in pre-Columbian times. They discovered that the Incas made pottery resembling that of early Greece, performed surgical operations, built wonderful staircase forms, domesticated 80-odd species of plants, including potatoes and corn, and laid stones weighing tons with the utmost nicety. Over 12,000 photographs were taken showing Peruvian types and ruins, as well as geologic, topographic, and physiographic features of the Andes. Another expedition was sent to Chaco Canyon, N. M., to excavate Pueblo Bonito, a colossal apartment house at least 1000 years old, with 300 rooms on the first floor, and probably five stories high. Portions of the fourth story walls were still standing. Cross sections of the beams discovered there were expected to furnish much information concerning the age, history, and geographical position of the forests which supplied building materials used in the dwellings.

A biological expedition was sent to the interior of China to make a survey and especially to find a specimen of the largest nonanthropoid species of monkey known, the *rhinopithecus brelichi*, of which only one skin was extant. Other explorers, going to the Burma-Tibet frontier in search of plants, were especially successful in bringing to the United States blight-

resisting chestnuts. They also hoped to find how Indian corn was transplanted into China in pre-Columbian times, when it was known as imperial wheat. The Society participated in an expedition to the islands off the coast of Lower California, collecting marine fossils, plants, fishes, and rare forms of animal life, and in one to Labrador, which mapped a large and previously unknown area and collected biological specimens. Early in 1924, the Society dispatched an expedition to southern Mexico under the leadership of Prof. Byron Cummings to investigate and unearth the ruins of Cuicuilco beneath the Pedregal lava flow. It was believed that these excavations would disclose evidences of a civilization in America antedating that of the Pharaohs in Egypt.

The membership of the Society increased from 300,000 in 1914 to 900,000 in 1924. To fulfill its purpose of diffusing knowledge it published, besides its monthly magazine sent to all members, daily and weekly bulletins for the press, bulletins for schools and Sunday schools, and scientific monographs on the discoveries of the Katmai expeditions. The president and editor-in-chief in 1924 was Gilbert Grosvenor; vice-presidents, Henry White and John Oliver Lagorce; secretary, O. P. Austin. Headquarters were in Washington, D. C.

GEOLOGY. Progress in this science during 1914-24 was substantial, representing the efforts of many workers in the different departments rather than a few signal discoveries or researches. If anything may be described as distinctive in the general trend of studies, it was undoubtedly the emphasis on the practical phases, economic or political geology, for which the War may be held responsible. This tendency still may be discerned in the output of most public surveys, which were inclined to give less attention to subjects of theoretical interest than they formerly did and was further illustrated by the growing participation of geologists in industrial undertakings, chiefly oil and natural gas production and mining. In contrast with its stimulative influence on work in this field, the War was accountable for much that was wholly regrettable, including the suspension of cooperative effort on the preparation of a world map and other plans of international scope, as well as for the partial or complete demoralization of scientific activities in some of the European countries.

General Geology. Geognosy. The effects of radio-active energy on the cooling of the earth have been given a quantitative expression; they put a new aspect on estimates of geological time. The presence of radio-active substances in all the constituents of the crust may be regarded as definitely established by the work of Strutt and others. The heat given off in this way would appear to counter-balance almost completely the loss by conduction and radiation of the original stored heat; perhaps it exceeds such loss under certain conditions, so that the cooling process is very slow. Lord Kelvin's classic studies, made before the discovery of radium, indicated a maximum of 40,000,000 years for the age of the earth; that is, the time required for it to have cooled to its existing state, an estimate which geologists for the most part accepted, even though a more liberal figure would have accorded better with their own data. On the new basis the period of earth evolution would be lengthened to many

times that amount, and 1,000,000,000 years is regarded as not improbable. Arthur Holmes calculated from radium ratios that the oldest igneous rocks exposed at the surface, largely granites, probably originated 1,500,000,000 years ago. The fossiliferous rocks extending back to Cambrian time, which is the span of historic geology, were accumulated in a minimum of 550,000,000 and a maximum of 700,000,000 years, according to Barrell, who would assign a period of similar magnitude for the Pre-Cambrian formations.

That the earth as a whole has a high degree of rigidity comparable to steel, and is likewise extremely viscous, was deduced by Michelson from experimental observations of tidal movements in the solid rocks. The old theory of a thin envelope about a fluid body would appear untenable on a physical basis. It is probable that the interior is very hot, sufficiently so to melt any rock material under atmospheric conditions, but the pressure produces a degree of immobility approaching a solid for the body as a whole. Other indications of deep-seated conditions are found in the study of earthquake tremors, the heaviest of which are world-wide in their travels but do not pass directly through the earth in the shortest paths. They indicate a zonal structure. Oldham inferred that three concentric layers exist, of which the crust or lithosphere is the thinnest, not more than 40 miles in depth. The next layer, asthenosphere, is possibly 2000 miles thick and is rigid under stress of short duration so as to transmit vibrations from distant sources. The innermost layer, the core, is likewise very thick and seems to deflect tremors, indicative of a viscous condition rather than of a rigid solid. The temperature gradient calculated from observations made in deep shafts and borings affords a method of estimating the thickness of the crust. Daly collected data from Europe and America on which he based the conclusion that 40 kilometers (roundly 25 miles) is the most likely figure for the outer layer.

Experimentation with mineral melts analogous in composition to some of the simpler igneous rocks has provided some new information about the crystallization of these materials. One of the problems that has been given attention is the cause of variation in igneous intrusions, the process of magmatic differentiation, so-called. An original mass or magma of uniform composition may split during consolidation into several types of variant textures and mineral ingredients. Bowen would explain these effects as a result of the crystallizing process, itself a natural inherent influence in all magmas. The process may be considered as occurring in two stages, an early stage when crystal settling is the main feature, and a later stage in which pressure acts to compress the crystal mass and to squeeze out the residual liquid which is later cooled to the crystallizing point. The one or the other agency, or their combined operation, serves to explain magmatic differentiation. From theoretical considerations purely, other writers have argued in favor of the effects of liquid immiscibility, convection currents, and melting of foreign materials; and it is recognized that the subject is still open to investigation.

The structure of coral reefs, about which Darwin's theories have been generally accepted as most satisfactory, was given renewed consid-

eration by several geologists. Daly remarked certain features of atolls, for example the flat floors that characterize some of the basins enclosed by the rings of coral, which seem inconsistent with reefs built around subsiding volcanic islands. He suggested that the corals may have built upward on relatively flat platforms produced by wave cutting at a time when the sea was at a lower level than now. The water stored up in the form of ice during the Pleistocene period may have caused a lowering of tidal waters by as much as 150-300 feet, when waves could have eroded benches and platforms well below the present range of their activity. On them the corals started their operations anew as soon as the waters reached a favorable temperature.

According to Davis, the flat floors of atoll lagoons can be explained by the leveling effects of sedimentation in periods of intermittent subsidence of the islands; coral reefs also occur on many of the Pacific islands that bear no marks of a cessation of growth that would be expected if the seas had been lowered and cooled during Pleistocene time. Borings on the Funafuti atoll were interpreted by Skeats as evidencing a slow, progressive, upward growth, without any breaks in the succession of coral rock corresponding to the estimated position of a glacial platform. Most of the coral species found at depth still exist in the vicinity. The evidence from that locality supports Darwin's conclusions. In the West Indies and Florida, Vaughan found that all offshore reefs have grown on recently depressed platforms and that there are no instances of long-continued submergence of coral areas or of the development of barrier reefs from fringing reefs. The work of corals as constructional agents is not of first importance in that region; other organisms like bacteria, foraminifera, and mollusks contribute more to rock formation by abstraction of calcium carbonate from sea water.

Dynamic Geology. Isostasy has acquired rank as a working principle among most of the American geologists, apparently, who have given attention to the problem of slow crustal movements. The work of Hayford and later of Bowie, both of the United States Coast and Geodetic Survey, has given strong support to the theory. Accurate gravity determinations were assembled by Bowie from the United States, Canada, India, and other countries, representing all conditions of topographic relief, and they were found to fall in line with previous deductions. Isostasy, it may be explained, assumes that every variation of topographic relief is accompanied by a variation of density of the underlying rock column down to a uniform level, that of isostatic compensation. Thus, mountain areas are deficient in density, while oceanic depths are of relatively high rock density. Denudation of an elevated surface causes or is compensated for by a rising of the area, whereas loading of a depression is accompanied by sinking. Bowie regards the compensation as practically complete at a depth about 60 kilometers for the United States as a whole; in mountain regions the depth is greater, 95-111 kilometers. Compensation is effected by a flow of material at the mentioned depths, in accordance with the fluctuating load at the surface.

Exemplification of the broad crustal swings both up and down that seem to call for expla-

nation by the isostatic principle is to be found in the changes of level in northeastern North America during Pleistocene time. At the beginning of the ice invasion the region was higher than it has been at any subsequent period, although the exact relation of the surface with reference to sea level can be stated only in general terms. Over this surface, which was perhaps from 1000 to 5000 feet higher than now, spread a thick mantle of ice which collected first in the Labrador and Laurentian highlands and moved gradually to the south and southwest, finally covering an area of several hundred thousand square miles to an extreme depth of perhaps 5000 feet. Following the maximum ice accumulation, the land surface began to sink under the weight, the movement continuing until the ice had retreated from the southern part of the region and until a considerable area had been depressed nearly to sea-level and marine waters invaded a smaller portion of it. The general withdrawal of the ice from the whole region so lightened the crust that an adjustment by reëlevation took place. This last movement has reached a maximum, according to Fairchild, of 1000 feet in the area between the St. Lawrence River and James Bay, the measurement being based on the altitudes of marine deltas formed by streams that flowed into the sea at the time of maximum depression. The elevation increased from south to north.

The relation of folds and faults to isostatic adjustment remains an outstanding problem, about which opinion, as yet, has found little common ground. The view that they represent the effects of stored-up stresses finding sudden relief is in apparent conflict with the evidences for a relatively thin crust that responds easily to variations of load. Folds and overthrust faults represent the effort of the crust to adjust itself to a shrinking circumference. R. T. Chamberlin, in a study of the Colorado Rockies, found that the amount of shortening was 8 miles in a distance of 140 miles across the axis of the main uplift. The depth to which the rocks were affected by disturbance ranged from 13 miles minimum to 107 miles maximum. In the Coast and Sierra Nevada ranges adjustments occurred mostly by faulting, according to Willis. The faults, which are high-angle thrusts, resulted from compression that brought about rotation of the mountain blocks along the fault planes. The cause of rotation was stress, set up by erosion and sedimentation, not sufficient to involve isostatic adjustment.

Koher explained mountain-making as an effect of compressive forces, which have their source in continued contraction of the earth. Adjustments have taken place by thrusting and folding in restricted zones, whereas the larger masses or plates of continental extent have behaved as rigid units. The zones of folding may receive an excess of material so as to be overloaded, when isostasy comes into play and the zones subside, possibly to an extent that brings them into the range of sedimentation. With a heavy accumulation of sediments the isogeotherms eventually begin to rise, and the increase of temperature sets in play chemical reactions and causes expansion, thereby upsetting equilibrium, which leads to adjustment by folding or thrusting. Crustal movements, in the view of T. C. Chamberlin, have not effected widespread interchanges of land and sea. The

continents and oceans are fixed in position, although migrations of shore-line have taken place frequently and are now in progress. Examples may be found of the engulfing of crustal blocks and folds, or of the upraising of the ocean floor into land, but they are isolated. The Antillean region, by its position between the two Americas and the two great ocean basins, has been particularly unstable, as instanced by the occurrence of deep-sea deposits on Barbados and other islands.

Metamorphism as an influence in the formation of mineral deposits is a subject to which practical students of geology have devoted much attention, with some important contributions to theory. One of the more significant results has been the broader recognition of the part played by igneous rocks in producing changes. Their field of operation, it is now regarded, may extend over such areas as are comparable to those of pressure or regional metamorphism, if, in fact, they have not been responsible for effects generally assigned in the past to the latter agency. Regions in which igneous rocks do not appear at the surface may still have been under their influence, for there is every reason to suppose that many deep-seated intrusions, like granite batholiths, are buried in the sedimentary layers out of sight. The heat, gases, and mineralizing solutions emanating from such bodies in the crystallizing stages would reach over extended zones, effecting those chemical and physical changes often ascribed to regional metamorphism. For the rôle of the igneous rocks in the formation of ores and valuable mineral deposits, see *Economic Geology*.

Stratigraphic Geology. The classification of the Pre-Cambrian formations in their order of sequence constitutes one of the outstanding problems of geology, about which a great deal of discussion has centred in late years, with many solutions proposed. Practically all students of the subject agree that the old idea of a dual division into Laurentian and Huronian or Archean and Algonkian, based on the thesis that there exists an earlier group of igneous rocks, chiefly granite, on which rests the altered sedimentary Algonkian or Huronian group, does not reflect the real conditions. Actually, the succession is much more complex than that, for sediments seem to have been laid down at recurrent intervals all through the Pre-Cambrian, and there are igneous formations of several different periods of intrusion. The sequence varies, also, between one region and another, and it is doubtful if any classification can be made, adapted to meet all conditions. The tendency now is to apply such methods and terminology as corresponds best with the local features and not to attempt to correlate the formations of one area, like that of Lake Superior, for example, with the Pre-Cambrian of Great Britain or Scandinavia. For the arrangement given in the article *Geology*, in the 1915 Edition of the *NEW INTERNATIONAL ENCYCLOPEDIA*, may be substituted the following scheme, which is fairly representative of the later research in the Pre-Cambrian areas of the eastern United States and Canada. The formations are named in order of age, the oldest being at the bottom:

6. Keweenaw. Continental sediments and lavas.
5. Animikian. Marine sediments. Iron ore formations of Lake Superior.

4. Huronian. Marine and continental beds.
3. Algonian. Later Laurentian granites.
2. Sudburyan. Marine deposits.
1. Basement Complex. Includes first Laurentian granites, Grenville schists and limestones, Keewatin greenstones, and Couthiching schists. Sequence still undetermined.

The climate of past ages may be inferred, according to Schuchert, from the character of the sediments and of the fossils contained in them. Life forms have always been responsive to climatic influences, just as they are now. There is evidence of widespread glacial climates during at least four periods; two of them occur in the Pre-Cambrian and two in later periods. In the lower part of the Huronian of Canada are found slate conglomerates, which represent hardened boulder clays. In the later Pre-Cambrian, glacial conditions are indicated by the tillites of Norway and southern Australia. The Permian period contains evidences of extensive glaciation in the equatorial and south temperate zones, notably in South Africa, Brazil, India, and other countries. The Pleistocene was the last of the great glacial periods. Changes of land surface are mainly responsible for the wide variations of climate; other causes are the variable supply of heat stored in the oceans and the fluctuating content of carbon dioxide in the atmosphere.

In many parts of America the Cretaceous system shows no well-defined natural boundaries between the Jurassic system below and the Tertiary system above. It appears that no general unconformability reflecting a widespread earth movement exists at the close of the Jurassic, but sedimentation seems to have been continuous in one area or another. Thus, the Morrison formation of the Rocky Mountain region has been considered by some geologists to be of upper Jurassic age, by others lower Cretaceous, and by still others as containing members of each of the two systems. Correlation with the European Cretaceous is suggested by Osborn as the best method of settling the difficulty; he would place most value on the evidence of fossils. On the question of drawing a line between the Cretaceous and Tertiary systems, the consensus of opinion is to make the close of the Cretaceous coincident with the passing of the age of reptiles, indicated by the extinction of the great families of terrestrial dinosaurs. This view accords with the classification adopted by European geologists. As applied to the formations of the west, the plan is to draw the limits at the top of the Lance formation and to place the Puerco and Torrejon beds containing the remains of the oldest mammals in the Tertiary system.

Structural Geology. Can the varied elements of earth structure be fitted into a broad plan expressive of the origin and history of the separate features? This is the problem that underlies the more interesting or significant studies in the recent literature of structural geology, for which the notable contributions of Eduard Suess have been both incentive and guide. A later work is Kober's *Der Bau der Erde* (1921), which develops the theory that there are two fundamental units of crustal structure, great rigid plates serving as buttresses to movement and narrow elongated zones, separating the plates, of weak or labile nature. The latter serve for relief of deformative forces set up by the shrinkage of the crust; they define the position of geosynclines

and of the great mountain systems, shifted somewhat in the course of geological time. Such zones, or orogens, are frequently defined by two parallel mountain systems with folds overturned away from each other toward the adjacent rigid plates. Between the parallel systems are broad intermontane regions of little folding. A cross-section of an orogen is more or less symmetrical, although each mountain system by itself has the asymmetrical structure so well described by Suess. The Pyrenees, Alps, Carpathians, Balkans, and Caucasus make up one parallel system, and the Apennines, Dinaric Alps, the Hellenic, Taurus, and Iranian mountains make up the other, the former overthrown to the north and the latter to the south. Kober believes a similar orogen may be found in the Rocky Mountains on the one side and the Sierras and Coast ranges on the other; also in the Andes as the eastern member of a zone of which the western part has foundered and disappeared in the Pacific. The existence of westward overfolding in the Appalachians is regarded as indicative of an eastern submerged member, now a part of the continental shelf.

Detailed studies of the structure and history of the Appalachian and Rocky Mountain systems were presented before the Geological Society of America (*Bulletin*, June, 1923). Although written for the specialist, the papers contain summaries of interest to the general student.

Observations in regard to the levels of marine beaches in northeastern North America have practically demonstrated a widespread uplift of the land surface since glacial time. Fairchild found that the rise between the St. Lawrence River and James Bay amounted to as much as 1000 feet. There has been a differential warping of the surface, the elevation increasing from south to north, with an uparching into a dome south of James Bay. Raised beaches on the west coast of Greenland and in Ellesmere Land, according to Ekblaw, may be assigned to a similar uplift since the glacial period, the maximum being about 650 feet.

Economic Geology. This department felt the effects of intensive activities in nearly all its branches, mining geology, oil geology, and underground waters and engineering phases of geology. One of the economic sequels of the War was an increased public and national interest in mineral resources, and there was a general stock-taking in these possessions all over the world. The control of the undeveloped oil fields became a matter of especial concern among the larger nations, with the realization that they were certain to play a considerable part in future commercial and naval operations. The location and development of petroleum fields had become almost a distinct department of geology, with its own technic and practitioners, who had extended their operations into the remote corners of the globe.

Out of the great volume of contributions on economic subjects, a few only may be selected for mention in this review. In the group of general works may be named the *Atlas of Economic Geology* (1921), published by the United States Geological Survey. It is a study of the geographic distribution of the valuable minerals and brings out clearly the political aspects of the world's supplies. It will be noted that the United States is well endowed in most of

the basic materials like coal, iron ore, copper, lead, zinc, and oil, but still has no adequate resources of potash or nitrate and is absolutely dependent on other countries for nickel, platinum, and tin. Great Britain with its colonies and its strong commercial position in other countries controls the precious metals and in the future is likely to dominate the oil situation. *Political and Commercial Geology and the World's Mineral Resources* (1920) is a compendium of statistics and special articles on the important minerals by American writers. In the same category is a series of short monographs by various British authorities, on the mineral resources of the Empire, which have appeared from time to time.

In the list of textbooks for students, prominent place should be given to the translation of Beytschlag, Krusch, and Vogt's comprehensive treatise, of which the English version, *The Deposits of the Useful Minerals and Rocks: Their Origin, Form, and Content* (1916), was made by Truscott. Leith's *Economic Aspects of Geology* (1921) and Emmons' *General Economic Geology* (1922) also were intended for students. Grabau's *Principles of Salt Deposits* (1920) was the most important contribution of recent date on the salines; potash, soda, and magnesia salts. Lindgren's *Mineral Deposits* appeared in a second edition (1919). Works on oil geology include *American Petroleum Industry* (1916) by Bacon and Hamor, and *Practical Oil Geology* by Hager (1916). Both of these cover such technical matters as mapping, drilling, and oil production, as well as the study of the occurrence and distribution of petroleum.

The control of geological structure on the accumulation of oil-pools has been worked out so completely that it is now a well established principle, which is directing the search in all new fields. Less is known about the motive force that compels the oil in its travels underground. McCoy has sought to explain this by capillary action, on the basis that water has a greater capillary force in small openings than oil has and consequently drives the latter ahead of it into the larger openings, which are found under domes. Other geologists have sought explanation in hydrostatic pressure and in gravity; in any event it is well known that in most accumulations underground waters have an important bearing on the localization of the oil. Another direction pursued by recent investigation is the relation between the character of oil and the degree of alteration or metamorphism of the enclosing rocks. Strata that have been much altered by compression or heat have lost their oil. An indication of the possibilities in this regard may be obtained, according to David White, by estimation of the fixed carbon ratios in the shale or coal that overlies the oil horizon; if the ratio exceeds 75 per cent of the total carbon there is little likelihood of a productive pool. Formations with a relatively high fixed carbon yield oils of the lowest gravity and most commercial value. Formations with lignitic beds are characterized by the lowest grade oils of all. It would appear that as organic matter is altered into substances having progressively higher carbon, through the elimination of oxygen, nitrogen, and a portion of the carbon, the distillates in the rocks become progressively higher in hydrogen.

For the study of ore deposits the most sig-

nificant feature in the contributions of the last decade has been the general trend toward the igneous or magmatic theories of vein origin, as opposed to the explanation by meteoric (atmospheric) waters which once received wide acceptance. Although nearly all writers are agreed that the intrusive rocks have supplied the materials out of which veins were formed, there is not the same unanimity of opinion about the methods by which the minerals have been transported and finally arranged in the veins and lodes. It is recognized, however, that certain kinds of ores, magnetite, for example, may originate by direct cleavage or differentiation of the igneous rock during the crystallizing stage. These occur in their original environment.

On the other hand many deposits, like those of gold, silver, copper, lead, and zinc, are often found at some distance from any intrusion that can be regarded as source and in formations distinctly older than the deposits themselves. For such it is obvious that the ores must have been transported in fluid or molten condition out of the parent magma. The agency may have been highly heated waters and gases evolved by the intrusion in cooling, the fluids passing upward and outward from regions of high pressure to those of low pressure; this is the view commonly accepted. With the gradual cooling and relief of pressure of the mineralized solutions as they move away from their source, the dissolved substances are deposited in the reverse order of solubility, and there results a general zonal arrangement which is frequently illustrated by the change of the mineral contents of veins in passing downward from the surface or outward from the igneous mass. This is the barest outline of the prevalent theories. A more detailed presentation will be found in the textbooks on mineral deposits already enumerated, and in the recent work by Spurr, *The Ore Magmas* (1923).

GEORGE, GRACE (1880-). An American actress (see VOL. IX). She established the Playhouse Company in repertoire in 1915 and starred in *The New York Idea*. Her later starring vehicles included *Major Barbara*, *The Earth*, *Captain Brassbound's Conversion* (1915-16), *Eve's Daughter* (1917), *L'Élévation* (1917-18), *She Would and She Did* (1919), *Quick Work* (1919), *The Ruined Lady* (1920), *The New Morality* (1921), *Marie Antoinette*, *The Love*, *The Enchanted Hour*, and *All Alone Susie*.

GEORGE V (GEORGE FREDERICK ERNEST ALBERT) (1865-). King of Great Britain and Ireland and of the Dominions beyond the Seas and Emperor of India (see VOL. IX). During the War, King George set an inspiring example by cutting down his personal expenses and by contributing freely from his private purse to relief work. In 1917 he renounced all German titles.

GEORGE WASHINGTON UNIVERSITY. A coeducational nonsectarian institution at Washington, D. C., founded in 1821. The university increased its enrollment from 1347 in 1913 to 4652 in 1923-24. The faculty was increased from 234 in 1916 to 321 in 1923-24 and the productive funds from \$104,670 to \$554,052. During the decade there were four different presidents; Charles Herbert Stockton, Ph.D., was succeeded in 1918 by William Miller Collier, L.H.D., LL.D., who held office until 1921, when Howard Lincoln Hodgkins, Ph.D., became president pro tempore and was succeeded in

1923 by William Mather Lewis. A law school building was bought and equipped in 1920, three lots were bought in 1919, and a large bequest of real estate was left to the university in 1921 by Gen. Maxwell Van Zandt Woodhull. A fund for the education of Filipinos was established in 1918 by Mrs. Larz Anderson.

GEORGIA. Georgia is the twentieth State in size, covering 59,265 square miles, and the twelfth in population; capitol, Atlanta. The population increased from 2,609,121 in 1910 to 2,895,832 in 1920, a gain of 11 per cent. The white population increased from 1,431,802 to 1,689,114; Negro, from 1,176,987 to 1,206,365; native white, from 1,416,730 to 1,672,928; and foreign born, from 15,072 to 16,186. The urban population of the State showed an increase of from 538,650 to 727,859; the rural, from 2,070,471 to 2,167,973. The growth of the principal cities was as follows: Atlanta (q.v.), from 154,839 to 200,616; Savannah, from 65,064 to 83,252; Macon, from 40,665 to 52,995; and Augusta, from 41,040 to 52,548.

Agriculture. As Georgia is one of the leading cotton-producing States, the ravages of the boll weevil during the decade 1914-24 greatly affected agricultural conditions. The pest had practically covered the State by 1916. Its effect will be indicated by a comparison of acreage and production for various years during this period: in 1913, 5,318,000 acres and 2,317,000 bales; in 1917, 5,195,000 and 1,884,000; in 1919, 5,220,000 and 1,660,000; in 1921, 4,172,000 acres and 787,000 bales. In 1923 the estimated production was 700,000 bales. In the southern part of the State the yield in 1922 reached a record low mark. For the general effects of the boll weevil on agriculture during the decade see the articles **BOLL WEEVIL** and **COTTON**.

While the population of the State increased 11 per cent in the decade, the number of farms increased by 6.8 per cent (from 291,027 in 1910 to 310,732 in 1920). In 1910 the total acreage of land in farms was 26,953,413, as compared with 25,441,061 in 1920. The improved land in farms increased from 12,298,017 acres in 1910 to 13,055,209 acres in 1920. While the total percentage of land in farms declined from 71.7 per cent in 1910 to 67.7 in 1920, the percentage of improved land increased from 45.6 to 51.3. The total value of farm property in the State showed an apparent increase, from \$580,546,381 in 1910 to \$1,356,685,196 in 1920; and the average value of farm property from \$1995 to \$4366. In interpreting these values, however, and, indeed, all comparative values in the decade 1914-24, the inflation of currency in the latter part of that period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. Of the 310,732 farms in 1920, 102,123 were operated by their owners, as compared with 98,628 in 1910; 1655 by managers, as compared with 1419; 206,954 by tenants, as compared with 190,980. The white farmers in 1920 numbered 180,545, as compared with 168,468 in 1910; colored farmers, almost entirely Negroes, 130,187, compared with 122,559. Farms free from mortgage in 1920 numbered 64,061; in 1910, 78,004. Those under mortgage numbered 23,135 and 18,257 in 1920 and 1910, respectively. The number of dairy cows increased from 405,710 to 484,122; "beef cows," from 245,303 to 282,067; mules, from 294,985 to 406,351 in

1920; while sheep decreased from 153,250 to 72,173. The number of swine rose from 1,836,246 in 1910 to 2,178,914 in 1920, this increased production of pork being typical of a change to more diversified farming, with a larger production of food used in the State. The estimated production of the chief farm crops in 1923 was as follows: corn, 50,828,000 bushels; wheat, 1,739,000; oats, 9,042,000; potatoes, 1,558,000; sweet potatoes, 11,598,000; tobacco, 12,067,000 pounds; hay, 513,000 tons; and peaches, 5,716,000 bushels. Comparative figures for 1913 are: corn, 63,023,000 bushels; wheat, 1,708,000; oats, 9,240,000; potatoes, 972,000; hay, 350,000 tons; and tobacco, 1,800,000 pounds.

Mining. Georgia is not important as a mineral-producing State. It has practically no metal mining, and of the non-metals, the most important are clay products, stone, fuller's earth, and cement. There is also produced a small quantity of coal, a considerable amount of bauxite, mineral waters, iron ore, and mica. The comparative value of the clay products and other minerals in the decade 1914-24 will be seen in the following figures. In 1914: clay products, \$2,263,034; stone, \$2,238,789; coal, 166,498 tons. In 1917: clay products, \$2,426,671; stone, \$1,797,098; coal, 119,028 tons. In 1920: clay products, \$5,572,999; stone, \$3,651,415; coal, 50,156 tons. In 1922, clay products, \$4,157,601; stone, 3,349,293; coal, 60,636 tons. The total value of the mineral production in 1921 was \$8,650,003; in 1920, \$12,178,695; in 1919, \$9,429,972; in 1918, \$8,312,051; and \$5,704,856 in 1914.

Manufactures. Georgia has shown a steady increase in the value of its industrial products in the last three census periods. In 1919, 12 cities of more than 10,000 inhabitants, forming 18 per cent of the total population, reported 45.7 per cent of the value of the State's manufactured products. There were in the State in 1909, 4792 manufacturing establishments; in 1914, 4639; and in 1919, 4803. The persons engaged in manufacture numbered 118,036, 118,565, and 141,012; and the capital invested in those years amounted to \$202,777,665, \$258,325,811, and \$448,700,194, respectively. The value of the products rose from \$202,863,262 in 1909 to \$253,270,511 in 1914, and in 1919 to \$693,237,097; but this increase was in great measure due to changes in industrial conditions brought about by the War. The increase shown in the average number of wage earners, however, indicates a considerable growth in the manufacturing activity of the State. The most important industry in point of value of products is the manufacture of cotton goods, the value of which in 1909 was \$48,037,000; 1914, \$59,982,000; 1919, \$192,186,000. Cottonseed oil and cake rank second, with products valued in 1909, at \$23,641,000; 1914, \$32,715,000, and 1919, \$99,320,000. Fertilizers, in third place, amounted in 1909 to \$16,800,000; 1914, \$29,046,000, and 1919, \$47,480,000. Lumber and timber products were fourth: in 1909, \$24,632,000, 1914, \$22,115,000; and 1919, \$43,066,000. The chief manufacturing city of the State is Atlanta, where in 1909 were 483 manufacturing establishments; in 1914, 423, and in 1919, 503, with products valued at \$33,038,000, \$41,279,000, and \$113,992,000, respectively. Savannah, ranking second in industrial importance, had 135 establishments in 1909, with a product valued at \$6,540,000; in 1914, 128 with \$6,343,-

000; and in 1919, 146 with \$18,087,000. In Macon there were 79 establishments in 1909, 70 in 1914, and 135 in 1919, with products valued at \$10,052,000, \$18,867,000, and \$57,721,000 in those years.

Education. The development of education in the State in the decade 1914-24 was marked. A notable aid in this was the passage by the Legislature of 1918 of an act codifying the school laws of the State; providing for a State Superintendent of Schools, a State Board of Education, and a State Board for Vocational Education. Laws for the consolidation of schools were passed by a later Legislature. In 1920 an act was passed providing for the physical education and training of pupils; so was a compulsory school attendance law; and in the same year the provisions of the Smith-Hughes Law, giving Federal assistance to the States for vocational education, were accepted. The Legislature of 1922 conferred on several counties of the State authority to levy taxes for vocational purposes; provided for the employment and pay of county agents and home administration agents, and for the employment and payment of agricultural teachers and home economics teachers in vocational high schools. The total enrollment in the schools of the State in 1913 was 590,808; in the white schools, 360,554; and in the colored, 230,254. The total enrollment in the white schools in 1922-23 was 470,242; in the colored schools, 275,193. In that year the total number in the primary and elementary grades was: in the white schools 411,744; in the colored schools, 272,072; a total of 683,816. In the white high schools were enrolled 58,498, and in the colored high schools 3121; a total of 61,619. In 1919-20, according to the census of the Bureau of Education, there were enrolled in the elementary and kindergarten schools 645,790; in the secondary schools, 45,128. No school census had been taken in the State later than 1918. The percentage of illiteracy in the State decreased from 24.1 in 1910 to 18.4 in 1920; among the native white population, from 9.2 per cent to 6.7; among the foreign born whites, from 5.9 to 5.6; among the colored, from 43.8 to 35.8.

Finance. See STATE FINANCES.

Political and Other Events. Georgia remained strongly Democratic in politics in the decade 1914-24. Within that period there were spirited conflicts between different factions which contributed considerable political activity and excitement. In 1914, following the death of Senator Bacon, William S. West was appointed to serve out his unexpired term. The latter's death and the expiration of the term of Senator Hoke Smith in March, 1915, made it necessary to elect two senators in 1914. Senator Smith was reelected and Thomas W. Hardwick, a representative in Congress, was elected to fill the term of Senator Bacon. Nathaniel E. Harris was elected governor. Political events in 1915 were subordinated to the agitation in the case of Leo M. Frank, a manufacturer, who in 1914 was tried and convicted of the murder of a young girl in Atlanta. He was sentenced to be hanged on June 22, but an appeal was taken by his counsel to the United States Supreme Court, which refused to interfere, declining to order a writ of habeas corpus. Petitions were circulated throughout the State and other parts of the country for commutation of sentence, and hearings were held

by the State Prison Commission. This body declined to recommend the commutation of the death sentence. Disregarding this action, Governor Slaton commuted Frank's sentence to life imprisonment. For several days the governor's home was threatened by mobs. On June 26 he retired from office and was succeeded by Nathaniel E. Harris. On August 16, Frank was seized in prison by a band of men, carried to an isolated spot, and hanged. This act was denounced by the officials of the State and by Governor Harris. The Grand Jury carried on investigations, but no clew to the instigators of the deed was found. The activities of 1916 centred about the election of a governor. Hugh M. Dorsey, who had acted as prosecutor in the case of Leo M. Frank, received the nomination and was elected. In the presidential election of this year, President Wilson received 125,831 votes and Charles E. Hughes 11,225 votes. The Prohibition laws of the State were upheld by the court on Jan. 12, 1916, and on May 1 these laws went into effect, making the selling of liquor much more difficult than under the former law. On Mar. 22, 1916, a serious fire swept over a large area in Augusta and destroyed many business blocks and residences. The loss was over \$5,000,000. In 1917 an investigation of the lynching evil was carried on by a commission appointed by the governor. The report of the commission declared that the number of lynchings in the State was grossly exaggerated. On Mar. 21, 1917, a disastrous fire in Atlanta destroyed a considerable portion of the city and caused a property loss of about \$5,500,000. Elections were held in 1918 for United States senator. Senator Hardwick was defeated for renomination by William J. Harris, who was later elected. In the presidential voting of this year, James M. Cox received 107,162 votes and Warren G. Harding 42,730. In 1920 Mr. Hardwick was elected governor. He took office on June 25 and promised to "vindicate the majesty and impartiality of the law." In 1922 Governor Hardwick was defeated for the renomination by Clifford L. Walker, who was elected. On Oct. 3, 1922, Mrs. W. H. Felton was appointed United States senator to succeed Thomas E. Watson, deceased. She was the first woman to hold such a position. The appointment was purely honorary, as the election was held for senator within a few days, and Walter F. George, former judge of the State Supreme Court, was elected, defeating former Gov. Thomas W. Hardwick and two other candidates. The presidential primary elections were held in the State in March, 1924. The Democratic candidates were Senator Oscar W. Underwood and William G. McAdoo, the latter winning a majority of the votes and being thus assured of the 28 votes of Georgia in the Democratic convention. Mr. McAdoo was born in Georgia.

Legislation. The Legislature of Georgia meets biennially, in even years. In 1918 the Legislature of June 26 ratified the Federal Prohibition Amendment, authorized the codification of school laws, provided a budget system, and passed measures providing for aid to returned soldiers. Departments of warehouses and archives and history were created. In 1922 the Legislature amended the motor-vehicle law, increased the tax on gasoline to \$0.03, created a committee to consider tax measures, and

amended the school laws to provide for Bible reading in the schools.

GEORGIA, SOVIET REPUBLIC OF. One of the three Transcaucasian republics that emerged in 1917. It is made up of the former Russian governments of Tiflis and Kutais and the districts of Batum and Artuin. Its boundaries enclose an area of 25,520 square miles; its population in 1920 was put at 2,372,403. The people were largely Christians and belonged to a distinct racial group called Georgian. The existence of this racial consciousness together with remnants of a certain political solidarity, whose inspiration centred in an 18th century Georgian kingdom, made for an advanced cultural outlook. Georgians, speaking a common language and possessing a tradition, looked down on the Armenian traders of the towns and the unruly Tatar mountaineers to the north. The capital, Tiflis, had a population of 346,766 (1915). Other cities were Kutais (85,151), Sukhum (61,974), and Batum (39,000). A university with six faculties was founded at Tiflis in 1918 and in the next year had 45 professors and 1500 students.

Industry and Trade. Agriculture engaged the attention of 90 per cent of the population, most of whom were a small peasantry as a result of the partition of the large estates. Corn was the most important crop, though other grains received attention. In 1915 all these yielded 30,000,000 poods (1 pood = 36 pounds). Cotton, silk, tobacco, the vine, fruits, were other agricultural products. Because of the primitive means of tillage the agricultural possibilities of the country were scarcely touched. After the Russian Revolution the disorganized life of the country led to a great dearth of food-stuffs, so that in 1920 the estimated deficit was placed at 21,700,000 poods in Tiflis and Kutais alone. Its economic wealth, however, was established in its mineral deposits. The greatest manganese deposits in the world, producing 44 per cent of the world's supply in 1913, were to be found at Chiaturi in the basin of the Kuiril River. Production, which had been about 66,000,000 poods annually before the War, fell to 3,300,000 in 1919 but rose to 7,800,000 in 1923. Other minerals were naphtha, copper ore, coal, lead, and iron ore. It was estimated that the country had available for use in industry 4,000,000 horse power in its rivers. All the basic industries were nationalized by the Soviet régime and the following were used for purposes of exchange in foreign markets: manganese, timber, tobacco, silk, and copper. There were 970 miles of railways. A through line, extending across the country, connected Batum and Poti on the Black Sea with Baku on the Caspian Sea, by way of Tiflis. Branch lines ran to the coal mines of Tkhibuli, the manganese mines of Chiaturi, the mineral springs of Borjom, as well as to Signakh, Telavi, and the Armenian frontier. By way of Batum communication was possible with the whole Caspian country, as well as Asia Minor and Central Asia. A pipe line connecting Batum with Baku brought Europe into contact with the rich oil fields of Azerbaijan. In 1919 steamers opened regular service between Batum and Marseilles, British ports, Italian ports, and New York.

History. After the Russian Revolution, representatives of the three Transcaucasian states gathered at Tiflis, Georgia, and there on

Sept. 20, 1917, founded the federal republic of Transcaucasia. It was inevitable, however, that the three states should go their separate ways. Georgia's attempt to rule the destinies of the new state, Azerbaijan's essentially Islamic outlook, and Erivan's territorial ambitions, were the rocks on which the federal republic foundered. On May 26, 1918, with the Bolsheviks in Baku and the Turks in Batum, as a result of the Brest-Litovsk Treaty, the federal republic was dissolved. On the same day the Georgian National Council proclaimed the independence of Georgia. Thenceforth, to the conclusion of the War, Georgia, because of a compact made with Germany, remained a dependency of the Central Powers, with its ports, mines, and railways in the possession of German and Turkish forces. By the armistice of October 30 the country was cleared of German and Turkish troops, only to find itself policed by British. A British force entered Batum in December, and for presumably strategic reasons, seized the railways of the country. Control was not relinquished, and evacuation did not come until the summer of 1920.

From 1920 until 1922 affairs never remained peaceful for long. In 1919 Georgians had been menaced by General Denikin's forces; but with the passing of this peril, in the spring of 1920, a Russian Soviet army pushed its way into Transcaucasia. Baku fell and Tiflis must have yielded too, had it not been for the distraction which the opening of the Polish campaign afforded. Russia for the time granted Georgia peace, even promising the Batum region despite the claims of the Turkish Nationalists. But the necessity for a Turco-Russian understanding with respect to a common frontier again made the region the scene of military operations late in 1920. The Turks invaded Erivan and with much bloodshed subdued the population. The Bolsheviks, following soon after, overthrew the republican government and established a Soviet republic. The procedure in Georgia was very much the same. A Turkish army entered the country and occupied Batum against practically no resistance, while Russian troops invaded from the opposite direction and fostered Bolshevik uprisings in the towns. On Jan. 27, 1921, Georgia received belated *de jure* recognition from the Allies. In the course of a few months, however, the Constituent Assembly was dispersed, the Social Democratic government headed by Jordiana was in flight; and supported by Russian arms, a Soviet government, established by Mdvani in March, ruled the country. Batum was restored to Georgia by a Russo-Turkish treaty in March, 1921. In December, 1921, the young republic was incorporated with the Armenian and Azerbaijan Soviet republics into a Transcaucasian federation, with its capital at Tiflis, with Tiflis taking orders from Moscow. Thus by the end of 1921, Russia again dominated the political and economic life of her old Transcaucasian governments. This state of affairs received full legal sanction in the treaty of Dec. 30, 1922, which was signed by Russia, the Ukraine, the three Transcaucasian Soviet republics, Bokhara and Khiva, and which set up the Union of Socialist Soviet Republics. With the treaty's promulgation, Georgia's history as an independent political state ended. See AZERBAIJAN, ARMENIA, RUSSIA.

GEORGIA, UNIVERSITY OF. A State institu-

tion at Athens, Ga., founded in 1785. The student enrollment increased from 632 in 1914 to 1618 in 1923-24. The endowment in 1923 was \$435,000, and the income was \$85,000 from State appropriations and \$175,000 from other sources. During the 10-year period about \$400,000 was spent on the erection of new buildings. The alumni subscribed over \$1,000,000 for endowment and the building programme. Memorial Hall, erected in memory of those alumni who fell and those who served in the War, was being completed in 1924 at a cost of \$275,000. Chancellor, David C. Barrow, LL.D.

GEORGIA SCHOOL OF TECHNOLOGY.

An institution for scientific and technical education, founded in 1888 at Atlanta, Ga. It forms a part of the University of Georgia. The enrollment of the school increased from 1002 in 1914 to 1865 in the year 1923-24, the faculty from 62 to 138 members, and the library from 13,000 to 17,000 volumes. A power station and engineering laboratory, and an addition to the mechanical engineering building were built in 1920, the building for the departments of physics and architecture was completed in 1923, and plans were approved for a building for the School of Ceramics. A campaign for the improvement of the plant netted over \$1,000,000 in 1922. Marion Luther Brittain, LL.D., succeeded K. G. Matheson, LL.D., as president in 1922.

GÉRALDY, PAUL (1870-). A French playwright, best known in America for two works. *Aimer* was produced in New York with Grace George in 1922, under the title *To Love*. *The Nest*, adapted by Miss George from his *Noces d'Argent*, was played in New York in 1922. He has written much for periodicals, including *Vanity Fair*.

GERARD, JAMES WATSON (1867-). An American lawyer and diplomat (see Vol. IX). In 1917, on the declaration of war by the United States, he was recalled from his post of minister at Berlin and took up the practice of law in New York City. He published *My Four Years in Germany* (1917) and *Face to Face with Kaiserism* (1918).

GERMAN EAST AFRICA. The largest and most important former colonial possession of Germany. It had an area of 384,170 square miles and a population in 1913 of 7,659,898 natives and about 15,000 non-Europeans. Europeans, chiefly Germans, numbered 5336. Slavery had existed, but in 1914 the Reichstag moved for its abolition. The chief exports were rubber, copra, ivory, vegetable fibre, and coffee and by 1910 were valued at £1,040,269, and in 1913, £1,777,552. The chief imports were provisions, textiles, hardware, and iron and by 1910 were valued at £1,932,938, and in 1913, £2,667,925. More than half of the trade was with Germany and was carried almost completely in German bottoms. Trade passed through the ports of Dar-es-Salaam, Bagamoyo, Pangani, Kilwa, Lindi, Mikindani, and Tanga, and over the Usumbara Railway (219 miles) and the Tanganyika railway (787 miles). The last budget framed by the German government (1914) called for expenditures of £1,188,500 and revenues of £825,500. Up to 1917, the German administration continued unhampered and in spite of being cut off from foreign aid maintained its position with comfort until the British and Belgian advances finally compelled it to flee (November, 1917). (See WAR IN EU-

ROPE, *Colonies*.) Governments were set up by Belgium and Great Britain in the territories occupied by their troops, but in May, 1919, the whole of German East Africa was turned over to Great Britain as a mandate territory. By agreement with Belgium (September, 1919) the provinces of Urundi and Ruanda in the northwest were ceded under mandate to the Belgian Congo. In January, 1920, the territory was renamed Tanganyika Territory (q.v.).

GERMAN LITERATURE. German literature in the eventful decade 1914-24 offers valuable material to the student of national psychology. Love of the fatherland, right or wrong, had been so assiduously fostered in German homes and so methodically drilled into the people in barracks and universities, that it reached something like an ideal culmination a year before the outbreak of the War, when the centenary of the so-called Wars of Liberation was celebrated all over the country and commemorated in lyrics, drama, and fiction. It was but a short step from the prevalent sentiment and sentimentality of that year to the emotional frenzy of 1914. In some works which appeared during the first half of the year a trend of thought appears which in the light of the following summer could be called prophetic, did not documentary evidence prove that the people expected and approved the government's plan to expand and enrich the fatherland at the expense of its neighbors. Such a work was the drama *Kriegein Tedeum* by Carl Hauptmann, the brother of the more famous Gerhart. His poet's eye saw visions of what might be: in an indefinitely localized milieu a plot of diplomatic intrigue and domestic conflict, followed by mobilization, and ending in the horrible wreckage of war. Some works still echoed the festive patriotic notes of the centenary, as Walter Blöm's *Geschichte eines Jungen Freiheitshelden* and Franz Adam Beyerlein's *Das Jahr des Erwachens*. But with the declaration of war the glorious past gradually gave way to what was considered a glorious present. A flood of war poetry poured forth, some of it contained in the anthology *Der Heilige Krieg*, which among other violently patriotic outbursts gave wide circulation to Ernst Lissauer's "Hymn of Hate."

The spirit of the people was more or less truthfully reflected in the literature of this time of turmoil. But it should be remembered that a busy and rigid censorship promptly suppressed every voice of protest against the violation of international law and other iniquities of the government. Only very keen observers and students of German literature were aware of the existence of such a publication as *Forum*, founded by Wilhelm Herzog, to which the gifted Heinrich Mann contributed, but which was quickly confiscated. Fritz von Unruh's drama, *Das Geschlecht*, also disappeared from the boards. It is to be regretted that the works of Heinrich Mann, a far more original writer than his brother Thomas, and those of von Unruh, both men who have long ranked high in contemporary German letters, are unknown in America. The dramatic output of the year was unimportant. With the exception of the play by von Unruh, which profoundly stirred its audiences, and Paul Ernst's *Manfred und Beatrice*, which appeared in book form and was warmly received, no really noteworthy dramatic event was recorded. In fiction the vet-

eran Adam Müller Guttenbrunn revived memories of the German-Czech conflict in Bohemia in *Deutscher Kampf*. E. von Keyserling in *Abendliche Häuser* gave us a new story of the effete aristocracy, and Carl Hauptmann's *Schicksale* dealt with his favorite types of complex psychology. The most noteworthy poetical products rising above the voluminous war poetry were Stefan Georg's *Der Stern des Bundes* and Anton Wildgans's *Vae Victis*. Richard Meyer published his *Weltliteratur im Zwangstigsten Jahrhundert*. Ricarda Huch's *Der Dreissigjährige Krieg* and Dr. Hermann Onckens's *Historisch-Politische Aufsätze* were the outstanding additions to history. Nietzsche was the subject of Otto Ernst's *Der Falsche Prophet*, Fritz Lienhard's *Parsifal und Zarathustra* and Elisabeth Förster-Nietzsche's tribute to her brother, *Der Einsame Nietzsche*.

The second year saw no decrease of literary activity. A pathetic example of the nationalistic frenzy which swept off their feet intellectuals, and so-called lower classes as well, was Carl Hauptmann, who in *Aus dem Grossen Kriege* had the bad taste to make the ruins of a Belgian cathedral the scene of one of these one-act plays. Emil Ludwig's *Kronprinz Friedrich* was a drama dealing with Frederick the Great's tragic youth. The most popular play was Schönherr's *Weibsteufel*, which subsequently found its way to America. In the unabated flood of war lyrics only the proletarian poet of Vienna, Alfons Petzold, sounded a broadly human note. But the year saw the début of one who has since risen to the foremost rank, Franz Werfel, who published his *Einander*. Fiction was represented by Wolzogen, Bartsch, Geissler, Lucka, Felix Salten, and others, among them Carl Bleibtreu, who from his safe retreat in Switzerland sent out his *Bismarck*, with the bombastic subtitle, "A World-Novel." The most important purely literary work was Erwin Rohde's *Der Griechische Roman und Seine Vorläufer*. Valuable additions to biography were Ricarda Huch's *Wallenstein* and Wilhelm Bode's *Stunden mit Goethe*. Prompted by the spirit of the time, Thomas Mann wrote his *Friedrich und die Grosse Koalition*, Jacob Wassermann his *Deutsche Charaktere und Begebenheiten*, and Hans von Helmolt began his history, *Der Weltkrieg*. Houston Stewart Chamberlain and Hans von Wolzogen also took up their pens in defense of the Hohenzollern policy. A voice in this wilderness was that of Annette Kolb, a German-French writer, who in her essays *Wege und Umwege* arraigned the German press for sowing hatred among the nations. The anonymously published protest *J'accuse* was confiscated, and Hermann Fernau's *Gerade weil Ich ein Deutscher Bin* had a similar fate.

As the great slaughter continued in the following year with no end in sight, literary production in Germany showed a slight decrease. In drama, concessions to the spirit of the time could be seen in Sudermann's *Die Entgötterte Welt*, Schönherr's *Volk in Not*, and Wedekind's *Bismarck*. In fiction one novelist, Eduard Stillebauer, won the distinction of having his war story, *Inferno*, confiscated. Helene Böhlau wrote a charming story of the Goethe period, *Der Gewürzige Hund*, Gabriele Reuter *Das Neue Land*, Georg Hermann another story of old Berlin, Heinrich Schoen, Jr., Gustav Meyrink *Der Golem*, which was later seen in America on the screen, and Max Brod a story of Kepler's time,

Tycho Brahes Weg zu Gott. The lyrical war madness continued, but in an anthology of that year, entitled *Vom Jüngsten Tage* and containing contributions from the youngest generation, a new spirit struggled for expression, and a new personal note was struck by Franz Werfel. Critics and historians seemed to have lost some of the vaunted German *Sachlichkeit* and objectivity, for Dr. Ernst Elster's *Deutschtum und Dichtung* and Dr. Rudolf Eucken's *Die Träger des Deutschen Idealismus* can hardly be ranked among valuable contributions to criticism. The most interesting work in that line was Dr. Heinrich Nohl's *Typische Kunststile in Dichtung und Musik*. Valuable for history of the drama were Ernst Possart's *Erstrebtes und Erlebtes* and Dr. Heinrich Stümcke's *Vor der Rampe*. Noteworthy essays were Alexander von Gleichen *Russwurm's Der Narrenturm*, Heinrich Lhotzky's *Vom Heiligen Lachen*, and Emil Lucka's *Grenzen der Seele*. The aged Ernst Haeckel contributed to war literature *Weltkriegsgedanken über Leben und Tod*, and the erratic Polish author Stanislaus Przybyszewski, once identified with the Young Germany of the 1880's, showed his peculiar attitude in *Polen und der Heilige Krieg*.

Thus literature moved on until the year when America's entrance into the War was to turn the tide. The spirit of minority of German and Austrian authors manifested itself in the founding of *Neues Vaterland*, a publication which was to continue the policy of the suppressed *Forum*. Among its contributors were Dr. Rudolf Goldscheid; the Viennese economist, Walter Schücking, and Kurt Eisner; its pamphlets were widely circulated in Switzerland and wherever the German censor could not interfere. Dr. Alfred Fried, the pacifist, published his *Kampf um die Vermeidung des Weltkrieges* and Annette Kolb her *Briefe einer Deutschfranzösin*; Hermann Fernau continued his brave protest against modern German tendencies. The greatest dramatic success of the year, after the suppression of von Unruh's *Das Geschlecht*, was Stefan Zweig's *Jeremias*. Two younger playwrights, Walter Hasenclever and Georg Kaiser, came into prominence. The fiction output was meagre. But Karin Michaelis, the Danish-German writer, published a thrilling story of the wanderings of homeless Polish war victims, *Opfer*. The poets who had most vociferously joined in the war cry before seemed now to have lost their voice. Only Max Pulver's epic *Merlin*, Walter Hasenclever's *Tod und Auferstehung*, and Bruno Frank's *Requiem* deserve mention. Literature, criticism, and history fared no better. It is noteworthy that Wahle in the *Goethe Jahrbuch* called attention to Goethe's French sympathies. Ricarda Huch published a study of *Jeremias Gotthelf*, the village novelist. Dr. Adolf Stern's seventh volume of his *Geschichte Europas* appeared, covering the period from 1848 to 1870. Thomas Mann, true to his Prussian sympathies, wrote a new biography of Frederick the Great.

The year of the Armistice saw literary production at its lowest ebb, but it witnessed the publication of such works as Hermann Fernau's *Wie Deutsche Geschichtsschreiber einst Urteilen Werden*, Dr. Wilhelm Mühlons *Die Verheerung Europas*, and Prof. G. F. Nicolai's *Biologie des Krieges*, which did much to open the eyes of thinking people. No great première was recorded on the German stage. The older gen-

eration was represented by Arthur Schnitzler's *Die Schwestern*, founded on an episode in the life of Casanova, and Carl Hauptmann's trilogy, *Die Goldenen Strassen*. Of the younger men, Georg Kaiser scored a success with *Von Morgen bis Mitternacht*, a play in the popular "kino" style, which was given by the Theatre Guild in New York; a performance of Paul Ernst's *Manfred und Beatrice* confirmed his claim to a place among leading German dramatists of the day. The outstanding works of fiction were Gerhart Hauptmann's *Merlin*, E. von Keyserling's volume of stories, *Im stillen Winkel*, and novels by the Swiss writers Ernst Zahn and J. C. Heer. Little poetry deserved mention except Wilhelm Schmiddtbonn's *Der Wunderbaum* and Emanuel von Bodmann's *Schicksal und Seele*. A collection of the critical writings of Paul Schlenker was the most important publication of its kind. Among the biographies and memoirs were Dr. Karl Lamprecht's *Kindheitserinnerungen*; among the volumes of correspondence, La Mara's *Letters of Liszt*; and among historical works Dr. Alfred Friedjung's *Auf dem Wege zum Weltkrieg*. War literature, decreasing in volume, was represented only by Eberhard Bucher's *Kriegsdokumente*.

After the Armistice a change of spirit might have been expected. Those who held optimistic views on the subject were disappointed. Self-righteous pride in what Germany had shown the world, although it did not attain the goal of its ambition, became the keynote of an avalanche of war books. Count Czernin's *Im Weltkrieg* opened the procession. But men like Walter Rathenau were beginning to be heard; his little books, *Nach der Flut*, *Der Kaiser*, and *Der Neue Staat*, reflected a saner spirit. Dr. Kurt Mühsam published a book with the significant title, *Wie Wir Belogen Wurden*. Otherwise the fall of the old régime failed to show any immediate effect. The most important dramatic event of the year was Richard Beer Hofmann's *Jakobs Traum*. Sudermann's *Das Höhere Leben* added one more to his many recent failures. Schönherr's *Königreich* appeared in a new revised and improved edition. Wedekind's *Felix und Galathea* and Elins *Erweckung*, and Stefan Zweig's *Legende des Lebens* made no deep impression. The fiction of the year showed the authors' sudden interest in their neighbors, as in Sudermann's *Lithauische Geschichten*. Lienhard's *Westmark*, Skowronnek's *Das Schleichende Gift*, Soyka's *Der Entfesselte Mensch*, and others. Schnitzler wrote another Casanova story, *Casanovas Heimfahrt*; Frenssen wrote *Die Brüder*; Gabriele Reuter, *Die Jugend einer Idealistin*; and Heinrich Mann, *Professor Unrat*. Noteworthy poetical productions were Christian Morgenstern's *Stufen*, Schaukal's *Vernen*, Lissauer's *Die Ewigen Pfingsten*, and Walter Heymann's posthumous, *Fahrt und Flug*. A work showing the German love of research was Max Scherrer's *Kampf und Krieg im Deutschen Drama von Gottsched bis Kleist*. War memories were perpetuated in Richard Dehmel's *Kriegstagebuch* and Georg Herrmann's *Randbemerkungen, 1914-17*. The last work of the beloved Austrian, Peter Altenberg, bore the title *Mein Lebensabend*. A history of the Russian Revolution was published by that keen observer, Allons Paquet. Grete Meisel-Hess concluded her thoroughgoing studies of the sex problem in a two-volume work, *Das Wesen der Geschlechtlichkeit*.

The year 1920 brought more explanations. Hans von Helmolt brought out *Ein Vierteljahrhundert Weltgeschichte, 1894-1919*, and when the socialist Karl Kautsky gained access to the government archives and published some incriminating documents relating to the War, he attempted to discredit the evidence in *Kautsky der Historiker*. Literary production assumed almost pre-war proportions, but a change of spirit had not taken place. Works voicing disapproval of the course pursued in the past or striking a note different from the prevalent self-righteous patriotism, were still rare exceptions. Among the few such can be noted Bernhard Kellermann's story of Armistice Day, *Der Neunte November*, and the gruesome picture of ruin and wreckage in Bolshevik Russia, *Ararat*, by Arnold Ullitz. Heinrich Mann's *Der Ehrgeizige* can be classed with this minority. The remaining works of fiction deserving of notice are Carl Hauptmann's *Der Mörder und die Lilienweisse Stute*; Bruno Wille's *Glasberg*, a story of his youth; Johannes Schlaf's *Miele*, Jakob Wassermann's *Der Wendepunkt*, and Clara Viebig's *Das Rote Meer*. In drama Fritz von Unruh created a sensation with the second work of his trilogy *Platz*, and Heinrich Mann with *Der Weg zur Macht*. The new plays by Gerhart Hauptmann, *Der Weisse Heiland* and *Hirtentied* which was written long ago, hardly added to his fame. Carl Hauptmann's love of far-fetched titles was evident in his new work *Gaukler, Tod und Juwelier*.

In the poetry of the year Franz Werfel appeared with *Der Gerichtshof*, and an almost forgotten poet of the previous generation, Hugo Salus, with *Das Neue Buch*. Julius Bab compiled two anthologies *Die Deutsch Revolutionslyrik* and *Der Deutsche Krieg im Gedicht*. Literature and criticism were represented by Emil Ludwig's volume on *Goethe*, Etta Federn's *Hebbel*, and Dr. Heinrich Mayne's *Fontane*. Among biographies and memoirs, the most important was Hermann Oncken's *Ferdinand Lassalle*. Gustav Frenssen's *Grübeleien* belongs to books of personal reflections and impressions. Collections of folktales of South American Indians, the Caucasus, Russia, and other countries, were numerous during this year, and a few books of travel also rose to literary importance, among them Bernhard Kellermann's *Ein Spaziergang in Japan* and Stefan Zweig's *Fahrten, Landschaften, und Städte*. Books of a certain ethical import were Hermann Hesse's *Zarathustras Wiederkehr, ein Wort an die Deutsche Jugend* and Wilhelm Uhde's singularly interesting work, *Die Freude*, containing lessons for a new reading of life in quotations from Schiller to Paul Claudel and illustrations from Beltraccio to Picasso. Jakob Schaffner's *Erlösung vom Klassenkampf* gives voice to the old socialist creed. Fritz Mauthner's *Der Atheismus und Seine Geschichte im Abendlande* is an erudite work but hardly of wide appeal.

The literature of the last three years of this decade returned to pre-war quantity and quality. The writers who had learned a lesson from the terrible calamity brought on the world by the lust for power were still few in number, and their voices were little heeded. No new note was struck in fiction. As the group once identified with what was known as the literary revolution of the 1880's reached middle age, their work differs little in spirit and form from the literature of the older generation which

they were fighting 40 years ago. One of the surviving veterans of that older generation, Adam Müller Guttenbrunn, has written a story about Lenau, *Dämonische Jahre*. But of that Young Germany of the 1880's, only a few are producing works of striking individuality. The latest products of that group are Carl Hauptmann's *Drei Frauen*, Bruno Wille's *Hölderlin und Seine Heimliche Maid*, Jakob Wassermann's *Der Wendekreis*, and Johannes Schlaf's *Wandlungen*. Gustav Meyrink's new mystery story, *Der Weisse Dominikaner*, bids fair to rival *Der Golem*. Idolde Kurz has published a new volume of short stories, *Legenden*. Franz Werfel entered the field of fiction with *Der Spielhof*.

The poetical output of these three years was negligible in quality, even if such names appeared on the record as Arno Holz, the author of *Die Blechschmiede*, Gerhart Hauptmann with his epic *Anna*, and Cäsar Flaischlen with a volume called *In Schloss der Zeit*. Only Stefan Georg's *Drei Gesänge* maintains the high standard of his somewhat precious style. Essays and criticism began to flourish as before. A history of Polish literature by A. Bruckner deserves mention. Goethe and Shakespeare were continually made subjects of research and comment. Eichendorf, Keller, Lenau, and others were also much interpreted. Interesting memoirs came from Carl Ludwig Schleich, Rudolf Eucken, and Gabriele Reuter. A work which attracted special attention was a posthumous volume, *Aus den Nachgelassenen Schriften eines Frühvollendeten*, by Otto Braun, who fell early in the War and is looked on as something of a literary prodigy by German critics. Eduard Fuchs has added to his books on caricature *Die Juden in der Karrikatur*. Among the many volumes on contemporary history, both the ex-Kaiser's *Gestalten und Ereignisse* and the ex-Crown Prince's *Erinnerungen* received more publicity than they merited. The same can be said of the explanatory volumes by von Tiritz, von Ludendorff, von Moltke, and others, which were supplemented by innumerable booklets and pamphlets of a more or less incendiary and provocative character, describing the future destruction of France, the next war, etc. To this category belongs also the booklet by Hermann Scheffauer, a German-American who took up his residence in Berlin during the War and wrote *Blood Money: Woodrow Wilson and the Nobel Prize*.

In drama alone, German literature of the last three years of the decade shows some signs of a revival. The older generation had no share in it. Gerhart Hauptmann treats an Aztec subject in his *Indipohdi*; in his *Peter Brauer* he returns to his former manner. Schönherr, becoming almost too prolific, followed his gruesome *Kindertragödie*, which scored a deserved failure in New York, with two plays in lighter vein, *Vivat Academie* and *Maientanz*. Wedekind's posthumous *Die Junge Welt* and Fulda's *Des Esels Schatten* failed to make any profound impression. Anton Wildgans began a trilogy in his *Cain*, to be followed by *Moses* and *Christus*. Trilogies being in order, Sudermann, too, was presenting one under the title of *Das Deutsche Schicksal*. But not one of these writers seems to have been deeply enough stirred by the great cataclysm to have conceived new ideas about the world and mankind or to have seen the problems of life in a new light. This was reserved for three men who only during these turbulent years came to the fore: Fritz

von Unruh, Franz Werfel, and Ernst Toller. Of the older generation, only the Austrian Karl Kraus, who spent his life in fighting the corruption of the Viennese press, dared to expose the dastardly policies of the Central Empires in a tragedy called *Die Letzten Tage der Menschheit*.

Fritz von Unruh had made his début about 1910 with a play called *Offiziere*, which was followed by *Prinz Louis Ferdinand*, and the novel *Opfergang*. *Stürme*, a play of his youth, was rewritten. Then followed his trilogy consisting of *Das Geschlecht*, *Platz*, and *Dietric*, the prologue of which, *Rosengarten*, is a most remarkable piece of writing and proved dramatically effective. The works of von Unruh, with their philosophical outlook and broadly human sympathies, found warm admirers among French critics. Franz Werfel, too, proved at the very outset of the War that his vision was not to be dimmed. His early verse and fiction were overshadowed by the originality and power of his dramas, *Spiegelmensch* and *Bocksgesang*. The latest of these remarkable newcomers is Ernst Toller, a young idealist whose participation in the communist uprising in Munich sent him to prison. He at first saw man collectively, as in that stupendous drama *Masse Mensch*, and also in the *Maschinenstürmer*. His next work was *Der Entfesselte Wotan*, but his latest, *Hinkemann*, proves that he does not lack the gift to limn an individual's tragic fate. The plays of these three men, as also the latest lyrical product of Franz Werfel, *Schwalbenbuch*, make them the protagonists of a new spirit in Germany.

GERMAN NEW GUINEA. A former territory of the German Empire in the western Pacific. It fell to Australian troops on Sept. 12, 1914. The Treaty of Versailles partitioned the islands of the territory as follows: those north of the equator, the Caroline, Marshall, Pelew, and Ladrone Islands, with the exception of Guam, to Japan under mandate; those south of the equator, the Bismarck Archipelago, the German Solomon Islands, and Kaiser Wilhelmsland (on New Guinea), to Australia; and German Samoa to New Zealand. See PACIFIC OCEAN ISLANDS and NEW GUINEA.

GERMAN REFORMED CHURCH. See PRESBYTERIAN CHURCHES.

GERMAN SOUTHWEST AFRICA. Formerly the oldest German colony in Africa, but since 1920 a British mandate territory, administered under the name of the Southwest Africa Protectorate, by the Union of South Africa. It had an area of 322,400 square miles, and in 1913, a native population of about 200,000. Whites, mostly Germans, numbered 14,816. The colony was of particular value to Germany because of the ease with which white colonists could be acclimated. Cattle raising, gold, diamond, and copper mining were the leading activities; the exports in 1912 were valued at \$7,734,762. The imports, made up of foodstuffs, iron and iron products, textiles, etc., were worth \$9,290,330. Trade was exclusively with Germany, the port of Swakopmund being its chief centre. Internal routes of communication were over the Otavi Railway (417 miles), Swakopmund-Windhoek Railway (237 miles), Northern Railway (314 miles), and Southern Railway (339 miles). For administrative purposes, the budget of 1913 balanced at \$7,804,258, of which a little less than half, or \$3,481,-

226, had to be furnished as an imperial subvention. Under General Botha, leader of the Union of South Africa forces, the German administration was compelled to flee the country, so that by July, 1915, the British occupation was complete. Germany renounced her sovereignty in the Treaty of Versailles with the result that in May, 1919, the Supreme Council assigned the territory under a mandate to the Union. On Dec. 17, 1920, the League Council approved the transfer. See WAR IN EUROPE, *Colonies*, and SOUTHWEST AFRICA PROTECTORATE.

GERMAN WEST HUNGARY. See BURGENDLAND.

GERMANY. A federal republic organized under the constitution of Aug. 11, 1919, embracing territory in Central Europe between France, Belgium, and Holland on the west, and Poland on the east. The Treaty of Versailles redefined Germany's territorial limits and assigned the provinces of Alsace and Lorraine (q.v.) to France, a small district comprising the towns of Eupen and Malmédy (q.v.) to Belgium, North Schleswig (q.v.) to Denmark, and a large block of territory to Poland (q.v.), including parts of East and West Prussia which were made into the Danzig corridor (q.v.), and some parts of the territory of Upper Silesia (q.v.), which were ceded to Poland in accordance with the decisions of a committee appointed by the League of Nations after a plebiscite held in the district in 1922. The Saar Basin (q.v.) was handed over to the administration of a commission appointed by the League of Nations, and a plebiscite to be held at the end of 15 years was provided for to decide the sovereignty of the territory. According to the figures of the census of 1910, the area and population of Germany were:

	Area in sq. km.	Number of inhabitants per sq. km.	Inhabi- tants per sq. km.
German pre-war area	542,622	64,925,993	120
Ceded territory	70,588	6,476,200	92

The estimated total of the population of Germany on July 1, 1914, was 67,790,000. The census of Oct. 8, 1919, on the basis of territory as of Jan. 1, 1923, showed:

	Area in sq. km.	Number of inhabitants per sq. km.	Inhabi- tants per sq. km.
German present area	472,034	59,852,682	127
Occupied territories only	36,674	10,710,166	292

The estimated total of the population of Germany on Jan. 1, 1923, was 62,281,000.

Overseas emigration from Germany via German and foreign ports was as follows: 1913, 25,843; 1920, 8548; 1921, 23,451; 1922, 36,527; 1923 (11 months only), 101,320. In pre-war years the rapid industrial expansion tended to prevent the large emigration which had characterized the early part of the nineteenth century. Figures for the year 1923 would seem to indicate a revival of emigration from Germany. This was of particular significance as an indication of living conditions within the country. According to the occupation census of 1907, the total number of wage earners was 30,232,000, of whom 27,274,000 were in the post-war territory. This included all persons engaged in any kind of occupation and those liv-

ing on their own means, such as pensioners, pupils, institutional inmates, etc. The number of workers in agriculture and forestry for the post-war territory of Germany was 8,554,000; in mining and industry, 10,451,000; in trade and transportation, 3,229,000; in personal services, 431,000; in government employ, 1,511,000. The number of workers of 1924 in agriculture and forestry was about identical with that of 1907; that in mining and industry increased by about 20 per cent, and in trade and transportation by 20 per cent. A decrease took place in the number of government employees through the abolition of compulsory military service, thus decreasing the army from 800,000 to 100,000 men. The total number of persons occupied in Germany was, in 1924, about 33,000,000, of whom 16,000,000 were workmen.

Agriculture. The total area in 1914 was 54,109,836 hectares. The area of the ceded territories amounted to 7,021,287 hectares, leaving a post-war area of 47,088,549. The 1924 area, inclusive of the Saar Basin, was divided as follows: arable soil, 21,589,043 hectares; horticultural land, 478,586; grass land, 5,358,734; pasture, 2,288,984; fruit orchards, 48,885; vineyards, 70,187. The entire arable land available for agricultural purposes was thus 29,854,419 hectares. Forests amounted to 12,699,875 hectares, and barren area used neither for agriculture nor forestry, to 4,534,255 hectares. The following indicates crops before and after the War (area of cultivated soil in hectares):

Crop	1923 Area in	1923 Area in	Per cent Increase or Decrease
Wheat	1,974,098	1,478,417	-11.8
Spelt	272,498	128,471	-52.8
Rye	6,414,143	4,366,481	-17.0
Spring barley	1,654,020	1,193,350	-13.6
Oats	4,438,209	3,344,705	-14.8
Potatoes	3,412,201	2,726,859	-2.7
Sugar beets	569,082	383,557	-17.8
Fodder beets		756,559	....
Fodder grass	8,162,055	7,673,467	-6.7

Crops in Tons			
Wheat	4,655,956	2,896,814	-28.4
Spelt	438,469	159,270	-63.6
Rye	12,222,394	6,681,622	-34.1
Total bread grains	17,316,819	9,737,706	-33.4
Spring barley	3,673,254	2,126,846	-30.0
Oats	9,713,965	6,106,778	-29.1
Potatoes	54,121,146	32,580,553	-26.0
Sugar beets	16,918,782	8,695,722	-37.8
Fodder beets		21,964,014	....
Hay	42,029,032	34,517,991	-6.4

Crops in Tons per Hectare			
Autumn wheat	2.35	1.97	-18.3
Spring wheat	2.39	1.90	-20.8
Spelt	1.61	1.24	-23.0
Autumn rye	1.92	1.54	-20.6
Spring rye	1.34	1.18	-12.6
Spring barley	2.22	1.78	-19.1
Oats	2.19	1.83	-16.8
Potatoes	15.86	11.95	-23.9
Sugar beets	29.73	22.67	-24.4
Hay	5.15	4.50	-12.3

The following indicates live stock before and after the War:

Animals	Dec. 1, 1913	Oct. 1, 1923
Horses	4,558,329	3,650,808 (Dec. 1, 1922)
Cattle	20,994,344	16,652,831
Swine	25,659,140	17,225,855
Sheep	5,520,737	6,094,022
Goats	3,548,484	4,858,607
Poultry	82,163,922	65,204,617 (Dec. 1, 1922)

The increase in number of sheep and goats reflected the lowered production of grains for animal feeding and more especially the decline in imported animal foodstuffs, such as cottonseed meal. Sheep and goats require a minimum of imported animal foodstuffs. The number of live stock slaughtered showed a considerable decrease in 1923 as compared with pre-war figures. Oxen were slaughtered to the number of 364,026 in 1913 and 155,784 in 1923, a decrease of 57.2 per cent; bulls, 359,878 in 1913 and 184,500 in 1923, a decrease of 48.7 per cent; cows, 1,095,160 in 1913 and 774,304 in 1923, a decrease of 29.3 per cent; bullocks and heifers, 580,419 in 1913 and 472,185 in 1923, a decrease of 18.6 per cent; calves, 2,872,412 in 1913 and 2,133,342 in 1923, a decrease of 25.7 per cent; swine, 11,769,889 in 1913 and 4,028,534 in 1923, a decrease of 65.8 per cent; sheep, 1,489,706 in 1913 and 799,962 in 1923, a decrease of 46.3 per cent; goats, 318,014 in 1913 and 135,050 in 1923, a decrease of 57.5 per cent; horses, 106,342 in 1913 and 119,128 in 1923, an increase of 12 per cent. It was significant that the only increase in slaughtering took place in the case of horses, showing the tendency of the population to turn toward cheaper meat products. The following indicates the consumption of meat in Germany before and after the War, in hundreds of kilograms, calculated on the basis of inspected slaughtering:

Description	1913	1922
Home grown meat	26,547,129	14,464,510
Imports of meat, meat products and fat	2,379,559	1,939,156
Exports of meat, meat products and fat	27,174	24,347
Available quantity of meat for home consumption	28,899,214	16,379,319
Per head of population	43.15	26.71
Decrease of consumption of meat per head of population		16.44 or 38.1%

Food Consumption. The average annual consumption in 1913 and 1914 of rye per capita was 153.1 kilograms. In 1922 and 1923, this had fallen to 91.9 kilograms. Similarly, the consumption of wheat and spelt together fell from 95.8 kilograms to 47.6 kilograms; barley from 108 kilograms to 30 kilograms; oats from 128.3 kilograms to 58.5 kilograms; potatoes from 700.2 kilograms to 573.2 kilograms. The very large consumption of potatoes in Germany was a feature of German domestic economy. Germany remained still the largest producer and consumer of potatoes, since these were utilized not only for human food but also for animal food and the production of alcohol, starch, potato flour, etc. The consumption of sugar in Germany in 1913 amounted to 1,282,309 tons or 19.2 kilograms per person; in 1922 this had risen to 1,289,107 tons or 20.7 kilograms per person, an increase of 7.7 per cent. The rice which was consumed in 1913 amounted to 167,190 tons or 2.49 kilograms per person; in 1922 the consumption was 100,654 tons or 1.64 kilograms per person, a decrease of 34.1 per cent. Herrings were consumed to the extent of 1,294,142 barrels in 1913 or 2.89 kilograms per head. In 1922 the figures are 705,268 barrels or 1.73 kilograms per head, a decrease of 40.1 per cent.

The next table indicates imports of food and live stock in 1913 and 1922.

Unemployment. The number of unemployed and part-time workers drawing government ben-

Articles	1913	1922
Grain and Fodder (in hundred kilograms)		
Rye	3,525,418	5,395,928
Wheat	25,459,586	13,925,752
Barley	32,382,117	2,670,164
Oats	5,050,223	905,664
Corn	9,186,450	10,854,161
Fodder	1,390,543	358,624
Live stock (number)		
Horses	143,586	44,216
Cattle	260,752	61,802
Sheep	23,465	1,328
Goats	458	100
Swine	148,422	101,544

efits in the unoccupied territory of Germany were as follows on Dec. 1, 1923: Chief recipients, 1,465,670; additional recipients, 1,436,003; short-time workers, 1,795,161. Unemployment amounted to a total of 28.2 per cent of all workers in December, 1923. In the metal industries alone the figure was 28.3 per cent and in the textile industry, 11.9 per cent.

Industry. The German output of coal amounted to 190,109,000 metric tons in 1913 and 129,965,000 metric tons in 1922 for the same area as was given in pre-war years. The actual production of coal in the present area of Germany under the Treaty of Versailles in 1922 was 119,145,000 metric tons. Production of lignite in Germany in 1913 was 87,233,000 and in 1922, 137,073,000. Production of coke was 34,630,000 in 1913 and 29,113,000 in 1922. In 1922 Germany delivered 18,953,844 tons of coal and coke calculated in terms of pit coal as reparation deliveries to the Allies. This was divided as follows: to France, coal, 4,486,250 tons; coke, 5,585,117 tons; lignite briquettes, 516,965 tons; to Belgium, coal, 2,312,029 tons; coke, 460,772 tons; lignite briquettes, 86,961; to Luxemburg, coal, 12,224 tons; coke, 371,847 tons; lignite briquettes, 60,688 tons; to Italy, coal, 2,606,291 tons; coke, 93,794 tons. The production of sulphuric acid in Germany was 1,727,381 tons in 1913 and 849,652 tons in 1921. Production of iron ore was 28,607,903 tons in 1913 and 5,980,142 in 1922. The production of lead and zinc ores was 2,888,758 tons in 1913 and 1,192,847 tons in 1922. The production of rock salt and evaporation salts was 2,025,484 metric tons in 1913 and 3,069,019 tons in 1922. Potash salts produced in 1913 totaled 11,956,528 metric tons and in 1922 had increased to 13,076,173 metric tons. In 1913 Germany produced 16,764,000 metric tons of pig iron. In 1920 this had fallen to 6,004,000 tons. Germany produced 16,943,000 tons of steel ingots in 1913 and 7,396,000 metric tons in 1920. Rolling mill products amounted to 13,119,000 tons in 1913 and 5,656,000 in 1920. Cast iron, including steel ingots, amounted to 3,549,000 tons in 1913 and 2,131,000 tons in 1921. There were 23,292 breweries in 1913 producing 69,200,000 hectolitres of beer, or 103 litres per head of the population. In 1922, 7363 breweries produced 31,235,000 hectolitres, or 50 litres per capita. In 1913, 133 factories produced 1,083,000 bottles of fruit wine. In 1921, 105 factories produced 1,260,000 bottles of fruit wine. In 1913, 157 factories produced 11,808,000 bottles of sparkling grape wine; in 1921, 113 factories produced 12,662,000 bottles of sparkling grape wine. For the production of spirits, distilleries numbered 62,887 in 1913 and 44,047 in 1922. These distilleries produced 3,753,000 hectolitres in 1913, or 5.4 litres per capita. In 1922, production amounted to 1,271,000 hecto-

litres, or 2 litres per head of population. There were 378 factories in 1913, producing 2,716,000 tons of sugar; in 1923, 292 factories produced 1,456,000 tons. Cigarettes numbering 12,412,000,000 were produced in 1913 and 19,769,000,000 in 1920. The 70 match factories of 1913 produced 90,586,000,000 matches; in 1921, 66 factories produced 106,562,000,000 matches. A total of 175 factories produced 13,700,000 carbon filament lamps in 1913 as compared with 128 factories with a production of 7,200,000 in 1921. Metal filament lamps were produced amounting to 93,000,000, in 1913, and 102,000,000 in 1921. Incandescent gas mantles amounted to 134,000,000 in 1913 and 54,000,000 in 1921.

The table reveals the number of German joint stock companies and limited liability companies in 1913 and 1923.

The capital required by German companies and corporations before the War averaged 102,870,000 gold marks per month in 1913. In 1921, the monthly average was 124,230,000 gold marks.

Communications. In 1913 the German state railways comprised 58,872 kilometers of line with 27,690 engines, 61,276 passenger cars, and 631,323 freight cars. In 1921 the length of lines was 52,377 kilometers; engines numbered 31,070, passenger cars 66,736, and freight cars 668,349. The railways conveyed 1,685,900,000 passengers in 1913 and 2,318,500,000 passengers in 1921; they carried 478,000,000 metric tons of goods in 1913 and 371,400,000 metric tons in 1921. The number of passenger kilometers in

1913 and a net deficit of 6,892,000,000 paper marks in 1921.

The freight traffic on German railways and inland waterways before and after the War was as follows:

RAILROADS			
Description of goods	1913	1921	Per cent increase or decrease
(in thousands of metric tons)			
Total	501,118	354,607	- 29.2
Pit coal briquettes and coke	160,564	104,219	- 35.1
Lignite briquettes and coke made therefrom	38,314	49,565	+ 29.4
Earth of all descriptions	39,548	20,070	- 49.3
Stone	50,787	29,946	- 41.0
Ore	25,113	8,393	- 66.6
Pig iron	15,336	10,897	- 28.9
Iron and steel wares	24,283	16,828	- 30.7
Wood	23,081	23,833	+ 3.3
Grain	15,630	10,363	- 33.7
Fertilizers	16,353	11,657	- 28.7

INLAND WATERWAYS			
Description of goods	1913	1922	Per cent increase or decrease
(in thousands of metric tons)			
Total	99,619	58,777	- 41
Coal briquettes and coke	29,886	22,018	- 26.3
Lignite briquettes and coke made therefrom	1,823	3,335	+ 82.9
Earth	11,872	5,854	- 50.7
Stone	5,961	2,951	- 50.5
Ore	14,209	8,851	- 37.7
Pig iron	1,484	493	- 66.8
Iron and steel wares	2,129	1,223	- 42.6
Wood	5,679	1,740	- 69.4
Grain	7,058	3,342	- 52.6
Fertilizers	2,891	1,504	- 48.0

Industry	1913		1923	
	Joint stock companies	Limited Liability-corporations	Joint stock companies	Limited Liability-corporations
Agriculture and forestry	4	115	36	401
Stock breeding and fishing	21	59	40	119
Mining and smelting	223	475	369	1,031
Mining and smelting mixed undertakings	38	8	57	23
Mineral industry, stones and earths	366	2,050	737	3,310
Metal working	172	1,105	670	3,123
Machinery	618	2,834	1,952	7,641
Chemical industry	172	932	557	2,371
Oils and fats	157	419	355	1,081
Textiles	382	642	842	1,773
Paper	107	374	264	702
Leather and rubber	66	269	237	768
Wood and wood carving	67	769	542	2,576
Foodstuffs	951	2,082	1,549	3,811
Clothing	20	288	355	1,337
Cleaning industry	5	97	9	132
Building trades	72	1,038	267	2,035
Printing and photography	127	1,068	407	3,554
Commercial trading	835	9,409	4,145	30,874
Insurance	143	25	462	260
Transportation	500	825	605	1,982
Hotels and restaurants	68	719	110	907
Music, theatres, etc.	61	931	71	594
Miscellaneous	311	862	397	2,336
Total	5,486	26,790	15,035	72,741

1913 was 39,024,000,000 and 49,103,000,000 in 1921. The number of ton kilometers was 57,900,000 in 1913 and 55,668,000 in 1921. The revenue and expenditure of the German state railways was as follows:

Passenger revenue in 1913	664,000,000 gold marks
" " " " 1921	7,244,000,000 paper marks
Freight revenue in 1913	2,140,000,000 gold marks
" " " " 1921	33,700,000,000 paper marks
Total revenue in 1913	3,804,000,000 gold marks
" " " " 1921	45,132,000,000 paper marks

The expenditure was 2,844,000,000 gold marks in 1913 and 52,024,000,000 paper marks in 1921, leaving a net surplus of 504,000,000 in

The German mercantile marine, including steam and motor vessels, amounted in 1914 to 2090 ships with 5,134,720 registered gross tons. In 1923, the number of steam and motor vessels was 1745, amounting to 2,509,708 registered gross tons, a decrease of 51.1 per cent. In 1913, 1,181,000 ships were in course of construction in German shipyards for German account. These amounted to 1,460,041 tons. For foreign account there were 257 vessels under construction, amounting to 60,926 tons. In 1922, there were under construction for German account, 1253 vessels with a registered gross tonnage of 1,393,225, and 100 vessels with a registered gross tonnage of 102,470 for foreign account.

The number of seagoing vessels entering German ports in 1913 under all flags was 115,966, of which 26,637 were under foreign flags. The total tonnage was 34,772,177, of which that under foreign flags amounted to 13,540,835. Vessels clearing amounted to 117,375, of which 26,919 were under foreign flags. The tonnage was 34,921,806, of which foreign flags accounted for 13,645,219. In 1922, vessels entering German ports numbered 59,427, of which foreign flags amounted to 12,954. Tonnage was 26,487,601, of which 16,208,403 were under foreign flags. Vessels clearing in 1922 were 61,311, of which foreign flags were 13,100. Tonnage was 26,349,792, of which foreign flags amounted to 16,260,488.

Commerce. The following gives German exports and imports for 1913 and 1922 by principal classes (value in millions of gold marks):

	1913	1922
IMPORTS		
Animals living	289.7	81.6
Food and drink	2,796.5	1,292.9
Raw materials	4,997.1	2,829.2
Articles partly manufactured ..	1,263.3	986.4
Articles wholly or mainly manufactured ..	1,422.1	1,112.7
Gold and silver	437.4	8.7
Total	11,206.1	6,311.5
EXPORTS		
Animals living	7.4	12.3
Food and drink	1,068.7	201.1
Raw materials	1,300.7	363.7
Articles partly manufactured ..	939.8	498.8
Articles wholly or mainly manufactured ..	6,778.3	5,104.7
Gold and silver	103.7	18.8
Total	10,198.6	6,199.4

A comparison of leading German imports of goods in 1913 and 1922 follows:

	1913	1922	Per cent increase or decrease
(in thousands of metric tons)			
Coal	10,540.1	12,598.4	+ 19.5
Coke	594.5	288.8	- 51.4
Lignite	6,987.1	2,015.7	+ 71.2
Iron ore	14,024.3	11,013.7	- 21.5
Iron balls and ingots	11.0	325.2	+ 2,856.4
Pig iron	124.3	294.3	+ 136.7
Rails	4	146.7	+ 36,575
Salt	21.4	2	- 99.0
Chile saltpetre ..	774.3	31.5	- 95.9
Artificial fertilizer ..	562.1	344.8	- 38.7
Cotton	477.9	252.3	- 47.2
Cotton goods ..	42.6	83.1	+ 95.0
Rye	352.5	539.6	+ 53.1
Wheat	2,546.0	1,392.6	- 45.3
Barley	3,238.2	267.0	- 91.8
Oats	505.0	90.6	- 82.1
Potatoes	382.1	167.6	- 56.1
Beet sugar	1	111.9	+ 111,800.0
Coffee	168.3	36.8	- 78.1
Fresh herring ..	129.8	45.5	- 64.9
Salted herring in barrels	1,298.1	931	- 28.3

A similar comparison of German exports for 1913 and 1922 shows a decrease in all items with the exception of salt and salted herrings.

Currency and Credit. The circulation of paper money in 1913 amounted to 2,100,000,000 paper marks in Reichbank notes, 110,000,000 in currency notes, and 140,000,000 in private bank notes, a total of 2,400,000,000 marks. Specie in circulation totaled 3,700,000,000 marks; a grand total of specie and paper money of 6,100,000,000 marks was in circulation. In 1923 the number of Reichbank notes in circulation was 74,941,738,917,400,000,000. Private bank notes in circulation were 13,063,445,500,000,000 marks, making a total of paper money in circulation

	1913	1922	Per cent increase or decrease
(in thousands of metric tons)			
Coal	34,598.4	5,062	- 85.4
Coke	6,433	908.2	- 85.9
Iron ore	2,613.2	173.1	- 93.4
Pig iron	782.9	157.8	- 79.8
Iron balls and ingots ..	700.8	102.1	- 85.4
Iron girders	446.9	38.8	- 91.3
Iron bars and shaped iron	1,173.3	473.5	- 59.6
Rails	500.8	286.1	- 42.9
Salt	432.1	963.5	+ 123
Sulphate of potash ..	133.4	85.2	- 36.1
Potash and other mine salts	1,676.2	913.1	- 45.5
Artificial fertilizers ..	1,029.4	19.4	- 98.1
Aniline and aniline dyes	71.6	39.2	- 45.3
Woolen goods	74.4	33.9	- 54.4
Cotton goods	85.8	85.6	- 0.2
Rye	934.5	2	- 99.8
Wheat	538.3	4.3	- 99.2
Oats	661.7	5.6	- 99.2
Potatoes	332.5	67.2	- 79.8
Beet sugar	110.1	12.5	- 88.9
Fresh herrings	10.8	8	- 92.6
Salted herrings in barrels	5.5	234.5	+ 4,163.6

at the end of December, 1923, of 74,954,802,394,900,000,000 marks. The value of this currency in gold marks was calculated as 722,000,000 on Dec. 31, 1922, figure one gold mark as equal to 1,000,000,000 paper marks. Average monthly clearings of the Reichbank in 1913 were 6,100,000,000 marks. In December, 1923, there were 197,553,153,600,000,000 marks; expressed in gold marks, 1,109,800,000. The circulation of stable currency in Germany on Dec. 31, 1923, expressed in gold marks, was 1,049,100,000 Rentenmarks, 240,000,000 gold loan notes, 141,900,000 emergency railway notes, and 234,700,000 gold loan emergency currency, or a total of 1,665,700,000 stable value currency. The average amount of Treasury bills held by the public in 1922 was 135,400,000,000 paper marks. Private deposits with the Reichbank average 80,700,000,000. The depreciation of the German paper mark was accompanied by a rise in domestic prices; on Jan. 2, 1924, foodstuffs were 1088 times their pre-war price. Industrial goods had increased 1479.1 times in price; domestic goods, 1153.2 times; imported goods, 1579.6 times; the average for all classes of goods was 1224.3 times. The gold mark value on the same classes of goods on Jan. 2, 1924, was as follows: foodstuffs had increased 8.8 per cent above the 1913 level; industrial goods, 47.9 per cent; domestic goods, 15.3 per cent; and imported goods, 58 per cent, giving a general average of price increases for all classes of goods of 22.4 per cent over 1913. Retail prices of certain goods in Berlin showed considerable changes from 1913 to 1923. One kilogram of rice worth 26 pfennigs in 1913 was worth 35.64 pfennigs in December, 1923; the percentage of increase was 36.9. A kilogram of yellow peas increased from 40 pfennigs to 96 pfennigs, or 140 per cent; a kilogram of potatoes from 5 pfennigs to 7.6, or 52 per cent; a kilogram of stewing beef from 183 pfennigs to 260, or 4.4 per cent; a kilogram of pork from 160 pfennigs to 320, or 100 per cent; a kilogram of butter from 280 pfennigs to 520, or 85.7 per cent; a kilogram of margarine remained stationary at 140 pfennigs; a kilogram of imported lard increased from 140 pfennigs to 168, or 20 per cent; a kilogram of sugar from 50 pfennigs to 90, or 80 per cent; an egg from 9 pfennigs to 21, or 133.3 per cent; a litre of milk from 22 pfennigs to 32, or 45.5 per cent.

Wages. The weekly wages of skilled labor showed the following changes from 1913 to December, 1923: all workmen, 35.02 marks to 16,542,000,000,000 in November, 1923; miners, from 37.562 to 18,582,000,000,000 in 1923; metal workers from 36.2 to 29,882,000,000,000; factory hands, from 32.99 to 29,040,000,000,000; typesetters from 32.84 to 25.80 gold marks; workmen in government employ, from 34.56 to 24 gold marks. Unskilled labor showed the changes from 24.31 to 14,231,000,000,000 in November, 1923; miners, from 24.84 to 15,492,000,000,000 in November, 1923; metal workers, from 24.44 to 25,245,000,000,000; factory hands, from 26.76 to 26,590,000,000,000; typesetters, from 23.67 to 21.34 gold marks; workmen in government employ, from 23.7 to 18.72 gold marks. The nominal and real weekly wages of skilled and unskilled laborers in Berlin from 1913 to 1923 changed, in the building trades, from 43.46 marks in 1913 to 33.27 gold marks in December, 1923, which had the pre-war purchasing power of 29.11 marks. An unskilled laborer received 29.15 marks in 1913, and 29.61 gold marks in 1923, with a purchasing power of 25.91 in pre-war currency. Skilled woodworkers received 34 gold marks in 1913 and 32.89 gold marks in 1923, with a purchasing power of 28.78 in pre-war currency. Unskilled woodworkers received 24.64 marks in 1913 and 24.84 marks in 1923, with a purchasing power of 21.73 marks in pre-war currency. Skilled metal workers received 42.44 marks in 1913 and 31.44 marks in 1923, with a purchasing power of 27.47 in pre-war currency. Unskilled metal workers received 30.62 in 1913 and 23.52 gold marks in 1923, with a purchasing power of 20.55 in pre-war currency. Skilled factory hands received 36.18 marks in 1913 and 24.96 marks in 1923, or 21.84 in pre-war currency. Unskilled factory hands in the chemical industry received 25.47 marks in 1913 and 22.8 marks in 1923 with a purchasing power of 19.95 marks in pre-war currency. Skilled typesetters received 34.38 marks in 1913 and 27 gold marks in 1923, with a purchasing power of 23.57 in pre-war currency. Unskilled typesetters received 27.03 marks in 1913 and 22.95 marks in 1923, with a purchasing power of 24.04 marks in pre-war currency. Unskilled workmen received in government employ 34.56 marks in 1913 and 25.57 marks in 1923, with a purchasing power of 22.37 marks in pre-war currency. Unskilled workmen received 23.07 marks in 1913 and 19.87 gold marks in 1923, with a purchasing power of 17.38 marks in pre-war currency.

Finance. The government's funded debt in 1913 amounted to 4,585,800,000 marks. There were, besides, 220,000,000 marks in treasury bills, making a total of 4,805,800,000 marks. In 1923 the funded debt amounted to 50,126,000,000; the premium loan amounted to 3,850,000,000; interest-bearing treasury bills amounted to 6,482,000,000. This gave a total funded debt of 60,458,000,000 with gold mark value of \$2000. The floating debt (discount treasury bills) arose to 90,874,330,250,000,000 in November, 1923. This amount was all held by the Reichbank.

For debts of the German states see table in next column.

The revenues and expenditures of the government for the fiscal year 1922, calculated on a dollar index, were as follows: revenues from

Prussia	3,400,000,000
Bavaria	213,200,000
Saxony	622,400,000
Württemberg	829,800,000
Baden	
Thuringia	218,000,000
Hesse	16,600,000
Hamburg	3,039,200,000
Mecklenburg-Schwerin	107,300,000
Oldenburg	186,500,000
Brunswick	30,400,000
Anhalt	65,000
Bremen	945,000,000
Lippe	5,200,000
Lübeck	190,600,000
Mecklenburg-Strelitz	2,700,000
Waldeck	1,100,000
Schaumburg-Lippe	4,300,000
Total	9,877,700,000

taxation, 1,488,100,000 gold marks; revenues from floating debt, 2,442,300,000 gold marks; from sundries, 20,200,000 gold marks; total revenues, 3,950,600,000 gold marks. Expenditures were: repayment of funded debt, 35,600,000 gold marks; interest on floating debt, 145,500,000 gold marks; contribution to railways, 643,700,000 gold marks; execution of Versailles Treaty, 1,498,400,000 gold marks; sundries, 1,627,600,000 gold marks; total expenditures, 3,950,600,000 gold marks. Revenues from taxation during the fiscal year 1922 were as follows: income, property and indirect taxes, 1,143,400,000 gold marks; export duties, 162,500,000 gold marks; import duties and consumption taxes, 449,900,000 gold marks; total, 1,755,800,000 gold marks. Further analysis for revenues from taxation for the fiscal year 1920 showed income tax receipts of 1,214,600,000 gold marks; emergency contribution, 49,400,000 gold marks; turnover tax, 632,800,000 gold marks; other property and indirect taxes, 372,000,000 gold marks; customs, 235,100,000 gold marks; coal tax, 411,700,000 gold marks; other taxes on consumption, 251,100,000 gold marks; export duties, 344,800,000 gold marks; non-recurrent taxes, 23,700,000 gold marks. This last analysis of taxation is based on cost of living index and not on the dollar index. On July 23, 1914, the Reichbank gold reserve amounted to 1,356,800,000 gold marks. On Dec. 31, 1923, the gold reserve was 445,700,000 gold marks, of which 21,300,000 were deposited abroad. The most important German government asset was the state railway system. In 1913-14 working receipts of state railways were 2,992,000,000 marks; working expenditures, 2,097,000,000. Total receipts were 2,994,000,000; total expenditures, 2,542,000,000, of which the expenditure for debt was 441,000,000; the net surplus was 452,000,000 gold marks. For the first nine months of 1923, the total receipts were 362,262,292,948,000,000 paper marks; total expenditures were 1,820,550,974,239,000,000 paper marks, leaving a net deficit of 1,467,288,681,291,000,000 paper marks. The number of persons employed on the railways, exclusive of Alsace-Lorraine, was 740,504 in 1913. In 1923 the number was 975,000. The number of train kilometers was 675,975,418 in 1913-14 and 519,190,207 in 1923, or 76.81 per cent of the pre-war figure.

History. Although the War came on the German people rather unexpectedly and there were immense popular peace demonstrations, organized by the Socialists, as long as it was only imminent, once the War had become an established fact it swept the German people into an orgy of patriotism and war enthusiasm

which increased with every new victory reported. The great majority of the Germans regarded the War as a struggle for their national existence, and the manifestoes of the Emperor and the other German sovereigns served to strengthen this belief and the patriotic ardor. Even the great Social Democratic party, concealing internal dissension regarding the War, supported the government from the start, and in conjunction with the other German parties, voted on Aug. 4, 1914, for the first war credits. On Sept. 9, 1914, the Socialist leaders protested against the anti-war activities of the International Socialist Bureau, and on December 2, the Socialists in the Reichstag voted for a second war credit. The government made efforts to keep the support of the Socialists and granted certain internal measures for which the Socialists had clamored a long time. This undivided support of the government on the part of the German people regardless of political opinion continued during the early part of 1915, but with the entrance of Italy in the War on the side of the Entente, in May, signs of a change in the war spirit began to appear. In March two Socialist members of the Reichstag, Liebknecht and Rühle, had defied their party and refused to vote for the budget. In the same session, Socialists ventured to criticize the General Staff. In the August session, on the occasion of the debate on the war credits, the leader of the Socialists made a demand for democratic reforms and expressed the hope that peace would soon be a reality. How the unquestioning faith of the German nation in the government's conduct of the War had given way to a critical attitude became manifest in December of the same year when Scheidemann, the Socialist leader, interpellated the government in the Reichstag on possible peace terms and a strong Socialist majority protested against the annexationist spirit which was rampant in the country. At the same time an uncompromising minority of 18 Socialists voted against the war credits. It was evident now that in wide circles of the German people it was felt that the War had lasted too long already and that peace on moderate terms must be concluded at the earliest possible moment. Germans who had supported the government only because they regarded the War as one of defense on the part of Germany began to grow apprehensive of the steadily increasing appetite of the nationalists for wide annexations. Moreover, the internal reforms which the people expected as a compensation for their sufferings and sacrifices were not forthcoming. The most potent factor in the slackening of war enthusiasm was the food situation, which became more unsatisfactory with every day of the War.

The interruption of maritime communications with foreign countries and the ever-tightening hold of the Allies' blockade reduced Germany, which depended on import for most of its raw materials and a large part of its food supply, to a position where stringent measures had to be taken in order to prevent the army from being impeded by lack of war materials and to save the civilian population from starvation. (See BLOCKADE, ALLIED.) The government, as a result, set up a rigid system of centralized control in economic affairs. Maximum prices for certain foodstuffs had been fixed shortly after the outbreak of the War, but the prices of food continued to rise. Drastic ac-

tion soon became necessary to check the two main evils, the extravagance of consumers and the manipulation of the market by speculators. Early in 1915 all grain and flour was confiscated by the War Grain Association, and bread cards were introduced allowing each person a limited ration. A number of similar measures enforcing the strictest economy were put into effect during the course of the same year. At the same time provision was made to increase the cultivated area within the Empire and to curb profiteering. On May 22, 1916, a War Food Office was created, and subsequently meat and milk were rationed in the same manner as bread. In spite of these measures the situation grew worse during 1916 and further action became necessary. Meanwhile the shortage of textiles led to the establishment of a War Clothing Office in July, 1916. As for the financial situations, Germany attempted to meet the steadily mounting cost of the War through the issue of long-term war loans. By this system of piling loan on loan the financial indebtedness of Germany rose finally to the incredible amount of 161,000,000,000 marks. At this time little recourse was had to increased taxation, and only in 1916 and 1917 were new taxes imposed by the Reichstag, which proved, however, quite inadequate. By 1918 German finances were approaching hopeless disorder.

The ever-increasing sacrifices demanded of the German people gradually destroyed the patriotic harmony which had existed in the first period of the War. The disagreement between the navy department and the civil administration was paralleled by conflicts between the political parties. When in March, 1916, the Socialists voted for the U-boat resolution, a minority of 18 under Haase dissented and formed a new organization, the Social Democratic Labor Union, which henceforth showed uncompromising opposition to the War. Further friction developed late in 1916 between the military and naval authorities and the civil administration, because Bethmann-Hollweg showed a certain sympathy for the democratic reforms demanded by the majority in the Reichstag and was, moreover, not at all in agreement with the military leaders as to war aims and war methods, especially as to unrestricted submarine warfare. Lacking, however, in strength of character, he finally allowed himself to be dominated by the military leaders. Field-Marshal von Hindenburg, hero of Tannenberg and idol of the populace, and Quartermaster-General Erich von Ludendorff, who had become chief of the general staff and quartermaster-general, respectively, at the close of August, 1916, with increasing frequency assumed the right to dictate governmental policies; indeed, Ludendorff was little less than military dictator of Germany from 1916 to 1918, and his influence was constantly exerted in favor of annexationist war aims and political reaction. The Chancellor's policy of moderation was supported in the Reichstag by a majority consisting of the Centre, the Progressives, and the Social Democrats. In opposition were a minority of Conservatives and National Liberals on the Right, and on the Left the small group of ultraradical Socialists.

At the end of 1916 the food situation had become so serious that further steps had to be taken toward the strictest economy. Conditions were aggravated by the bad harvest of the year. Additional restrictions were put on

a number of articles, and substitutes were introduced, which served their purpose only ineffectively. To offset the shortage of labor the Auxiliary Service Law was enacted on Dec. 2, 1916; it compelled all males between 17 and 60 years of age to work. The stranglehold of the Allied blockade and the resulting economic distress reduced the civilian population to a state of mind where the demand of the nationalists and the military authorities for the immediate application of drastic methods of warfare, and especially of unrestricted submarine warfare, had a powerful appeal. The great mass of the Germans hoped for a speedy termination of their sufferings from these measures and saw little difference between their own privations and those which the submarine war might inflict on their enemies. Few Germans had any clear conception of the possible effects which America's entrance into the War might have. Thus public opinion drifted more and more into a spirit of desperate recklessness and swung over to the viewpoint of the General Staff. When the Chancellor, who in spite of his better judgment was by this time completely under the control of the military and naval authorities, announced on Feb. 1, 1917, to the Central Committee of the Reichstag that the government had decided to pursue a policy of unrestricted submarine warfare, the parties voiced little definite opposition. At the same time the majority maintained its desire for a speedy peace and its distrust of the government, which became clearly manifest in the great debate on war aims in May, 1917. This sentiment came even more strongly to the foreground during the following months because of the disappointing results of the submarine campaign, the energetic participation of the United States in the War, the feeling that Germany was facing overwhelming odds, and the reluctance of the government to grant electoral reforms. On July 16, 1917, Erzberger, the leader of the Centre and of the majority, made a sensational speech in the Central Committee of the Reichstag, in which he repudiated submarine warfare and demanded immediate steps in the direction of peace. He was supported by the Centre, the Socialists, and the Democrats, the parties constituting the majority, which were now in full opposition to the Chancellor, in whose policy they had lost all faith. The parties of the Right were equally strongly opposed to the Chancellor because he did not go far enough to suit their extreme nationalistic tendencies. Bethmann-Hollweg tried in vain to placate both the Right and the Left, the one by his statement in committee on July 10 that the formula of peace without annexations was not acceptable, and the other by inducing the Emperor on July 11 to issue a declaration promising a franchise reform in Prussia. He was forced to resign on July 14, 1917, and was succeeded by Dr. Michaelis, who also soon found himself in a difficult position in the Reichstag. On July 19 the Centre, Socialists, and Democrats carried by a majority of 90 votes a resolution calling for a peace by agreement and rejecting forced annexations and any policy of political, economic, or financial coercion after the War. The resolution declared, moreover, that, in case any such peace should be impossible of attainment, the Germans would stand together as one man and carry on a fight for their existence. Michaelis

stated that he was ready to accept the Peace Resolution "as he understood it." This latter phrase created immediate antagonism, which developed into open hostility during the fall of the year. A cabinet crisis arose in the early part of October when Michaelis attempted rather clumsily, in the course of a debate in the Reichstag, to construe the connections of some of the Independent Socialist leaders with the mutineers in the navy earlier in the year into something akin to treason. This sealed Michaelis's fate, and by October, 1917, all parties except the Conservatives agreed that he was impossible. On October 23 they informed the chief of the Emperor's Civil Cabinet to this effect and Michaelis resigned five days later. His successor was von Hertling, Bavarian Prime Minister and veteran leader of the Centre, who appointed the Progressive leader, Payr, as Vice Chancellor in Helfferich's place. The circumstances which brought about Hertling's appointment and the fact that he accepted the Peace Resolution as a basis for his policy led many to regard him as the first parliamentary chancellor of Germany. Hertling promptly denied the truth of this assumption and proved the bureaucratic character of his office by introducing into the Prussian Diet a franchise bill which was only a tardy step in the direction of electoral reform, and which circumscribed the powers of the Lower House.

While the year 1918 opened under rather favorable political circumstances and with great military success, the economic situation gave little cause for rejoicing. Milk, meat, and fats were becoming luxuries. There were now widespread transgressions of the food regulations, and profiteering had grown apace. The steadily increasing antagonism between town and country made the equitable distribution of foodstuffs very difficult. Likewise the scant supply of fuel, textiles, and other materials was a serious problem to the authorities. There could be no denying now that the machinery of bureaucratic central control, which had functioned so smoothly in former times, was beginning to break in many places under a pressure which had been too heavy and too long sustained. The military successes of the spring and the benefits accruing from the Bolshevik Revolution, two factors which had brought about a temporary revival of the annexationist spirit, were only a partial compensation for the grave internal situation. The war-weariness of the civilian population advanced rapidly as a result of the economic distress, and with it went a hitherto unknown spirit of dissatisfaction with a government which seemed either unwilling or unable to improve matters and abolish abuses. The great strikes in January, 1918, had been a manifestation of this sentiment, and it became further evident through the renewed pressure of the majority in the Reichstag for a peace by diplomacy. Moreover, the behavior of the military leaders in the negotiations with Soviet Russia and the failure of the peace treaties with Russia and Rumania to lead to a general peace undermined confidence in the government still further. Erzberger, who had set himself up as the leader of the peace movement, became increasingly hostile to the government in spite of the fact that both he and Hertling were leaders of the same party. How incapable the government was of grappling with the internal situation was made evident by its only concession

to the German people at this time, a law enacted by the Reichstag on June 8, 1918, by which the number of Reichstag deputies for the larger municipal and rural constituencies was increased and proportional representation was provided for the election of these additional deputies.

Germany's military strength had thus far enabled the government to restrain the movement for peace in the Empire. But in the summer of 1918 military reverses presaged an internal crisis. On June 21, Foreign Secretary Kühlmann, in a sensational speech in the Reichstag, declared it was no longer possible to attain peace by force of arms. It is true that the Chancellor repudiated this statement in the next sitting and that Kühlmann was forced to resign, but during the following month came the final offensive of the Allies on the Western front, and with it the movement for peace in Germany entered its last stage. The aggressiveness of the Socialists increased with every new German reverse, and with the defection of Bulgaria the Hertling cabinet was forced out of office. Prince Max of Baden formed a new government with a programme of radical democratic reforms and peace on the basis of President Wilson's Fourteen Points. The grim course of events made short work of his plans. After four years of hardship and sacrifice the spirit of revolution had gripped the German people, and in the face of the impending Allied military victory their former discipline had given way to panic and to a naïve confidence that by complete surrender a just peace could be obtained. At the same time the Chancellor received frantic requests from the German General Staff that immediate application be made for an armistice, since only the cessation of hostilities could save the German army from military disaster. Events followed each other in rapid succession. The Revolution broke out in Kiel in the first days of November. A series of mutinies occurred in the navy, and the Republic was proclaimed in the principal seaports. In Munich, Kurt Eisner set up a red republic on November 7. Two days later the Revolution had spread to Berlin, and Prince Max turned the government over to Ebert, leader of the Socialists. The Emperor fled to Holland on the following day, but did not sign the abdication document until November 28. For the account of the course of the diplomacy of the Central Powers during 1914-18, see AUSTRIA-HUNGARY and WAR DIPLOMACY.

The Revolution was now in full swing. In Berlin the overthrow of the Imperial government took place without armed resistance from the monarchists. Although the revolutionary movement had been actually engineered by the Independent Socialists, and the Majority Socialists had not taken part until the Revolution was an established fact, the latter now assumed full charge of it and steered it into rather moderate channels to forestall the establishment of a Soviet republic. A provisional government was formed in Berlin under the title of the People's Commissaries, which immediately appointed a cabinet consisting almost entirely of non-Socialists. Thus the machinery of government was started running and Germany was helped over the dangerous period of disorder which otherwise would have led to the establishment of an ultraradical government. Meanwhile revolutionary Workmen's and Soldiers'

Councils had sprung up and assumed power everywhere in the Reich. The chief element of opposition to the provisional government was the Workmen's Council in Berlin, which claimed supreme legislative authority for the whole Reich. In the full realization of this serious situation the government called a congress of delegates from all the councils. At this congress, held in Berlin on Dec. 16, 1918, executive power was delegated to the six People's Commissaries, who thereupon issued at once a call for elections for a National Assembly. Thus the Berlin Council as the chief element of opposition was definitely eliminated. Foiled in their designs, the ultraradicals under the leadership of Karl Liebknecht and Rosa Luxemburg organized the Spartacus League and attempted by force of arms to seize power and to set up a dictatorship of the proletariat. After minor disturbances the Spartacist Sailors' Division started a revolt in Berlin on Dec. 23, 1918, which was subdued by the government by means of regular troops on the following day. Primarily as a result of this drastic action of the government, the three Independent Socialist members in the Council of Commissaries, who favored a more revolutionary policy, resigned during the last days of December and were replaced by Majority Socialists. In January, 1919, a new and more vigorous Spartacist insurrection occurred which was put down by Noske, the Majority Socialist Minister of National Defense, only after sanguinary fighting in the streets of Berlin. Renewed uprisings in Berlin during March and in various other cities during April were quelled by the Reichswehr. With the close of these revolts the Majority Socialist government had weathered the threatening danger from the Left for the time being.

The elections to the National Assembly in January, 1919, showed a great increase in the Socialist vote, although the recruiting strength of the Socialist parties had suffered considerably from their internecine strife. The combined Socialist vote was 13,750,000, against 16,000,000 votes for the bourgeois parties, and the two Socialist parties secured 185 seats in the Assembly out of a total of 421. The revolutionary transformation which had occurred in Germany, and, paradoxically, the continuity of the new republican régime with the old order, were significantly exemplified in the metamorphosis of the political parties which entered the National Assembly. The German National People's party (popularly, the Nationalists), with their 42 delegates, were simply representatives of the old parties of the Right, i.e. the Conservatives and Free Conservatives; they were opposed to democracy, to Socialists and Jews, and to the Treaty; they represented monarchist and militarist reaction. The German People's party, with 21 delegates, was the emaciated but influential successor of the old National Liberal party, the party of big business, and soon became almost a personal faction representing the coal and iron king, Hugo Stinnes. The Christian People's party, with 88 representatives, was so clearly recognizable as the quondam Catholic Centre that the old name was used more frequently than the new. The Democratic party, heir to the old Progressive party, showed surprising strength, with its 75 representatives and distinguished leaders, one of whom was to draft the new constitution. With the addition of 10 independents, these bourgeois parties mus-

tered 236 votes in the new Assembly, as against 163 moderate Social Democrats, i.e. Majority Socialists, and 22 more radical Independent Socialists. These returns showed clearly that the revolution begun by admirers of Russian Bolshevism had taken a nonsocialist turn, but the danger of social revolution was not wholly averted. Fearing revolutionary upheavals in the capital, the new Parliament assembled on Feb. 6, 1919, in Weimar instead of Berlin, and elected on February 11 the Socialist Ebert as President of the Reich. Immediately afterward a coalition cabinet, consisting of Majority Socialists, Centrists, and Democrats, was formed by Scheidemann. The Right, composed of the Nationalists and the People's party, and the extreme Left or Independent Socialists opposed the new government and did their best to block its measures. It was the ratification of the Treaty of Versailles, however, which caused the first cabinet crisis in Republican Germany. Scheidemann, who by previous statements had committed himself to non-ratification of the Treaty, resigned with his cabinet on June 21, in order to leave the President free to take the necessary steps for ratification. After some difficulties the Majority Socialist Bauer formed a new cabinet of Centrists and Socialists. A majority in the Reichstag, consisting of the Majority Socialists, the Independent Socialists, the Centre, and some of the Democrats, thereupon authorized the government, on June 23, to sign the Treaty. On June 28 the German representatives duly affixed their signatures, and the Reichstag approved the Treaty on July 9.

On July 31, 1919, the new constitution, drafted chiefly by Professor Preuss, was adopted in the Reichstag by 262 votes against 75. While it contained all the characteristic juridical features of any modern constitution, it applied the democratic principle of equal rights with an almost unprecedented thoroughness and included a number of educational, economic, and social provisions which were distinctly novel. It was divided into two parts: the composition of the Reich, and the fundamental rights and duties of Germans. The German Reich was declared to be a republic whose sovereignty was to be vested in the people. It was provided that each state should have a liberal constitution and a parliament elected by universal, equal, and secret suffrage. All citizens over 20 years of age were to receive the vote, women as well as men. To avoid any inequality, elections were to accord with the principle of proportional representation, and the same democratic franchise was to govern elections to every German diet and municipality. The Reichstag was to be elected for four years. The President, elected for seven years by a direct vote of the people, was to have power to conclude treaties, receive ambassadors, etc., but declarations of war and peace were to be issued by the Reichstag, and treaties with foreign states were to be ratified by it. The Chancellor and the ministry were to be nominated by the President, and the former was to direct the foreign policy and to be responsible for the cabinet. The Imperial Council was to be composed of the representatives of the states, each of which was to have at least one vote; the votes of the large states were to be proportionate to their populations. The laws were to be submitted to a plebiscite if the President de-

sired. Article 18, permitting the alteration of state boundaries by the national government with the consent of the population of the regions concerned, was one of many examples of the strongly national and centralized nature of the new government, as contrasted with the federal constitution of the defunct Empire. This article was later taken advantage of to consolidate eight Thuringian duchies and principalities (Saxe-Weimar, Saxe-Meiningen, Saxe-Altenburg, Saxe-Gotha, Schwarzburg-Rudolstadt, Schwarzburg-Sonderhausen, and the two principalities of Reuss) into a unified state of Thuringia (q.v.), and to unite Saxe-Coburg with Bavaria, thus reducing the number of states in the Reich from 25 to 17. The most important feature of the second part of the constitution was the article providing for the establishment of a system of industrial democracy through works councils and an economic parliament for the Reich. The latter, the Economic Council, was to give an opinion on all bills of an economic and social character and was also to have power to propose such measures. The Council, however, was not to be a legislative organ. Important also was the opening provision of article 151: "The ordering of economic life must reconcile the principle of economic justice with the aim of a civilized life for everybody." The most unusual clause, in many respects, provided that in the schools of the Reich every effort must be made to inculcate a spirit of conciliation with the other peoples of the world.

In September, 1919, the cabinet was enlarged by the reëntance of the Democrats. At the same time the Works Councils Bill was passed by the Reichstag. As adopted, the bill represented a compromise and did not by any means embody the radical principles which had been originally proposed, nor was it applied without further moderating compromises, bitterly as the Socialists protested. Another important event of the legislative session was the Socialization Law with reference to the mining industry. Republican Germany had taken over a cheerless economic heritage from the imperial system. After the Revolution, conditions had become more desperate month by month. The debt had risen to 220,000,000,000 marks, the budget amounted to 15,000,000,000 of ordinary expenditure and to 41,000,000,000 of extraordinary expenditure. New sources of revenue had to be found, and with this end in view, Minister of Finance Erzberger proposed an "emergency contribution" which amounted to a partial confiscation of wealth. The measure was passed by the Reichstag on Nov. 17, 1919, by 238 votes against 43.

The application of the Peace Treaty, which went into effect on Jan. 10, 1920, caused universal discontent in Germany. The Allies' demands for the extradition of the war criminals, including the foremost military leaders of Germany, and for the reduction of the German army in accordance with the treaty, were especially potent in arousing national feeling which reacted directly against the republican government. The impotence of the latter in the face of the relentless pressure from the victors served to weaken the Republic, whose position had been none too secure from the beginning. Aside from the dangerous opposition of the revolutionary Left, there were powerful nationalist sections which had never become reconciled to the new state of affairs and which were only waiting for an opportune moment to reestablish

the old order. Accordingly a counter-revolution broke out in March, 1920. Under the leadership of Dr. von Kapp and General von Lüttwitz, the monarchists, together with dissatisfied troops who were to be disbanded in conformity with the demands of the Allies, seized Berlin on March 13 and set up a new government. The Republican government, forced to seek refuge in Stuttgart in Württemberg, appealed to the workers to declare a general strike. The entire trade union movement of Germany responded to the call, and the organized hostility of the workers throughout the Reich compelled the counter-revolutionists to evacuate the capital after five days of undisputed military power. The Kapp Putsch, as the counter-revolutionary attempt was generally called, showed clearly the lamentable weakness of the republican government. The only reassuring element in the situation was the strength of republican sentiment among the masses of the German people and the power of action manifested by the trade union movement. After its return to Berlin the government was attacked by the radical Socialists and organized labor for its weak conduct and its ignominious flight. Unable to satisfy the demands of the trade unions for far-reaching democratic reforms, the Bauer government fell from power on March 26 and was replaced by a new coalition government under Hermann Müller, composed of Majority Socialists, Centrists, and Democrats. A direct result of the Putsch was the stricter application of democratic principles to the civil service. More serious than the Putsch itself, which was in reality a ludicrous attempt at a monarchist revolution on the part of a few reactionaries with very limited political vision, were its indirect consequences, particularly the revival of radical revolutionary disturbances in the Ruhr, the Vogtland, and other districts. The workers in the Ruhr organized a proletarian army against the monarchists, defeated them, and took possession of the towns and the mines. Because of the revolutionary aspect of the movement, the Berlin government was compelled to send troops into the district; after some bloodshed, peace and order were restored. In Bavaria the March insurrection led to the complete consolidation of the reaction which had been steadily marshaling its forces since the overthrow of the Soviet government in April, 1919. Meanwhile France had become alarmed at the presence of large bodies of troops in the Ruhr, which under the treaty had been included in the demilitarized zone, and had retaliated by occupying Frankfurt and the Maingau. Germany appealed to the League of Nations, but without avail. At the Conference of San Remo in April, 1920, the French agreed to withdraw as soon as the German troops in the Ruhr had been reduced to the required strength. The action of the French, however, and especially their firing on civilians in the city of Frankfurt, was a powerful factor in strengthening national feeling throughout the Reich. Another manifestation of the restlessness prevailing in 1920 was the tragic shooting of demonstrators before the Reichstag building on January 13.

The elections for the first German Reichstag on June 6, 1920, were unfavorable to the coalition. Both the Right and the Left gained as a result of the year's events. The representa-

tion of the various parties in the Reichstag was as follows: Majority Socialists, 110; Independent Socialists, 80; Centrists, 67; Nationalists, 65; German People's party, 61; Democrats, 45; Christian Federalists, 21; minor parties, 11. In view of the changed parliamentary situation a new coalition cabinet was formed by the Centrist Fehrenbach; it consisted of Centrists, Democrats, and members of the German People's party. The new government soon had to face difficulties in regard to reparations; after considerable wrangling, these ended with the acceptance of the Allies' demands by the Germans. Each move of coercion on the part of the Allies weakened the none too stable republican government. Nationalist feeling was further strengthened by the decision of the Ambassadors' Conference awarding a small part of the plebiscite area in East Prussia to Poland, although the plebiscite had resulted in an almost unanimous German vote. Due to the insistent demands of the Allies, the Reichstag passed measures in July to bring about the disarmament of the civilian population, the actual application of which was, however, rather difficult. An important event of the latter part of the year was the disposal of the problem of socialization of mines. Of two proposals presented by the Socialization Commission, the one favoring the mine owners was adopted by the joint committee of the Economic Council and the Coal Council. The measure failed to meet the approval of the miners, and nationalization of mines was abandoned for the time being.

Between the Armistice and the end of 1920, the internal situation in the Reich had changed very materially. The Revolution had for the most part spent its force as far as the great mass of the German people were concerned. In place of the old aristocracy a new ruling class had arisen which was amassing vast wealth and was gaining complete control over the means of production. The workers and the middle classes were becoming impoverished as a result of the Peace Treaty and the rise of the new plutocracy. Thus Germany presented the amazing spectacle of a country in which political power was directed by democratic and socialistic principles, but in which the real power was wielded by a few all-powerful captains of industry. At the same time large sections of the people were going over to the extreme Right and Left, both of which were hostile to the Republic. Due to the Treaty and the Allies' policy, nationalist feeling was gaining day by day and communism became more and more a factor with which republican statesmen had to reckon. Late in 1920 the majority of the Independent Socialists embraced the doctrine of the Third International and in conjunction with the Communists formed the United Communist party of Germany. At the instigation of this party serious revolutionary risings occurred in Central Germany in March, 1921, which the government was able to quell only after considerable difficulties.

Meanwhile the reparations policy of the Allies took its course with fateful consequences for the German political and industrial situation. When the German statesmen refused to accept the severe demands of the Conferences of Paris, Jan. 24-29, 1921, and of London, Feb. 29, 1921, negotiations were broken off, and the Allies imposed their "sanctions." At a third conference, in London, May 1-5, 1921, the Allies

decided on an ultimatum which forced the Fehrenbach government out of office. The new government under Dr. Wirth, consisting of Centrists, Socialists, and Democrats, undertook the fulfillment of the Allies' demands. In this spirit Walter Rathenau, the German Minister of Reconstruction, concluded with Louis Loucheur, the French Minister of Reconstruction, the so-called Wiesbaden Agreement providing for the delivery to France of German materials to be credited to the reparations account. The policy of fulfillment, and especially the Wiesbaden Agreement, met with bitter criticism from the nationalists, particularly when the expected results were ultimately not forthcoming. The government's efforts to pay were seriously impeded by the cataclysmic fall of the mark, and for this reason the subject of reparations came up again. The position of the government was injured still further through the remonstrances of the Allies concerning disarmament, the disbanding of secret military organizations, and the inadequacy of the verdicts rendered by German courts against the so-called war criminals. The intensity of nationalist feeling at this time became clearly apparent through the murder of Erzberger by a nationalist zealot on Aug. 26, 1921. The worst blow of the year, however, and the factor which more than any other since 1918 decreased the industrial strength of Germany and at the same time served to fan nationalist feeling to white heat, was the partition of Upper Silesia. The plebiscite of Mar. 20, 1921, had resulted in a two-thirds vote for Germany, whereupon the Poles, fearing a decision unfavorable to them, started an insurrection. Allied troops interfered only when the German population had been given full opportunity to realize that it was at the mercy of the victor. The final award of the Supreme Council, which was based on the report by a commission of the League of Nations, gave the greater and most valuable part of the Upper Silesian industrial district to Poland. On the official publication of the verdict, the Wirth government resigned, but it resumed office again after a reorganization of the coalition cabinet. (For a full discussion of the problem, see UPPER SILESIA.)

The reparations problem, the cause of all unrest and anxiety, was acute once more at the end of 1921 and assumed an even graver aspect during the following year. The Conference of Genoa in April, 1922, lost much of its significance because France agreed to participate only on the condition that reparations should not be officially discussed. On Easter Sunday, Apr. 16, 1922, the German and Russian delegates concluded at Rapallo a treaty whereby peace was reestablished between their countries, and both sides waived all claims arising from the War. This pact aroused a storm of indignation at the conference, which no assurance of good faith on the part of the Germans could pacify. Both Germans and Russians denied that the treaty contained any secret clauses working to the prejudice of the Allies. In May a moratorium for the year 1922 was granted to Germany by the Reparations Commission, in return for which the Wirth government promised to take measures toward balancing the budget, provided that an international loan was arranged in due time. Subsequently a loan committee, of which the American banker J. P. Morgan was a member, was formed to study the

German finances. Any constructive work on the part of the committee was blocked by the refusal of the French government to make a loan dependent on the modification of the French demands. While the reparations problem was thus hanging over Germany like the sword of Damocles the country was sinking ever deeper into the abyss of political hatred and financial and economic disorder. In the summer of 1922 nationalist conspirators made attempts to murder Scheidemann and Harden and succeeded in assassinating Walter Rathenau, the Foreign Minister. This crime created a violent outburst of popular indignation throughout the Reich, and since it was evidently intended to be a blow at the Republic—Rathenau being the outstanding figure in German political life—a law for the protection of the Republic was enacted. The murder showed clearly the depths of political dissension in Germany. The foes of the Republic made the Revolution and republicanism responsible for all the misery which had descended on Germany. Meanwhile the mark had begun its spectacular downward movement, and in October, 1922, the dollar exchange had mounted to 3000. The depreciation of the currency provoked confusion in public finances and a complete revolution in prices with all its disastrous consequences. Wages and salaries could not keep pace with prices, and terrible suffering befell the population, particularly the middle classes. The only people who profited by this lamentable situation were the industrialists, the profiteers, and the farmers. The Wirth government tried vainly to stabilize the mark, and conditions continued to grow worse as the year advanced. At the same time changes had occurred in the parliamentary situation which brought about a cabinet crisis. The Majority and Independent Socialists had re-united at the Unity Conference of Nuremberg, and as a result the United Socialist party had taken a turn to the Left. Chancellor Wirth sought to reconstruct the coalition government by the inclusion of the German People's party. To this, the United Socialists would not assent, because, not without justification, they regarded the latter party as officially republican, but unofficially and in sentiment as thoroughly monarchist and reactionary. The Wirth government fell thereupon and was succeeded by a business cabinet under Dr. Cuno. This was composed entirely of bourgeois politicians; the German People's party was its driving force.

Although the Cuno government pursued the same reparations policy as its predecessor, a deadlock soon appeared between the Reparation Commission and Germany over a comparatively small default in the delivery of coal, and as a result the French and Belgians, in January, 1923, occupied the Ruhr industrial district. This action aroused the most bitter resentment and denunciation throughout the Reich. The occupation and the passive resistance of the local population, which was encouraged and actively supported by the German government and people, led to a revival of patriotic ardor and monarchist activity. A still more fateful consequence was the rapid aggravation of the economic and financial situation. When the Ruhr, the chief centre of Germany's economic life, ceased work, production all over the Reich was seriously impeded, and there was an unprecedented increase in unemployment. Moreover,

inflation continued without interruption, because the enormous cost of passive resistance in the Ruhr necessitated an ever-increasing output of paper money. On May 31, 1923, the mark sank below the Austrian crown and collapsed completely during the following months, in spite of all efforts at stabilization. The rapidity of the mark's decline was equaled only by that of the rise of prices, with which wholesale increases in salaries and wages could not keep pace. With the growing depreciation of the mark, the food situation became more alarming, since the farmers were very reluctant to exchange their products for worthless paper money. All faith in the mark vanished completely during the summer and fall, and business and labor began to make loud demands for real money. It seemed indeed as if Germany were headed for the final breakup. All these internal factors brought about the fall of the Cuno cabinet on Aug. 12, 1923; the immediate cause was the withdrawal of Socialist support in the Reichstag. Stresemann, the leader of the German People's party, formed a new coalition from members of his own party, the Centrists, the Socialists, and the Democrats.

The new government assumed office with the promise of taking immediate and drastic steps to untangle the complicated foreign and domestic problems, and with this end in view acknowledged defeat in the Ruhr by abandoning passive resistance. Likewise, vigorous action was taken in regard to the critical problems of taxation and finance, and for a brief period hope was revived. But the measures adopted led to renewed difficulties with the nationalists, industrialists, and communists. By means of a modified form of martial law, serious outbreaks of the extreme Right and Left were narrowly averted, but the steady pressure of the moderate Right, which objected primarily to the drastic financial reforms of the radical Socialist Minister of Finance, Hilferding, forced the resignation of the Stresemann cabinet on October 3. Since no other chancellor was available at this particular time, the Stresemann coalition resumed office after Hilferding had been replaced by a Centrist. In order to render the government more stable in the face of the extraordinary internal situation, a bill was passed by the Reichstag on October 13 suspending certain constitutional rights and liberties and vesting the government with extraordinary power to issue such decrees relative to the financial, economic, and social conditions as might be warranted by the situation. Such drastic measures seemed necessary, indeed, for the misfortunes of the year culminated in November in a series of events which came near disrupting the fragile structure of the Republic. In October the Rhenish separatist movement (see RHINELAND) had come to a head, and in the closing months of the year the separatists in the Rhineland and the Palatinate, who were comparatively few in numbers and recruited for the most part from the dregs of the population, succeeded, with the connivance of the French and Belgian authorities, in gaining possession of a number of towns. The local population, worn out by the long period of occupation, was cowed by French and Belgian military force. But once the armies of occupation, under pressure from the English and influenced by international public opinion, withdrew their support, the flimsy structure of the "Rhenish Republic" fell to

pieces; and the movement petered out in the early months of 1924. Another danger lay in the rising tide of extreme nationalism, which had found a safe haven in reactionary and monarchist Bavaria. On November 8 the extreme monarchists in Munich under the leadership of Ludendorff and Hitler executed an abortive coup, commonly called the Beer Hall Putsch. Although the coup was easily frustrated and was in itself a rather childish affair, it served to show the extent and boldness of the extreme nationalist movement. More serious was the constant friction between the republican government of the Reich and the reactionary government in Munich. It was only through a policy of diplomacy and forbearance that Berlin succeeded in preventing an open break between the Reich and Bavaria. While proceeding in the delicate Bavarian situation with the utmost caution, the government used coercion against the recalcitrant Communist and radical Socialist governments of Saxony and Thuringia which were removed by use of the federal military and replaced by moderate Socialist governments. The summary action against "Red Saxony" and the forbearance of the government against monarchist Bavaria caused the Socialists to withdraw from the cabinet. These developments, together with Stresemann's announcement of the abandonment of all assistance to the people in the occupied regions, resulted in a vote of no confidence in the Reichstag and consequently the resignation of the government on Nov. 23, 1923. After a whole week of fruitless endeavor a new coalition government, consisting of the Centre, the Democrats, the German People's party, and the Bavarian People's party, was formed with Dr. Wilhelm Marx as Chancellor. At the request of the new Chancellor, the Reichstag, by a vote of 313 to 18, gave the government plenary powers without parliamentary sanction for an indefinite period. The chief purpose of this act was to empower the government to take drastic action in regard to the critical social and economic situation. Late in 1923 currency reforms were inaugurated whereby a Rentenbank was established which issued a new currency token, the Rentenmark, to be covered by a hypothecation of the entire wealth of Germany. Alongside it, the old paper mark and the mark of the gold loan in August were temporarily to remain legal tender. When the Rentenmark, which was worth somewhat less than a quarter of a dollar, came into circulation it was worth exactly 1,000,000,000 paper marks, but with its appearance the inflation of the paper mark came to a halt. As a result of the introduction of a fixed-value currency, prices early in 1924 were put definitely on a gold basis and general confidence in the currency began to return. At the same time the food situation and the condition of the middle and working classes became worse for several reasons, chiefly the fall in wages and the lengthening of working hours. While the stabilization of the currency had thus been attained through the issue of the Rentenmark, the balancing of the budget remained an open problem. Meanwhile the Dawes Committee of experts had begun its investigation of German finances, and under its indirect influence an important step was taken in the direction of budget reform in January, 1924; this was the temporary repudiation of the public debt until after payment of reparations. Further meas-

ures aiming at improvement of the financial situation were introduced in the spring of 1924, and as a result there was a continued recovery of Germany during the first half of the year, not only in regard to finances, but also in a general economic sense. While the food situation was still grave and there was by no means cause for rejoicing, yet it was felt that the worst was over. This feeling was strengthened by the Dawes Report (see REPARATIONS) and by the results of the French elections in May, 1924. The Dawes Report was regarded by most Germans as acceptable in the main, not because of its satisfactory conditions, but because it seemed to supply a basis on which in due time an ultimate accord on reparations might be reached, especially as it was backed by the prestige of the United States. Even the nationalists were not outspoken in their opposition to it.

The Reichstag, which had been in session for four years, was dissolved on Mar. 13, 1924, and new elections were held on May 4. The results were approximately as follows: Socialists, 100; German National party, 96; Centrists, 62; Communists, 62; German People's party, 44; People's Freedom party, 32; Democrats, 25; Bavarian People's party, 16; minor parties, 28. The outstanding feature of this election was the strengthening of the extreme Right and Left at the expense of the middle parties supporting the Republic. It is true that much larger inroads on the republican majority had been expected; yet the coalition upholding the Republic had been left only a narrow working majority. At the same time the German People's party, the parliamentary tool of the great industrialists, although nominally a member of the republican coalition, was in spirit thoroughly monarchist. Thus the Republic rested on a more precarious basis than at any other time since its creation, if the line-up of the political parties may be taken as a criterion. As a matter of fact, matters were even worse than the parliamentary situation indicated, for many Germans who had nationalist and monarchist sympathies voted for republican parties chiefly out of consideration for the Dawes Report. Ever since 1919 there had been an uninterrupted swing to the Right and the Left. After the Armistice the republic was looked on by the great majority of the German people as established, and the monarchy was to all intents and purposes dead. But the Peace Treaty and all its dismal consequences, reparations, the Ruhr occupation, the never-ending national humiliation, and the resulting economic misery, had destroyed faith in the republic and induced most Germans to seek salvation in monarchism or communism. In view of the large Nationalist representation the Marx cabinet resigned after the election, and President Ebert turned to the Nationalists for the formation of a new coalition government, but the latter, who were perhaps not overanxious to assume office at this particular time, advanced such extreme conditions, such as the nomination of Admiral Tirpitz as chancellor, that President Ebert fell back on ex-Chancellor Marx. The latter resumed office for the time being with a coalition, consisting of the Centre, the Democrats, the German People's party, and the Bavarian People's party. With the support of the Socialists, this government had a slight majority in the Reichstag. The attitude of the

nationalists was due primarily to their unwillingness to take a definite stand for or against the Dawes Report. Early in June, 1924, the Reichstag by a majority of 64 voted in favor of acceptance of the Dawes Report, and immediately steps were taken to draft the laws required under the plan. In the latter part of June the government of the Reich showed its willingness to accept military supervision by the Allies. These developments, together with the moderate policy announced by the new French Radical Socialist government, augured well for the gradual solution of Germany's complicated problems. See BADEN, FREE STATE OF; BAVARIA; PRUSSIA; SAXONY; SCHLESWIG; THURINGIA; WÜRTTEMBERG; also NAVIES OF THE WORLD.

GEROULD, GORDON HALL (1877-). An American philologist, born in Goffstown, N. H. He has been a member of the faculty of Bryn Mawr and after 1916 was professor of English language and literature at Princeton. He is the author of *The North England Homily Collection* (1902), *Sir Guy of Warwick* (1905), *Selected Essays of Fielding* (1905), *The Grateful Dead: The History of a Folk Story* (1908), *Saints' Legends* (1916), *Peter Sanders, Retired*, a novel (1917), *Youth in Harley*, a novel (1920), and other works. In 1918 he was a captain in the United States army.

GEROULD, JOHN HIRAM (1868-). An American zoölogist, born at Stoddard N. H., and educated at Dartmouth College and at Harvard. He was instructor in zoölogy at Dartmouth (1894-1915), assistant professor (1915-1918) and professor (1918-). Professor Gerould published articles in zoölogical journals on the development of sipunculids and holothurians, and on the genetics of butterflies and moths.

GEROULD, KATHARINE FULLERTON (1879-). An American writer, born at Brockton, Mass., and educated at Radcliffe College. She was a reader in English at Bryn Mawr, 1901-10. In addition to many articles in magazines she published *Vain Obligations* (1914), *The Great Tradition* (1915), *Hawaii. Scenes and Impressions* (1916), *A Change of Air* (1917), *Modes and Morals* (1919), a collection of essays; *Valiant Dust* (1923), a collection of short stories; and other volumes. Mrs. Gerould has been criticized as weighing down a distinct literary talent with an unbending conservatism, which though it does not attract the masses, has a coterie of faithful admirers.

GEST, MORRIS (1881-). A theatrical producer born in Vilna, Russia. He came to the United States in 1893 and was educated in the public schools of Boston. He began his theatrical business in Boston and since 1905 has been a member of the firm of F. Ray Comstock and Morris Gest in New York. This firm has produced more than 50 plays. Among its most notable successes are *Experience* (1914), *The Wanderer* (1917), *Chu Chin Chow* (1918), *Aphrodite* (1919), and *Mecca* (1920). Balieff and his Chauve-Souris artists were presented to the American public by this management (1922) and the Moscow Art Theatre (1923). During the 1923-24 season it produced *The Miracle* under Max Reinhardt's direction and plays starring Eleonora Duse, and Sir John Harvey.

"GESTALT" PSYCHOLOGY. See PERCEPTION.

GIBBONS, FLOYD (PHILLIPS) (1887-).

An American journalist and war correspondent, born at Washington, D. C., and educated at Gonzala College and Georgetown University. In 1907 he entered the newspaper field as a staff member of the *Minneapolis Daily News*, later joining the staff of the *Milwaukee Free Press* and the *Minneapolis Tribune*. In 1912 he went over to the *Chicago Tribune*. In 1917 he was London correspondent for the *Chicago Tribune* and a year later went as war correspondent to France, where he was wounded in the Battle of Château-Thierry. He was awarded the French and Italian Croix de Guerre. After the Armistice he became foreign director of the *Chicago Tribune* and editor of the European edition published in Paris.

GIBBONS, HERBERT ADAMS (1880-). An American author, born at Annapolis, Md., and educated at the William Penn Charter School in Philadelphia, the University of Pennsylvania, and Princeton Theological Seminary. He was ordained to the Presbyterian ministry in 1908, and until 1919 was correspondent in Turkey and in Europe for various American periodicals. From 1910 to 1913 he was professor of history and political economy in Robert College, Constantinople, and in 1919 was named honorary associate professor in the Army War College, Washington, D. C. His publications include *The New Map of Europe* (1914); *The Foundation of the Ottoman Empire* (1915, 1921); *The New Map of Africa* (1916); *Reconstruction of Poland and the Near East* (1917); *The New Map of Asia* (1919); *Venizelos* (1920, 1923); *Bases of Anglo-Saxon Solidarity* (1921); *Lithuanian Recognition* (with W. G. McAdoo; 1921); *An Introduction to World Politics* (1922); and *Europe Since 1918* (1923).

GIBBS, SIR PHILIP (1870-). An English newspaper correspondent and writer. He was educated privately, and after several years of editorial work, he entered journalism in 1902. He was literary editor for several papers. He served as war correspondent with the Bulgarian army in 1912 and with the French and Belgian armies in 1914. From 1915 to 1918 he reported field operations of the British armies in France. His daily articles gave vivid and sustained descriptions, particularly of the human side of war. He was knighted in 1920. In 1921-22 he was editor of *The Review of Reviews*. He was the author of many books relating to the Great War and of several novels. His works include *The Soul of War*, *Battles of the Somme*, *The Way to Victory*, *The Hope of Europe*, *Now It Can Be Told*, *More That Can Be Told*, and *Heirs Apparent*, a novel (1924). He lectured in the United States in 1921, 1922, and 1923.

GIBSON, CHARLES DANA (1867-). An American illustrator (see Vol. IX). During the War he did some notable work as cartoonist. Later he purchased a controlling interest in *Life*, of which he assumed entire charge in April, 1920.

GIBSON, HUGH (1883-). American diplomat, born at Los Angeles, Cal., and educated for the diplomatic service at the Ecole Libre des Sciences Politiques at Paris. Between 1908 and 1919 he held various diplomatic posts in Central America, England, Belgium, and France, and was a member of special committees or missions in Washington, Santo Domingo, and the countries of the former Austro-Hungarian Empire. In 1918-19, he served with Herbert Hoover in European relief work. In the latter year, he was named first Envoy Extraordinary

and Minister Plenipotentiary to Poland. He published *A Journal from Our Legation in Belgium* (1917).

GIDE, ANDRÉ (1869-). One of the leading French writers of the twentieth century, born in Paris and educated in the Parisian lycées. He began publishing in his twenty-first year. When he wrote his *Nourritures Terrestres*, a collection of prose poems, he had already reached his prime and was seen by his generation to be an intellectual poet of the first order. As a novelist and an intellectual essayist, Gide showed himself a master of psychological observation. In many ways he resembled Dostoyevsky and revealed, like the Russian, an over-anxious soul groping its way. This is perhaps accounted for by his Protestant environment, which made him stand midway between the religious assurance of Catholicism and the anticlerical assurance of French rationalism. Gide, in fact, pushed his Protestantism as far as Nietzscheanism, without however abandoning his moral preoccupations. After the War, Gide was among the first to demand the resumption of intellectual relations with Germany and engaged in a polemic against nationalistic writers like Barrès and Maurras. His works include: *Philoctète* (1890); *Cahiers d'André Walter* (1891); *Poésies d'André Walter* (1892); *Le Voyage d'Urien* (1893); *Paludes* (1895); *Prétextes* (1895); *Les Nourritures Terrestres* (1897); *Saul* (1898), played at the Théâtre du Vieux Colombier in Paris (1922); *Le Roi Candale* (1898); *Le Traité de Narcisse* (1899); *Prométhée Mal Enchaîné* (1899); *Lettres à Angèle* (1900); *L'Immoraliste* (1903); *Amyntas*; *Le Retour de l'Enfant Prodigue*; *La Porte Étroite*; *Les Caves du Vatican*; *Isabelle* (1912); *L'Offrande Lyrique*, translated from Rabindranath Tagore; *Dostoyevsky*; *Journal d'Alissa*; *Oscar Wilde*; *La Symphonie Pastorale* (1920); *La Tentative Amoureuse* (1921); and *Morceaux Choisis* (1922). *La Porte Étroite* was translated into English under the title *Straight Is the Gate* (1924).

GIDE, CHARLES (1847-). A French economist, born at Uzes, and educated in law at the University of Paris. He taught at the Collège de France. An independent thinker on economic questions, Gide stimulated interest in economics as an art of social administration rather than as a science of the status quo. His *Histoire des Doctrines Economiques* (1909-22) contains a penetrating criticism of the communist experiment in Russia. He takes the social ideal for granted but emphasizes the painful slowness with which it must be approached. His other works include a treatise, *Principes d'Economie Politique*, which went through 23 editions in 40 years (1883-1923); lectures on the history of the coöperatives, *La Coopération* (1900); *Les Institutions de Progrès Social*, 4th ed. (1920); and *Premières Notions d'Economie Politique* (1921).

GIESE, WILHELM OSKAR FRITZ (1890-). A psychologist and author. He studied philosophy, psychology, and medicine and is connected with a sanitarium near Halle. Among his principal recent works are *Kulturwende* (1916), *Der Romantische Charakter* (1919), *Psychologisches Wörterbuch* (1920), *Psychologische Normung* (1920), and *Wesen und Ziele der Psychotechnik* (1920).

GILBERT, ARTHUR WITTER (1882-). An American agronomist, born at West Brookfield, Mass., and educated at the Massachusetts

Agricultural College and Boston University. From 1903 to 1907 he was instructor and assistant professor of agronomy at the University of Maine, and from 1910 to 1911, assistant professor of plant breeding at Cornell, where he became a full professor in 1911. From 1917 to 1919 Professor Gilbert was agricultural secretary to the Boston Chamber of Commerce, and Commissioner of Agriculture of Massachusetts from the latter date. He was a member of many agricultural societies and the author of *Plant Breeding*, with L. H. Bailey (1914), and *The Potato* (1917). During the War he was secretary of the Federal milk commission.

GILBERT AND ELLICE ISLANDS COLONY. See PACIFIC OCEAN ISLANDS.

GILBRETH, FRANK BUNKER (1868-1924). An American consulting engineer (see VOL. IX). In July, 1917, he became commanding major of engineers, and in December of the same year was on duty at the General Staff College in Washington. Among his later writings are *Applied Motion Study* (1917), *Motion Study for the Handicapped* (1919), and papers on the reëducation of the crippled soldiers.

GILDERSLEEVE, BASIL L. See PHILOLOGY, CLASSICAL.

GILES, HERBERT ALLEN (1845-). An English Orientalist (see VOL. IX). Among his later works are "China" in *History of the Nations* (1913); *Adversaria Sinica* (1914-15); *Confucianism and Its Rivals* (1915); *How to Begin Chinese: the Hundred Best Characters* (1919); *The Second Hundred Best Characters*; and *Revision of Bullock's Progressive Exercises* (1922).

GILLETT, FREDERIC HUNTINGTON (1851-). An American Congressman, born at Westfield, Mass., and educated at Amherst College and the Harvard Law School. He began the practice of law in Springfield in 1877. He was Assistant Attorney General of Massachusetts, 1879-82. For two terms he was representative in the Massachusetts House, and in 1893 became a member of the National Congress, where he served continuously from the Fifty-third Congress. In 1914 he favored the Panama Canal Toll Repeal Bill and was distinctly opposed to the government's Mexican policy. In May, 1919, he was elected Speaker of the House in place of Champ Clark and in 1920 was a delegate-at-large to the Republican national convention. Speaker Gillett favored the World Court and in spite of his 72 years was still a representative of remarkable physical and mental vigor at the Sixty-eighth Congress.

GILLOUIN, RENÉ C. G. (1881-). A French philosophical writer. He was born at Aouste, Drôme, and was educated at the Ecole Normale Supérieure. He entered the municipal administration of Paris and was attached to the cabinet of the president of the city council. As a writer his affinities were with the nationalist Catholic school and the ideology of Bergson and LeRoy. Three of his works received the prizes of the French Academy for literature and criticism. His writings include *Ars et Vita*, *Etudes Littéraires et Philosophiques*, *La Philosophie de M. Henri Bergson*, *Idées et Figures d'Aujourd'hui*, and *Une Nouvelle Philosophie de l'Histoire Moderne et Française*.

GILSON, ETIENNE HENRY (1884-). A French professor and philosophical writer, born in Paris, and educated at the Sorbonne. He taught in the lycées of Bourges, Tours, and Angers, and in the universities of Lille, Stras-

bourg, and Paris. As a scholar, Gilson was best known by his researches in mediæval philosophy. His writings include a doctoral dissertation on *La Liberté chez Descartes et la Théologie* (1912); *Etudes de Philosophie médiévale* (1921); *La Philosophie au Moyen Age*, 2 vols. (1922); *Le Thomisme* (1923); and *La Philosophie de Saint Bonaventure* (in preparation, 1924).

GINZKEY, FRANZ KARL (1871-). An Austrian author, born at Pola in Istria, and educated at the Marine Academy and Cadet School. After serving as officer in various Austrian towns, he was appointed technical director of the Military-Geographical Institute in Vienna. Later he went to Salzburg and devoted himself to writing. His works include *Ergebnisse*, poems (1901); *Hatschi-Bratschis Luftball*, 4th ed. (1905); *Jakobus und die Frau*, a novel (1908); *Geschichte einer Stillen Frau*, a novel (1909); *Balladen und Neue Lieder* (1910); *Der Wiesenzaun*, a story (1913); *Die Front im Tirol* (1916); *Der Gaukler von Bologna*, a novel (1917); *Befreite Stunde* (1918); *Der Doppelspiegel*, a story (1920); and *Die Einzige Sünde*, a story (1920). In 1906 he was awarded the Bauernfeld Prize. He was elected president of the Authors' Union of Austria.

GIOLITTI, GIOVANNI (1843-). An Italian statesman (see VOL. IX). When the War broke out he was in favor of a strict neutrality. When the question of Italian participation arose in 1915, he attempted to overthrow the Salandra cabinet, but his effort was swept aside by the patriotic zeal of the Italian masses for war. Throughout the course of the War he was looked on as a "defeatist." After the Armistice he again returned to the premiership (May, 1920), largely because of the unsatisfactory régime of Premier Nitti. His stay in power was comparatively short (April, 1921) and was marked by a successful foreign policy but an internal programme which was dominated first by the Socialists and later by the Fascists. See ITALY, History.

GIRAUDOUX, JEAN (1882-). A French man of letters, educated at the Ecole Normale. Following his graduation he devoted himself in turn to teaching, journalism, and diplomacy. In the meantime he began his literary career as a writer of poems in prose. His first book, *Les Provinciales* (1909), won immediate recognition. His war book, *Lectures pour une Ombre*, is one of the few war books of literary merit. In 1922 his *Siegfried et le Limousin* (1922), a war story of shell shock and amnesia, was one of the books awarded the Grand Prix Balzac. His works include *Simon le Pathétique*; *Amica America*; *Elpénor*; *Adorable Cléo* (1920); *Suzanne et le Pacifique* (1921); and *Finale de Siegfried et le Limousin* (1922).

GIRL SCOUTS. A national organization founded in 1912, which emphasizes methods of training to develop in girls initiative, self-control, self-reliance, and service to others. In the War, Girl Scouts sold, in the third Liberty Loan campaign, 12,742 bonds, amounting to \$3,151,000. No records were kept of their activities in the first two loan campaigns, but in the fourth loan they practically doubled their third loan figure, when they sold \$6,123,550 worth, or 39,987 bonds. The government awarded 1201 medals to Girl Scouts for selling 10 or more bonds to as many different people, simply

in the fourth loan. Many other forms of war service were entered into and initiated by them. The War over, they readily turned to peacetime activities. Home-making, with the idea of developing beauty and simplicity as well as utility in the home, and teaching Girl Scouts to make the best American homes of to-morrow, is increasingly emphasized. From the date of foundation (1912) to 1924, 497,208 girls had the benefits of Scout training.

GISH, DOROTHY (1898-). An American motion picture actress, born in Dayton, Ohio, sister of Lilian Gish. She appeared on the stage from childhood. Her best known pictures are *Old Heidelberg*, *Stage Struck*, *The Little Yankee*, *Children of the Feud*, *That Colby Girl*, *Hearts of the World*, *Battling Jane*, *The Hope Cheat*, and *Orphans of the Storm*. In 1920 she married James Rennie, an actor.

GISH, LILIAN (1896-). An American motion picture actress, sister of Dorothy Gish. She appeared on the legitimate stage at the age of five and after 1913 played in motion pictures. Her best characterizations were in *The Birth of a Nation*, *A House Built on the Sand*, *Souls Triumphant*, *Hearts of the World*, *The Greatest Thing in Life*, *Broken Blossoms*, *Way Down East*, *Orphans of the Storm*, and *The White Sister*.

GLACIAL CONDITIONS. See GEOLOGY.

GLACKENS, WILLIAM J. (1870-). An American painter and illustrator (see VOL. X). At the Panama-Pacific International Exposition, 1915, he was awarded a bronze medal. In his later work, continuing his interest in the more colorful aspects of life, he maintained his reputation as a remarkable colorist.

GLAND. See SECRETIONS, INTERNAL; ZOÖLOGY, *Physiology*.

GLASPELL, SUSAN (MRS. GEORGE CRAM COOK) (1882-). An American author (see VOL. X). She wrote *Fidelity* (1915); *Trifles*, with George Cram Cook (1917); *Suppressed Desires* (1917); *Plays*, a collection including *Bernice* (1920); *Inheritors* (1921); and *Verge* (1922).

GLASS, CARTER (1858-). An American politician and Congressman, born at Lynchburg, Va., and educated at public and private schools there. For eight years he worked in a printing office and subsequently became owner of the *Daily News* and the *Daily Advance* of his native town. He served in the Virginia Senate from 1899 to 1903, and in the latter year, on the death of P. J. Olney, he became a member of the United States Congress, to which he was continuously reelected until 1918, when he resigned to become Secretary of the Treasury in President Wilson's cabinet. Here he was active in floating the Victory Loan. He resigned a year later (November, 1919), and was appointed and later elected to fill the unexpired term of Senator Thomas S. Martin, deceased. In 1920 he was chairman of the committee on resolutions at the Democratic national convention. As chairman of the House banking commission he sponsored and was largely responsible for the Federal Reserve Act. In 1923 he favored the recall of the American troops from Germany and in March of the same year was appointed a member of the debt funding commission but declined to serve.

GLASS, MONTAGUE (MARSDEN) (1877-). An American author, born at Manchester, England, and educated at the College of the City

of New York and New York University. Among other works he is the author of *Potash and Perlmutter* (1913), a successful farce, written in collaboration with Charles Klein. With Goodman (q.v.) he wrote: *Object: Matrimony* (1916); *Business before Pleasure* (1917); *Why Worry?* (1918); *His Honor Abe Potash* (1919).

GLEAVES, ALBERT (1858-). An American naval officer, born in Nashville, Tenn., and educated at the United States Naval Academy. He was commissioned ensign in 1881. He served on many stations and during the Spanish-American War commanded the torpedo boat *Cushing*. From 1901 to 1904 he commanded the *Dolphin* and *Mayflower* in special service, and from 1904 to 1908 he was in charge of the torpedo station at Newport, R. I. He did shore duty and was in command of several vessels until 1915, when he was placed in command of the destroyer force of the Atlantic fleet. In 1917 he had charge of convoy operations on the Atlantic and convoyed the first force of the American Expeditionary Force to France. From 1917 to 1919 he commanded the cruiser and transport force of the Atlantic fleet, and from 1919 to 1921 commanded the Asiatic station, and in 1922 the First Naval District and the Navy Yard in Boston. He was retired by operation of law in 1922. He was appointed rear-admiral in 1915, vice-admiral in 1918, and admiral in 1919. He wrote *Capt. James Lawrence, U. S. N.* (1904) and *History of the Cruiser and Transport Force* (1921).

GLENN, MARY WILLCOX (MRS. JOHN M. GLENN) (1869-). An American social worker, born in Baltimore, Md. For several years she taught in private schools and from 1897 to 1900 was executive secretary of the Henry Watson Children's Aid Society of Baltimore. In 1900 and 1901 she served as general secretary of the Charity Organizations Society of Baltimore and in 1915 was appointed president of the National Conference of Charities and Corrections. She was president and director in many other social organizations and was the author of *Development of Thrift* (1899).

GLENN, OLIVER EDMUNDS (1878-). An American mathematician and educator, born in Moorefield, Ind., and educated at Indiana and Pennsylvania universities. In 1902-03 he served as instructor at the University of Indiana and afterward was acting professor of mathematics at Drury College. In 1906 he was a member of the faculty of the University of Pennsylvania as instructor in mathematics, assistant professor, and after 1914, professor. He was a member of several scientific societies and the author of *A Treatise on the Theory of Invariants* (1915) and mathematical memoirs.

GLENO DAM FAILURE. See DAMS.

GLIDERS. See AERONAUTICS.

GLOVES. See LEATHER.

GLYCEROL. See CHEMISTRY, ORGANIC.

GOBLOT, EDMOND (1858-). A French logician and philosopher of science. In his *Essai sur la Classification des Sciences* (1898) he sought to continue the tradition of positive rationalism inherited from Comte and Cournot. This project he carried out more fully in his later works, his *Traité de Logique* (1918) and *Le Système des Sciences: le Vrai, l'Intelligible, et le Réel* (1922). The rationalism expounded in these works is in direct contrast to the tendency of the school of Bergson toward

aesthetic mysticism. Goblot is also the author of a *Vocabulaire Philosophique* (1901).

GODDARD, HENRY HERBERT (1868-). An American psychologist known for his research in feeble-mindedness. He was born in Vassalboro, Me., and educated at Haverford College. After a period of school teaching, he was appointed professor of psychology at the State Normal School of Pennsylvania. In 1906 he resigned to take charge of the bureau of research in the Training School for the Feeble-minded at Vineland, N. J. After 12 years in this capacity he was made director of the State Bureau of Juvenile Research, of Ohio. His major publications comprise *The Kallikak Family* (1912); *Feeble-mindedness: Its Causes and Consequences* (1914); *The Criminal Imbecile* (1915); *Psychology of the Normal and Subnormal* (1919); *Human Efficiency* (1920); and *Juvenile Delinquency* (1921).

GODFREY, HOLLIS (1874-). An American educator and engineer, born in Lynn, Mass., and educated at Tufts College and Harvard University. From 1898 to 1905 he was engaged in teaching and from 1906 to 1910 was head of the department of science of the School of Practical Arts in Boston. He was consulting engineer for several cities and corporations and was research worker for the New York State Commission on Hygiene from 1910 to 1917. He was president of the Drexel Institute in Philadelphia from 1913 to 1921, and after 1921 was chancellor and senior fellow of the Institute of Management. He wrote *The Man Who Ended War* (1908); *The Health of the City* (1910); and *Dave Morrell's Battery* (1912), as well as contributions to periodicals.

GOETHALS, GEORGE WASHINGTON (1858-). An American civil and military engineer (see Vol. X). He resigned from the post of Governor of the Canal Zone in 1916 and was made chairman of the board of inquiry in regard to the Adamson eight-hour law. He was State engineer of New Jersey in 1917 and in the same year was made manager of the Emergency Fleet Corporation. Because of his lack of faith in the wooden fleet he resigned after three months and was appointed acting quartermaster-general of the United States Army. In 1918 he was made chief of the division of purchase, storage, and traffic, and was also a member of the War Industries Board. At his own request, he was relieved from active service in 1919, and later headed an engineering and construction company.

GOITRE. Examination of United States recruits during the War showed a considerable percentage of cases of this affection. In one group of 20,000 no less than 6 per cent showed simple goitre in a considerable degree. It also became evident that this affection was endemic in certain areas, such as the belt which runs south of the Great Lakes. It is here that most of the intensive study and attempts at prevention have taken place. Thus in the school children of Akron, Ohio, goitre is known to develop in a considerable number, and it was learned that addition of a few milligrams of iodine to the daily diet was a certain preventive. At Rochester, N. Y., the city water supply was medicated with iodine with the desired result of preventing the development of the disease.

As far as the United States and Great Britain are concerned, simple goitre may be regarded as the most readily prevented of all diseases.

The problem is more complicated in France, Switzerland, and India, where the disease has been endemic for centuries with a high incidence. Here other factors may be at work in determining the disease, and the mere addition of a little iodine to the food or water may be insufficient for prevention. The iodine ingested by the patient may not be absorbed as a result of an abnormal condition of the intestine. Similarly there may be some irregularity in regard to the metabolism of iodine, or it may be too rapidly eliminated. The preventive action of iodine has, however, been demonstrated in school children in Switzerland, and it has been shown likewise that regions of high altitudes, remote from the ocean, may not contain enough iodine in their plant foods and water to prevent the development of the disease. Simple goitre must not be confused with toxic goitre or Graves's disease. In this form there is not much enlargement of the thyroid, but the patient is an invalid who suffers much from rapid pulse and nervousness. See **FOOD AND NUTRITION**.

GOLD. The War, with its extension economic changes and dislocation of values, produced a depression in the gold mining industry from which, after 1921, mining interests sought to emerge. Naturally, on account of the world exchange situation, certain mines, such as those in South Africa and Australia, were able to produce gold with considerable advantage, as they received a virtual premium on their output; but with the strengthening of sterling exchange they were placed in a worse position. In the United States there was no such advantage, and with the increased costs of labor and materials the mining of gold was not attended by attractive profits, so that in November, 1922, payment of a bounty on gold mining for three years was even advocated; another measure proposed a bounty to be raised by an excise tax on gold used in the arts. In the United States few new

PRODUCTION OF GOLD IN THE UNITED STATES CALENDAR YEARS 1910-23

Calendar years	Fine-ounces	Value
1910	4,657,017	96,269,100
1911	4,687,053	96,890,000
1912	4,520,719	93,451,500
1913	4,299,784	88,884,400
1914	4,572,976	94,531,800
1915	4,887,604	101,035,700
1916	4,479,057	92,590,300
1917	4,051,440	83,750,700
1918	3,320,784	68,646,700
1919	2,918,628	60,333,400
1920	2,476,166	51,186,900
1921	2,422,006	50,067,300
1922	2,363,075	48,849,100
1923	2,485,445	51,378,700

fields were developed between 1914 and 1924, but with improved processes older mines had been reopened, and with increased production of copper, lead, and zinc, the gold and silver obtained as a by-product was more and more looked on as a source of profit. In 1915 the United States produced gold valued at \$101,035,700, or 21.5 per cent of the world's highest production, namely, \$468,799,812; but its quota had continually decreased until, notwithstanding an increase in 1923, it was but 14 per cent (\$51,378,700), or but slightly more than half of the record production of 1915. This reduced output also was accompanied by a discouraging outlook for the future as the returns from the various States showed that there had been a

considerable decline in production where the gold was obtained from siliceous ores and gravels, while the increases had come where the gold was obtained from refining the base metals, copper and lead, where production had greatly increased and metallurgical processes were constantly being improved. Thus while Arizona, Utah, Nevada, Idaho, Montana, Washington, and New Mexico all showed increased production in 1923, California, Alaska, South Dakota, Colorado, and Oregon all had a diminished output. In the United States the purchasing power of the gold dollar was shrinking, and at the same time large importations of gold were being made. This increased the gold reserves of the United States and added to the considerations which naturally would lead to low interest rates, to high prices, and in mining to higher costs. The accompanying table shows the production of gold in the United States in 1923 by States.

UNITED STATES REFINERY PRODUCTION OF
GOLD FOR 1923
FIGURES COMPILED BY THE BUREAU OF THE
MINT, WITH THE COÖPERATION OF THE
UNITED STATES

State	Ounces	Gold Value
Alaska	309,653	\$6,401,100
Alabama	5	100
Arizona	292,684	6,049,700
California	655,051	13,541,100
Colorado	314,495	6,501,200
Georgia	19	400
Idaho	36,305	750,500
Montana	85,121	1,759,600
Nevada	195,227	4,035,700
New Mexico	23,563	487,100
North Carolina	53	1,100
Oregon	23,085	477,200
Pennsylvania	111	2,300
South Carolina	15	300
South Dakota	303,984	6,283,900
Tennessee	319	6,600
Texas	44	900
Utah	157,567	3,257,200
Washington	15,335	317,000
Wyoming	10	200
Philippine Islands	72,824	1,505,400
Porto Rico	5	100
Totals	2,485,445	\$51,378,700

During the latter part of the period 1914 to 1924, and particularly during 1924, gold mining in the United States suffered on account of the high cost of labor and supplies, which were probably about 60 per cent higher than in 1913, while the price of gold naturally remained fixed at \$20.67 an ounce. Furthermore the mine operators of the United States were not able to pay for labor and supplies in a depreciated currency as in other countries but on a gold basis. In 1922 the United States consumed in the industrial arts gold to the amount of \$59,806,052, of which \$36,697,980 was new material, while \$48,849,096 represented the total production for the year. Gold was similarly used in other countries so that the total amount thus consumed was estimated as slightly in excess of \$100,000,000. When gold was used for cheap jewelry, for gilding, and like purposes, it obviously could not be recovered, so that the world's supply correspondingly was depleted.

In 1914 the United States exported some \$222,616,156 of gold and imported \$57,387,741, a balance of \$165,000,000 in excess of exports over imports. With the single exception of 1919, when the United States exported \$368,185,248

and imported \$76,534,046, the imports were in excess of the exports, because of the extremely heavy excess of merchandise exports over merchandise imports. In 1919 the United States had considerable balances due to neutrals, particularly in South America and Asia, and in that year there was a net outflow of gold, as shown in the table. On Mar. 18, 1922, the

UNITED STATES GOLD MOVEMENTS

	Imports	Exports
1913	\$63,704,832	\$91,798,610
1914	57,387,741	222,616,156
1915	451,954,590	31,425,918
1916	685,990,234	155,792,927
1917	552,454,374	371,883,884
1918	62,042,748	41,069,818
1919	76,534,046	368,185,248
1920	417,068,273	322,091,208
1921	691,267,448	23,891,377
1922	275,169,785	36,874,894
1923	322,716,812	28,643,417

Secretary of the Treasury announced that "the Treasury had resumed payments of gold service in the ordinary course of business without demand, and that the Federal Reserve Banks throughout the country would be guided by a similar policy in making current payments for gold account." This action removed the last artificial restriction on gold payments. The gold imported into the United States up to the close of 1921, and possibly for a short while afterward, was used to cancel indebtedness earlier incurred to Federal Reserve Banks by member banks. After that time the net gold imports were employed to build up the cash reserves of member banks with the reserve banks and to enable them approximately to increase the deposit liabilities of the member banks some tenfold without increasing their reliance on advances from the central banks. In January, 1923, the gold reserve in the United States was \$3,800,000,000, or nearly three times that of the British Empire and more than three times that of France.

PRODUCTION OF GOLD IN THE WORLD
CALENDAR YEARS 1910-22
BUREAU OF THE MINT

Calendar years	Fine ounces	Value
1910	22,022,180	\$455,289,100
1911	22,348,313	461,980,500
1912	22,549,335	466,136,100
1913	22,248,331	459,913,820
1914	21,244,880	439,170,642
1915	22,678,191	468,709,812
1916	21,974,839	454,260,242
1917	20,294,304	419,520,457
1918	18,563,157	383,734,482
1919	17,698,184	365,853,933
1920	16,303,306	337,004,255
1921	15,974,962	330,231,792
1922	15,440,243	319,178,164

The production of gold in Canada varied considerably. In 1911 it had fallen to \$9,781,077 for the entire Dominion, from which it increased to \$19,148,920 in 1921, and to \$26,116,050 in 1922. The Klondike's production, which in 1900 had been 1,077,553 ounces, by 1913 had declined to 282,838 ounces, and in 1922 this had further shrunk to 54,456 ounces. While there were no prospects of another Klondike in Canada, yet from time to time new deposits were encountered, and it was realized that there were substantial possibilities in other regions. For example, in 1923 the chief producers at Porcupine had a good year, and the same was true elsewhere in the province, Ontario producing

about \$21,000,000 in 1923. There the shortage of power was being met by new hydro-electric plants which were put in operation; others were in course of construction.

Mexico in 1910 reached a maximum gold production valued at \$25,100,000, from which it fell off to \$4,960,000 in 1915, increasing to \$16,705,000 in 1918, and about \$15,000,000 in 1922. The high cost of explosives was a serious item in view of the increased operating expenses; in Mexico, as in Germany, greater use was being made of liquid-oxygen explosives.

In South America, Colombia, which averages about 240,000 ounces a year, was the best gold producer during the decade 1914-24 and was followed by Brazil with an average of 125,000 ounces.

Russia and Siberia must be looked on as important future producers of gold, as the deposits there certainly warranted exploitation with proper government encouragement. Siberia in 1915 had a production valued at \$28,586,000, but due to the Revolution and changed conditions of government this had fallen to approximately \$1,000,000 in 1921 and to \$2,700,000 in 1922. The Transvaal, which had a maximum output in 1916 valued at £39,484,934, had only £34,488,250 in 1921. In 1922, due to the strike and civil war, the production was but £29,835,000. One significant feature of mining operations in the Transvaal was the decreasing production cost, which it was thought would be lowered still more with the consummation of a policy of consolidating some of the smaller properties. Increased labor efficiency was also the rule, and with native colored labor more largely employed and made more efficient, it was believed that properties once considered of too low a grade could be worked at a profit and the life of the gold fields extended.

GOLD COAST. A British colony of West Africa which includes within its administrative area Ashanti and the protectorate of the Northern Territories. Total area, 80,000 square miles; population, census of 1911, 1,503,386; increased by 1921 to 2,078,043. In 1915 there were 2206 Europeans, and in 1921, 2939. Chief towns are Accra (38,000), Seccondie (10,000), and Cape Coast Castle (15,000). Education, encouraged by the government and foreign missions, made great strides. There were 20 government schools and 214 government-aided schools with an attendance of 31,089 in 1921. The staple products and exports remained cocoa, palm oil, kola nuts, palm kernels, india rubber, and manganese. Exports in 1913, 1920, and 1922 were valued at £5,427,106, £12,352,207, and £8,335,400. Imports for the same years were £4,952,494, £15,152,145, and £7,900,539. That the gains were due to inflated values may be seen from the shipping record over the period, for the total tonnage entered and cleared was 2,986,000 (1913), 2,358,254 (1920), and 2,509,000 (1921). Chief imports in 1921 were cotton goods, machinery, provisions, apparel, hardware, and building materials. The growing importance of the United States in the Gold Coast foreign trade may be gauged from the following: imports for 1921 from United Kingdom, £5,828,000; from the United States, £965,000; exports to the United Kingdom, £3,216,000; to the United States, £1,031,000. Cocoa, the chief source of the economic well-being of the native population, continued to gain steadily. Exports in 1913 were 50,554 tons; in 1922,

159,305 tons. Gold, the leading product of the Ashanti, declined. In 1912 the production was 352,957 ounces; in 1921, only 85,019. The output of manganese ore in 1922 was valued at £106,031. Government accounts for 1913, 1920, and 1921-22 showed in revenues and expenditures £1,301,566 and £1,353,201; £3,721,772 and £2,856,347; £3,016,520 and £3,285,290. Railroad building continued; a line was completed from Accra to Anyinam (85 miles), and an extension was under way from this line to Coomassie in 1923. During the War the Gold Coast regiment aided in the reduction of German Togoland, where administration was conducted by British Gold Coast officials until the surrender of the territory to the French in 1919 under a League of Nations mandate.

GOLDEN, JOHN (1874-). An American playwright and producer, born in New York City. He played in stock and repertoire and was successively comic journalist, student of music, and song writer. He has composed more than 1000 songs, written many short plays, and designed scenery and costumes and composed the music for about a dozen musical comedies. His best known serious song is *Poor Butterfly*. The best plays with which he has been identified include *Turn to the Right*, *Lightnin'*, *Three Wise Fools*, *Thunder*, *Dear Me*, *The First Year*, *The Wheel*, *Spite Corner*, and *Thank U*. Of a number of big shows at the Hippodrome his best were *Hip-Hip Hooray*, *Cheer Up*, and *Everything* (1918-19).

GOLDFARB, ABRAHAM J. (1881-). An American zoölogist, born in London, England, and educated at the College of the City of New York and Columbia University. He was tutor in biology (1910-11), instructor in natural history (1911-13), and assistant professor (1913-) at the College of the City of New York. He published articles on experimental zoölogy and embryology.

GOLDMAN, EMMA (1869-). An American anarchist (see VOL. X). She was arrested and deported to Russia in 1919. In 1920 she was reported to have said that she wanted to come back to the United States, but she was not allowed to return. On promising to abstain from propaganda, she was allowed to live in Germany, but in 1924 she held a protest meeting in Berlin, in behalf of the non-Communist revolutionaries in Russia, which was broken up by the police.

GOLDSMITH, ROBERT (1882-). An American writer and lecturer, born at Kingston, N. Y., and educated at Phillips Academy in Andover, Mass. In 1907-08, he engaged in publishing, and at intervals from 1909 to 1916 he was active in the Congregational ministry. His last pastorate was that of the Mapleton Park Congregational Church in Brooklyn, N. Y. From 1916 on, he held editorial or administrative positions with the Russell Sage Foundation, the League to Enforce Peace, the Rockefeller Foundation, the Interchurch World Movement, the New York World, the Bureau of Political Research, and the Democratic national committee. He is the author of *A League to Enforce Peace* (1917).

GOLDWYN, SAMUEL (1882-). An American motion picture producer born in Warsaw, Poland. He organized the Jesse Laaky Feature Photoplay Company, the Goldwyn Pictures Corporation, the Eminent Authors' Pictures, Inc., and the Madison Productions, Inc.,

and was a pioneer in inducing American authors to work actively for the motion pictures. Among the stars he introduced to the screen were Mary Garden, Pauline Frederick, and Geraldine Farrar. He has published a volume of reminiscences.

GOLF. The galleries at golf matches are small compared with the throngs which assemble for professional baseball games or college football games in the United States or a soccer cup-tie in the United Kingdom. The reason is simple. Everybody is intent on his own little golf match. In other words, in so far as the Anglo-Saxon world is concerned, golf has more actual playing disciples than any other sport. Both sexes of all classes and all ages have joined in the stampede for the links; the biggest rush came in the decade ending with 1924. The "craze" has been more widespread in the United States than elsewhere and has led the larger municipalities to lay out courses in the public parks. The number of club links opened during recent years runs into the thousands. International competition, particularly between Great Britain and the United States, has been keen. In 1920 Edward Ray of England visited the United States and captured the national open championship, and in 1921 Jock Hutchison of the United States reciprocated by carrying off the British open title. In the following year Walter Hagen, also of the United States, won the British open championship. A. G. Havers succeeded in 1923 in regaining these laurels for England. In 1924 Walter Hagen again won the British open title. An American team successfully defended the Walker Cup, emblematic of the world's team championship, against English players in 1923. The winners of the more important United States championships during the period 1915-23 follow:

National open: 1915, Jerome D. Travers; 1916, Chick Evans, Jr.; 1917, Jock Hutchison; 1918, no match; 1919, Walter C. Hagen; 1920, Edward Ray (England); 1921, James Barnes; 1922, Gene Sarazen; 1923, Robert T. Jones, Jr.

National amateur: 1915, Robert A. Gardner; 1916, Chick Evans, Jr.; 1917, no match; 1918, no match; 1919, S. D. Herron; 1920, Chick Evans, Jr.; 1921, Thomas Guilford; 1922, Jesse Sweetser; 1923, Max R. Marston.

National women's amateur: 1915, Mrs. C. H. Vanderbeck; 1916, Alexa Stirling; 1917, no match; 1918, no match; 1919, Alexa Stirling; 1920, Alexa Stirling; 1921, Marion Hollins; 1922, Glenna Collett; 1923, Edith Cummings.

The holders of the principal British titles have been:

Open: 1915-19, no matches; 1920, George Duncan; 1921, Jock Hutchison (United States); 1922, Walter C. Hagen (United States); 1923, A. G. Havers; 1924, Walter C. Hagen.

Amateur: 1915-19, no matches; 1920, Cyril Tolley; 1921, W. Hunter; 1922, E. W. Holderness; 1923, Roger Wethered.

Women's: 1915-19, no matches; 1920, Cecil Leitch; 1921, Cecil Leitch; 1922, Joyce Wethered; 1923, Miss Chambers.

GOLLANCZ, ISRAEL (1864-). An English scholar (see VOL. X). He became a corresponding member of the Royal Spanish Academy (1919) and visited the United States in 1923. One of his later works was the *Book of Homage to Shakespeare* (1916).

GOMEZ, JUAN VICENTE (1859-). A Venezuelan politician (see VOL. X). In 1913

ex-President Castro attempted to regain his power in Venezuela, and on August 3, President Gomez left the capital to restore public order. On Jan. 1, 1914, he returned to Caracas with his army and resumed the presidency. His term ended on Apr. 19, 1914, and on that day the Venezuelan Congress elected him commander-in-chief of the national army. On May 3, 1915, he was chosen president for the term ending Apr. 19, 1922. He did not take office but remained commander of the army. On May 3, 1922, he was again elected president for the term 1922-29.

GOMPERS, SAMUEL (1850-). An American labor leader (see VOL. X). On the entrance of the United States into the War, he was appointed a member of the Advisory Commission of the Council of National Defense (1917-19); and in 1918-19, he was a representative of the American Federation of Labor at the Paris Peace Conference. He was president of the international commission on labor legislation at the peace congress; chairman of the delegates from the American Federation of Labor to the convention of the International Federation of Trades Unions at Amsterdam (1919); a member of the President's first industrial conference (1919), of the President's unemployment conference (1921), and of the President's advisory disarmament commission (1921-). In addition, he has held the presidency of the Pan-American Federation of Labor and was a member of the Sulgrave Institute. In 1921 he was elected president of the American Federation of Labor for the fortieth time. Gompers is an antisocialist and for that reason opposed the United States' recognizing Russia.

GONADS. See SECRECTIONS, INTERNAL.

GONZIA AND GRADISCA. See FIUME-ADRIATIC CONTROVERSY.

GOODALE, HUBERT DANA (1879-). An American zoologist, born at Troy, N. Y., and educated at Trinity College, in Connecticut, and Columbia University. He was resident investigator at the Station for Experimental Evolution, Cold Spring Harbor, N. Y. (1911-13) and research biologist in poultry husbandry at the Massachusetts Experiment Station (1913-). Professor Goodale's publications have been on heredity, mainly in connection with domestic fowl.

GOODMAN, JULES ECKERT (1876-). An American dramatist, born in Gervais, Ore., and educated at Harvard and Columbia Universities. He was prominent in magazine work for years as managing editor of *Current Literature* and with the *Dramatic Mirror* and *Outing*. His writings include, in collaboration with Montague Glass, *The Man Who Came Back* (1916); *Object: Matrimony* (1916); *Business before Pleasure* (1917); *Why Worry?* (1918); *His Honor Abe Potash* (1919). He also wrote *The Silent Voice* (1914) and *Pietro* (1919), in both of which Otis Skinner was starred; *The Dreamer* (1920); *The Law Breaker* (1921); *Charms* (1923).

GOODNOW, FRANK JOHNSON (1859-). An American educator and legal scholar (see VOL. X). In 1914 he was made president of Johns Hopkins University. He published *Principles of Constitutional Government* in 1916.

GOOSSENS, EUGENE (1893-). A British composer and conductor, born in London. He began his musical studies at the Conservatory in Bruges in 1903 and entered the Liver-

pool College of Music in 1906. In 1907 he won a scholarship at the Royal College of Music in London, where he spent the next four years under Rivarde (violin) and Stanford (composition). From 1911 to 1915 he was a violinist in the Queen's Hall Orchestra and appeared occasionally as conductor of his own works. In 1915 Beecham engaged him for his opera company, to conduct Stanford's *The Critic*; of this task the young man acquitted himself so successfully that he remained as regular conductor until the dissolution of the enterprise in 1920, when he was engaged by the British National Opera Company. In the meantime frequent appearances as guest conductor with several orchestras in the provinces and in London had established his reputation as one of the foremost of British conductors. In 1923 he appeared in the United States as guest conductor of the Rochester Philharmonic Orchestra for the first half of the season. As a composer he is very prolific and won recognition from the beginning. He is an uncompromising exponent of ultramodern tendencies. Among his works are two symphonic poems, *Perseus* and *The Eternal Rhythm*; *Symphonic Prelude* to a poem by Ossian; an orchestral scherzo, *Tam O'Shanter*; *Variations on a Chinese Theme* for orchestra; *Poem* for violin and orchestra; *Miniature Fantasy* for string orchestra; *Fantasy Sextet* for strings, commissioned for the Berkshire Festival, 1923; a great deal of chamber music; piano pieces and songs; and an overture and incidental music to Verhaeren's *Philip II*.

GORDON, CHARLES WILLIAM (1860-). A Canadian author (see Vol. X). In 1915 he was chaplain with the Canadian forces at the front. He has served on a special commission for the imperial government and the Canadian government in the United States (1917) and on a special commission for the Canadian government to Great Britain (1918) and was appointed chairman by the Council of Industry for the Province of Manitoba by the provincial government (1920). Among his later publications are *The Major* (1917), *The Sky Pilot in No Man's Land* (1919), and *To Him That Hath* (1921). He wrote under the name of "Ralph Connor."

GORDON, WALTER HENRY (1863-). An American army officer, born in Wilkinson county, Miss. He graduated from the United States Military Academy in 1886 and was commissioned second lieutenant in the same year. After serving in the Spanish-American War and with various regiments, he was appointed colonel of the 31st Infantry in 1916, and brigadier-general in the National Army in 1917. He served as commander of the 154th Depot Brigade at Camp Meade, Md., in 1917, and in the same year was transferred to the 10th Infantry Brigade, 5th Division, Camp Forrest, Ga. In 1918 he was appointed major-general commanding the 6th Division. He was honorably discharged and was appointed brigadier-general of the Regular Army in 1921. In 1918-19 he was on service in France and was with the Army of Occupation in Germany in 1919. In 1920 he was appointed commandant of the Infantry School at Camp Benning, Ga.

GORE, CHARLES (1853-). An English theologian and prelate (see Vol. X). In 1919 he resigned his bishopric, and settling in London, identified himself with the Christian Socialists. Among his later works were *The*

Religion of the Church (1916); *The Epistle of St. John* (1920), *Christian Moral Principles* (1921), *Belief in God* (1921), *The Duty of Christ* (1922), and *Belief in Christ* (1923).

GOREMYKIN, IVAN LOGGINOVITCH (1839-1917). A Russian statesman (see Vol. X). After the Revolution he was arrested and confined for a short time in the Fortress of St. Peter and St. Paul. Together with his wife and brother-in-law, he was murdered in the Caucasus in the latter part of October, 1917.

GORIZIA. See WAR IN EUROPE, *Italian Front*.

GORKY, MAXIM (ALICKËI MAXIMOVITCH PÉSHKOV) (1863-). A Russian author (see Vol. X). His later works include *About the Devil*, *The Reader*, *Three Men*, *Comrades*, *My Childhood*, *In the World*, *Reminiscences of L. N. Tolstoy*, and *My University Days*. Throughout his works runs the same motive, the story of an inarticulate soul striving for expression.

GORMAN, JAMES EDWARD (1863-). An American railway official, born in Chicago. He began his railroad career with the Chicago, Burlington, and Quincy road, in 1877. He occupied important positions in several companies and was with the Atchison, Topeka, and Santa Fé in various capacities from 1895 to 1917. In the latter year he became president of the C. R. I. and P. R. R. and was Federal manager of this road from 1918 to 1920, when he again became its president.

GOSSE, EDMUND WILLIAM (1849-). An English poet, critic, and biographer (see Vol. X). He was chairman of the board of Scandinavian studies at University College in London (1917) and president of the English Association (1921). His later works include *Inter Arma* (1916), *The Life of Algernon Charles Swinburne* (1917), *Three French Moralists* (1918), *Diversions of a Man of Letters* (1919), *Malherbe* (1920), *Books on the Table* (1921), and *Aspects and Impressions* (1922).

GÖTZINGERF, GUSTAV (1880-). A geologist at the Geological Institute, Vienna, born in Neu-Serowitz, Moravia, and educated at the Gymnasium and the University of Vienna. He became editor of the *Geographische Jahresbericht aus Österreich*. In 1903-05 and 1907-12 he was assistant at the geographical institute of the University of Vienna; in 1905, hydrographer and geographer of the biological station at Lunz; and in 1906-11 oceanographer of the Society for the Investigation of the Adriatic. In 1912 he was appointed section geologist of the Geological Institute at Vienna. He is the author of numerous works, dealing especially with glacial and marine geology. Some of these are *Exotische Blöcke Wienerwald* (1906); *Entstehung der Begrüdenformen* (1907); *Lunzer Mittersee* (1908); *Eis der Lunzer Seen* (1909); *Oceanographische Beobachtungen Nördlicher Adria* (1910); *Geomorphologie der Lunzer Seen*, *Geologie und Morphologie Dinara*, *Morphologie des Ostlichen Kalkhochplateaus* (1912); *Gletschervermessung der Alpen* (1906); *Nordisches Diluvium West-Schlesiens* (1914, 1915); *Erzgebirge, Österreichische Alpenneeforschung* (1916); *Eis der Lunzer Seen* (1917); and *Phosphathöhle von Osaklovina* (1919).

GOUCHER COLLEGE. A nonsectarian college for women at Baltimore, Md., founded in 1885. Goucher showed a gain of approximately 165 per cent in the number of students enrolled

in the decade between 1913-14 and 1923-24, with 1024 registered at the end of that time as compared with 386 at the beginning. The faculty also increased, from 29 to 81, and the library from 12,000 to 40,000 volumes. The endowment fund, begun during this period, amounted to \$1,500,000 in 1924. A new site was bought in 1921 at Towson, Md., and a campaign inaugurated to collect \$6,000,000, of which \$5,000,000 was to be used to move the college from Baltimore to Towson. The remaining \$1,000,000 was to be added to the permanent endowment fund. To this latter fund the General Education Board in New York pledged \$400,000 in 1921 and paid an additional \$40,000 in cash. The Board gave \$250,000 to the endowment fund of the college in 1917. President, William Westley Guth, Ph.D., LL.D.

GOULD, EDWIN (1866-). An American railway official (see VOL. VIII). In 1917-18 he served with Squadron A, New York National Guard, and in the latter year was major of ordnance in the 1st Brigade of the New York guard.

GOURAUD, HENRI JOSEPH EUGÈNE (1867-). A French general, born at Paris, and trained at St. Cyr. He became lieutenant of infantry in 1880. He served in the Sudan in the 1890's. In 1904, promoted to the rank of lieutenant-colonel, he became commandant of the Congo territory. In 1914 he was temporary general of division and in 1915 commander of the colonial army corps. In the same year he was appointed substantive general of the division. Early in his life General Gouraud was made a chevalier of the Legion of Honor; in 1904 he became an officer, and in 1918 he received the Grand Cross of the Legion. In 1924 he was elected to the French Academy in the section of Archaeology and Belles Lettres. This was in recognition of his establishment, in the Near East, of a special archaeological and fine arts service, which helped in the excavations of Byblos, Tyre, and Sidon.

GOYAU, P. L. T. GEORGES (1869-). A French man of letters. He was born at Orléans and was educated at the Ecole Normale Supérieure and the Ecole Française de Rome. As one of the editors of the powerful *Revue des Deux Mondes* and of *Figaro* he wielded an influence in behalf of conservatism and Catholicism. His published writings reflect the social Catholic tradition of Joseph de Maistre. He was elected member of the French Academy in 1923. A partial list of his writings includes *Le Pape* (1893); *Le Vatican* (1895); *Autour du Catholicisme Social* (3 series: 1897, 1901, and 1907); *L'Allemagne Religieuse: Le Protestantisme* (1898); *L'Idée de Patrie et l'Humanitarisme* (1901); *Essai d'Histoire Française* (1901); *L'Allemagne Religieuse: le Catholicisme* (2 vols., 1905); *Le Cardinal Mercier* (1917); *La Pensée Religieuse de Joseph de Maistre* (1921); *St. Jeanne d'Arc* (1921); and *Histoire Religieuse de la Nation Française* (1922).

GRAFF, KASIMIR ROMUALD (1878-). A German astronomer, born at Prochnowo, Posen, and educated at the Gymnasium and at Friedrich-Wilhelm University in Berlin. In 1897 he was made assistant in astronomy at the university and in 1900 became a member of the board of directors of the Urania Observatory in Berlin. In 1909 he transferred to the Hamburg observatory, where he became a professor in

1917. He is the author of many astronomical articles in scientific periodicals and of the *Grundriss der Geographischen Ortsbestimmung* (1914); a German adaptation of Fabre, *Der Sternhimmel* (3d ed., 1921); an adaptation of Newcomb, *Astronomie für Jedermann* (4th ed., 1922); and *Astrophysik*, with Scheiner (1922).

GRAFLY, CHARLES (1862-). An American sculptor (see VOL. X). In 1915 he served on the International Jury of Awards at the Panama-Pacific International Exposition. In 1917 he became instructor in the Boston Museum of Fine Arts. Among his awards during the period were the Potter Palmer gold medal, 1921.

GRAHAM, STEPHEN (1884-). An English writer on Russia (see VOL. X). In addition to a series of articles contributed to the *London Times*, his later works include *Russia and the World* (1915); *The Way of Martha and the Way of Mary* (1915); *Through Russian Central Asia* (1916); *Russia in 1916* (1917); *Priest of the Ideal* (1917); *Quest of the Face* (1918); *Private in the Guards* (1919); *Children of the Slaves* (1920); *The Challenge of the Dead* (1921); *Europe—Whither Bound?* (1921); *Tramping with a Poet in the Rockies* (1922), and *Under-London* (1923).

GRAHAME-WHITE, CLAUDE (1879-). An English aviator and writer (see VOL. X). Among his later books are *Learning to Fly* (1914); *Aircraft in the Great War* (1915); *Air Power* (1917); *Our First Airways, Their Organization, Equipment and Finance* (1918); *Books for Boys; Heroes of the Air; With the Airmen; The Air King's Treasure; The Invisible War-plane; Heroes of the Flying Corps*.

GRAIN. See AGRICULTURE; WHEAT.

GRAINGER, PERCY ALDRIDGE (1882-). A British composer and pianist, born at Brighton, Melbourne, Australia. He received his first instruction on the piano from his mother, continued with J. Kwast in Frankfort (1894-1900), and was for a short time with Busoni. After a most successful début in London, in 1900, he toured Great Britain, New Zealand, Australia, and South Africa. Returning to Europe in 1906, he made tours of the continent until 1915, when he visited the United States and settled there permanently. He served in the American army during the War and was afterward naturalized. As a composer he became known first in 1912, when he conducted his *Mock Morris* at one of Gardiner's concerts in London. Almost without exception his compositions are based on folk music, of which he is not only a profound student but also an ardent collector; he has taken more than 500 records of folk melodies of all the countries he has visited. His choral works with orchestra include *Father and Daughter*, *Sir Eglamore*, *The Bride's Tragedy*, and *Marching Song of Democracy* (for the Worcester Festival, 1916). He has also written *In a Nutshell*, suite for piano and orchestra; for orchestra, *Molly on the Shore*, *English Dance*, *Colonial Song*, *Shepherd's Hey*; pieces for piano, and a few songs. Consult D. C. Parker's *P. A. Grainger: A Study* (New York, 1918).

GRAIN STANDARDS. See WHEAT.

GRAND RAPIDS. A city of Michigan, at the head of navigation on the Grand River. The population rose from 112,571 in 1910 to 137,634 in 1920, and to 145,947 by estimate of the Bureau of the Census for 1923. A new charter providing that the city be governed by

a commission of seven members and a city manager went into effect in 1916. In 1920, active city planning work was begun. Building permits increased from \$3,618,119 in 1914 to \$10,204,795 in 1923. During the period a municipal tuberculosis hospital costing \$605,000, a high school costing \$600,000, grade schools, a theatre costing \$750,000, hotels, churches, a Roman Catholic seminary, and an academy were built. Bank deposits increased from \$34,281,682 to \$63,671,929, and clearings from \$168,038,735 to \$334,335,000. Assessed valuation rose from \$100,842,216 to \$221,426,753.

GRÄNER, PAUL (1873-). A German composer, born in Berlin. After a varied career as operatic conductor in several German cities he went to London in 1896 as conductor at the Haymarket Theatre and taught several years at the Royal Academy of Music. From 1902 to 1909 he taught at the Neues Konservatorium in Vienna and from 1910 to 1913 was director of the Mozarteum at Salzburg. He then lived in Munich until 1920 and devoted himself chiefly to composition. In 1920 he accepted the professorship of composition at the Leipzig Conservatory, succeeding Reger. He is the originator of *Kammermusikdichtung*, employing the usual combinations of instruments heretofore used only in pure chamber music for the purpose of interpreting a literary programme, as Raabe's *Hungerpastor* by means of a piano trio, or *Sehnsucht an das Meer* by means of a piano quintet. Among his other works are a symphony in D minor, a *Sinfonietta*, *Musik am Abend* for orchestra, and the operas *Das Narrengericht* (Vienna, 1913), *Don Juans Letztes Abenteuer* (Leipzig, 1914), *Theophano* (Munich, 1918), and *Schirin und Gertraude* (Dresden, 1920).—Consult G. Gräner's volume, *Paul Gräner* (Leipzig, 1922).

GRANT, PERCY STICKNEY (1860-). An American clergyman (see Vol. X). He continued, until 1924, as rector of the Church of the Ascension, New York City. Here he maintained a so-called Forum for free discussion, in which advocates of all political and social doctrines were permitted to speak freely. This was widely criticized and finally, in 1923, following action taken by Bishop Manning, the forum was greatly modified in its character. He also came in controversy with Bishop Manning on the question of divorce. He became engaged to a lady who had been divorced, and Bishop Manning refused to authorize the marriage, which did not take place. In June, 1924, he resigned his rectorship. His later books include *Fair Play for the Worker* (1918); *Essays and Poems* (1922); and *The Religion of Main Street* (1923).

GRAPHITE. Graphite is extensively consumed in the United States for various industrial purposes. The natural product, both in its crystalline and amorphous forms, entered into consumption, together with the manufactured product, which is made in the electric furnace. In addition to the native supply, the crystalline graphite used in the United States is produced in Ceylon, Madagascar, Japan, Austria, Bavaria, and Czecho-Slovakia as indicated in the accompanying table. It is used mostly in making crucibles and as the metallurgical activities of the War led to extensive mining, there was abnormal production which was gradually later being absorbed.

The crystalline product, in the form of lump,

DOMESTIC NATURAL GRAPHITE SOLD

Year	IN THE UNITED STATES, 1914-22			
	Amorphous		Crystalline	
	Short tons	Value	Pounds	Value
1914	1,725	\$38,750	5,220,539	\$285,368
1915	1,181	12,358	7,074,370	417,273
1916	2,622	20,723	10,931,989	914,748
1917	8,301	73,481	10,584,080	1,094,398
1918	6,560	69,455	12,861,839	1,454,799
1919	3,379	47,716	8,086,191	731,141
1920	4,694	49,758	9,632,360	576,444
1921	1,842	20,860	1,189,523	75,664
1922	2,200		1,849,766	85,242

chip, or dust, comes mainly from Ceylon, while most of the imported crystalline flake comes from Madagascar and Canada. The amorphous graphite is used mainly for foundry facings and paint, and while some is mined in Rhode Island, the greater part is imported from Chosen (Korea) and Mexico. The sales of crystalline graphite in 1922 amounted to 1,849,776 pounds, valued at \$85,242, the average value per pound being \$0.046, or \$0.018 less than in the preceding year. The quantity of amorphous graphite sold was 2200 tons.

The imports into the United States were, in 1916, 86,033,920 pounds, valued at \$7,279,884, but they declined to 39,633,575 pounds, valued at \$480,961, in 1923. In 1900 artificial graphite was first manufactured on an extensive scale in the United States, when 860,750 pounds, valued at \$168,860, were produced. By 1914 this amount had been increased to 10,455,139 pounds, and to 13,012,000 pounds by 1922. In 1915 the manufacture of graphite started on a substantial scale in Canada with a production of 497,271 pounds, which by 1918 had increased to 1,808,698 pounds. Naturally such production was only possible where cheap water power was available.

GRASTY, CHARLES HENRY (1863-1924). An American journalist, born at Fincastle, Va., and educated at the University of Missouri and Washington and Lee University. He was managing editor of the *Kansas City Times* (1884-89); editor and proprietor of the *Baltimore Evening News* (1892-08); director of the Associated Press (1900-10); editor and controlling owner of the *St. Paul Dispatch* and the *Pioneer Press* (1908-09), and of the *Baltimore Sun* (1910-14); war correspondent for the Associated Press, *New York Times*, and *Kansas City Star* in Europe (1915); and treasurer of the *New York Times* (1916-20). During the War he was on the editorial staff of the *New York Times* (1916-21) and was widely recognized as an independent writer on war situations abroad. He died in London, in January, 1924.

GRAVES, CHARLES L. (1856-). An Irish author (see Vol. X). Among his later works are *War's Surprises* (1917), *Lands and Libels* (1918), *Mr. Punch's History of the Great War* (1919); *Horace's Odes*, Book V, an English version with Rudyard Kipling (1920), *New Times and Old Rhymes* (1921), *Punch's History of Modern England* (1921), etc.

GRAVES, FRANK PIERREPONT (1869-). An American educator, born in New York City, and educated at Columbia University. From 1891 to 1893, he was assistant professor of Greek, and immediately afterward, professor of classical philology in Tufts College. In 1896-98, he was president of the University of Wyoming; in 1898-1903, president of the University of Washington, and in 1904-21, pro-

fessor of education or dean in Missouri, Ohio, Wisconsin, Chicago, Pennsylvania, and Columbia Universities. In 1921 he became president of the University of the State of New York and Commissioner of Education. His publications include *Burial Customs of the Ancient Greeks* (1891); *The Philoctetes of Sophocles* (1893); *The State University Ideal* (1897); *A History of Education before the Middle Ages* (1909); *A History of Education during the Middle Ages and the Transition to Modern Times* (1910); *Great Educators of Three Centuries* (1911); *Peter Ramus and the Educational Reformation of the Sixteenth Century* (1912); *A History of Education in Modern Times* (1913); and *What Did Jesus Teach?* (1919).

GRAVES, HENRY SOLOW (1871-). An American forester, born at Marietta, Ohio, and educated at Yale, Harvard, and the University of Munich. From 1900 to 1910 he was professor of forestry and director of the Forest School at Yale, and from the latter date to 1920, chief of the United States Forest Service. He was a member of many American and foreign societies and wrote *Forest Mensuration* (1906), and *Principles of Handling Woodlands* (1911). During the War he was lieutenant-colonel in the corps of engineers, serving in France. In 1920 he became consulting forester.

GRAVING DOCKS. See **DOCKS**.

GRAVITATION, IN LIGHT OF MODERN THEORY. See **PHYSICS**.

GRAY, ALEXANDER (1882-). An American engineer, born in Edinburgh, Scotland, and educated at Edinburgh and McGill Universities. Until 1904 he was engaged in engineering work in Edinburgh, and from 1910 to 1915 was assistant professor of electrical engineering at McGill University. In the latter year he became head of the electrical engineering department at Cornell. He was a member of several engineering and other societies and wrote *Electrical Machine Design* (1913) and *Principles and Practice of Electrical Engineering* (1914). He was also the author of a section of the *Standard Handbook for Electrical Engineers*.

GRAY, GEORGE (1840-). An American jurist and legislator (see Vol. X). He was appointed peace commissioner to Great Britain in 1915, and in the same year he was chairman of the United States delegation to the Pan-American Scientific Congress. President Wilson appointed him a member of the American-Mexican Commission in 1916.

GRAY, LOUIS H. (1875-). An American orientalist, (see Vol. X). He was associate editor of the *Hastings Encyclopædia of Religion and Ethics* (Edinburgh 1905-15), editor of *Mythology of all Races* (1915-18), and after 1921 professor at the University of Nebraska. He was one of the American commissioners to negotiate peace in Paris (1918) and attaché to the American embassy (1920).

GRAYSON, CARY TRAVERS (1878-). An American physician and rear-admiral, born at Culpepper County, Va., and educated at William and Mary College and the University of the South. In 1904 he graduated from the United States Naval Medical School. After service as assistant surgeon of the United States navy, he was appointed medical director, with the rank of rear admiral, in 1916. He was the personal physician of Presidents Roosevelt, Taft, and Wilson. During the War he was a member of many important commissions and was

also connected with the staff of several hospitals in Washington and elsewhere.

GRAZIE, MARIE EUGENIE DELLE (1864-). An Austrian poet, dramatist, and novelist, who was very prolific during the years 1914-24 (see Vol. X). She published *Das Buch des Lebens* and *Zwei Wittwen* (1914); *Die Blonde Frau Fina*, *Das Buch der Liebe*, *O Jugend!* and *Eines Lebens Stern* (1916); *Homo*, *Donaukind*, *Der Liebe und des Ruhmes Kränze*, and *Die Blume der Acacia* (1921), all fiction.

GREAT BRITAIN. The United Kingdom of Great Britain and Northern Ireland, and the Irish Free State. The former is a constitutional monarchy; the Irish Free State, a self-governing dominion. The capital of the United Kingdom is London, and Dublin is the capital of the Irish Free State. The term Great Britain is applicable literally to England, Scotland, and Wales; the term United Kingdom to Great Britain, Northern Ireland, the Isle of Man, and the Channel Islands; and the term British Isles to the United Kingdom and the Irish Free State. The United Kingdom with all of its possessions and dependencies, including the self-governing dominions, crown colonies, protectorates, mandates, and other territories subject to the control of Parliament, constitutes the British Empire (q.v.).

Area and Population. The total area of the British Isles is 121,633 square miles, of which 88,745 square miles make up Great Britain, 27,155 square miles the Irish Free State, 5,431 square miles Northern Ireland, and 302 square miles the Isle of Man and the Channel Islands. The total population of the British Isles in 1921, exclusive of navy, army, and merchant seamen abroad, was 47,307,601, an increase of 1,937,071 over 1911. No census was taken in Ireland in 1921; so the 1911 figure was used in both years. The number of persons per square mile was, in 1911: England and Wales, 618.3; Scotland, 156.6; Northern Ireland, 230.3; Irish Free State, 115.6. In 1921 it was: England and Wales, 649.4; Scotland, 160.6. During 1922 there were 780,187 births in England and Wales and 115,085 in Scotland; there were 486,829 deaths in England and Wales and 72,904 in Scotland. In 1921 there were 90,720 births in Ireland and 63,838 deaths. The population of Greater London was 7,476,168 in 1921 and 7,251,358 in 1911. The population of the Administrative County of London and City of London was 4,483,249 in 1921, as compared with 4,521,685 in 1911. The largest cities in the United Kingdom are:

			Per cent Increase or Decrease
ENGLAND			
	1911	1921	
London	4,521,685	4,483,249	- 0.9
Birmingham	840,202	919,438	+ 9.4
Liverpool	753,353	803,118	+ 6.5
Manchester	714,385	730,551	+ 2.3
Sheffield	460,183	490,724	+ 6.6
Leeds	454,155	458,320	+ 1.2
Bristol	357,114	377,061	+ 5.6
West Ham	289,030	300,905	+ 4.1
Kingston-upon-Hull ..	277,991	287,018	+ 3.2
Bradford	288,458	285,979	- 0.9
SCOTLAND			
Glasgow	784,496	1,034,069	+ 31.8
Edinburgh	320,318	420,281	+ 31.2

The following table shows the population of the British Isles in 1911 and 1921 divided according to sex.

Division	AREA Square Miles	1911		POPULATION		1921	
		Males	Females	Total	Males	Females	Total
England	50,874	16,421,298	17,623,992	34,045,290	16,984,087	18,694,443	35,678,530
Wales	7,466	1,024,310	1,000,892	2,025,202	1,098,133	1,108,579	2,206,712
Scotland	30,405	2,308,839	2,452,065	4,760,904	2,348,403	2,533,885	4,882,288
Northern Ireland	5,431	602,539	647,992	1,250,531	* 602,539	* 647,992	* 1,250,531
Irish Free State	27,155	1,589,509	1,550,179	3,139,688	* 1,589,509	* 1,550,179	* 3,139,688
Isle of Man	227	23,937	28,079	52,016	27,321	32,917	60,238
Channel Islands	75	46,229	50,670	96,899	41,264	48,350	89,614
Total	121,633	22,016,661	23,353,869	45,370,530	22,691,256	24,616,345	47,307,601

* Irish Census of 1911.

The total movement of travelers from the British Isles to non-European countries was 463,285 in 1923 and 701,691 in 1913, and the inward movement was 210,509 in 1923 and 372,618 in 1913. The 1923 figure included British subjects: 337,567 outward and 147,184 inward; alien subjects: 125,718 outward and 63,325 inward. In addition to the above, there were 12,653 outward passengers and 5642 inward passengers recorded at ports of the Irish Free State for the nine months from April to December, 1923, when that country had separated from the United Kingdom. In 1923, about 33 per cent passed through Liverpool, 32 per cent through Southampton, 16 per cent through London, and 12 per cent through Glasgow. Of the outward passengers, 182,758 went to the United States; 158,359 to British North America; 45,265 to Australia, and 21,160 to British South Africa. Of the inward passengers, 80,109 started from the United States, 47,300 from British North America, 20,238 from British South Africa, and 14,539 from Australia. The number of passengers of all nationalities to and from the Continent was 1,038,154 outward and 1,103,016 inward in 1923, as compared to 1,184,412 outward and 1,309,874 inward in 1913. In 1923, 256,284 British nationals left for non-European countries as emigrants and 57,606 returned as immigrants; the figures for 1913 were 389,394 and 85,709 respectively. Of the 1923 emigrants, 93,076 left for the United States, 88,290 for British North America, and 39,967 for Australia. The following table shows the total emigration of British nationals:

	1913	1922	1923
Male adults	178,538	77,073	135,870
Female adults	141,106	70,816	84,178
Children under 12	69,750	26,207	36,236
Total	389,394	174,096	256,284

Of those moving in 1923, 140,891 departed from England, 4529 from Wales, 88,584 from Scotland, and 22,280 from Ireland, as compared with 271,756, 5040, 68,202, and 44,396, respectively, in 1913.

Education. Elementary education was under the control in England and Wales of the Board of Education, in Scotland under the Committee of Council on Education, and in Ireland under the Commissioners for National Education. Elementary education was free and compulsory from 5 to 14 years. In 1921, there were 21,584 elementary schools in England and Wales with 7,160,000 pupils and 170,000 teachers, an increase over 1913, when there were only 6,046,500 pupils and 164,152 teachers. In addition, in 1921 there were 546 schools for the blind and defective with an enrollment of 38,326 pupils, as compared with 25,704 pupils in 347 such schools in 1913.

In 1921 there were 1205 secondary schools with 17,950 teachers and 340,000 pupils, while in 1913 there were only 1010 such schools with 13,790 teachers and 174,423 pupils. A similar increase was recorded in teachers' training colleges, of which there were 86 in 1913 with 11,876 pupils, and in 1921, 92 with 15,451 pupils. In 1920, there were 4831 evening schools with 751,327 pupils, as compared with 6876 in 1913 with 798,881 pupils. In Scotland there were 3426 public schools with 21,986 teachers and 860,984 pupils in 1913, and in 1921 there were 3387 schools with 24,484 teachers and 862,220 pupils. In Ireland in 1913 there were 8229 primary schools with 682,011 pupils, and in 1917 (last available total) there were 7947 schools with 682,561 pupils. The universities and colleges were rapidly recovering from the ill effects of the War. The 10 leading universities in England are Oxford, Cambridge, Durham, London, Manchester, Birmingham, Liverpool, Leeds, Sheffield, and Bristol. In Scotland, St. Andrews, Glasgow, Aberdeen, and Edinburgh were the four leading Universities, and in Ireland, Trinity College (Dublin), Queens University (Belfast), University College (Cork), University College (Galway), and University College (Dublin), were the five leading institutions of higher education. The enrollment in such schools in the British Isles in the years 1913-14 and 1922-23 was as follows:

	Professors		Students	
	1913-14	1922-23	1913-14	1922-23
England	2,533	3,077	24,010	31,030
Wales	156	294	1,140	2,530
Scotland	564	747	7,550	11,190
Ireland	532	289	2,475	4,492
Total	3,785	4,407	35,175	49,242

Agriculture. In the British Isles, land was divided into three classes: rough grazing, arable land, and permanent grass. The following table shows the distribution of land in 1912 and 1922:

	1912 acres	1922 acres
England and Wales:		
Rough grazing	3,774,655	4,782,000
Arable land	11,335,276	11,310,515
Permanent grass	15,839,414	14,715,278
Scotland:		
Rough grazing	8,919,629	9,634,000
Arable land	3,325,027	3,338,068
Permanent grass	1,496,307	1,387,431
Ireland:		
Rough grazing	2,583,485	2,864,288
Arable land	4,988,551	5,270,615*
Permanent grass	9,685,227	9,122,860*

* Area in 1918.

The British farmer was in a bad economic position, as only 20 to 25 per cent of the food supply of the country could be produced within the country, and he had to meet the keen competition of products imported from countries more favorably situated, especially from the Continental countries of depreciated exchange. 1922 and 1923 were both bad years, the former because of a long drought and the latter because of persistent and heavy rains during the latter part of the summer and early autumn. The heavy burden of post-war rates, tithes, and taxes left little from the proceeds of crops for the landowner. One result was the return to permanent pasture of much of the arable land which was put under cultivation during the war period. In 1918, the total arable land in Great Britain and Ireland was 21,122,750 acres, approximately 1,500,000 more than before the War. The following table shows the acreage of crops in the British Isles:

Irish Free State	1912	1922
Horses		429,101
Cattle		4,326,294
Sheep		3,067,473
Pigs		919,449

To the above statistics on land, produce, and animals in the larger divisions of the British Isles should be added small amounts for the Isle of Man and the Channel Islands. In 1922 they were as follows:

	Isle of Man	Channel Islands
Arable land	65,690	20,655
Permanent grass	17,955	9,894
Oats	19,472	1,965
Wheat	229	625
Barley	534	297
Turnips	6,526	...
Potatoes	2,208	9,753
Horses	5,764	3,651
Cattle	19,291	16,244
Sheep	72,150	179
Pigs	3,709	960

Crops	Great Britain		Ireland	Northern Ireland	Irish Free State
	1912	1922	1912	1922	1922
Wheat	1,925,737	2,032,168	44,855	34,469	6,305
Oats	3,029,054	3,152,357	1,046,000	813,970	399,722
Barley	1,648,201	1,521,068	165,367	167,747	2,518
Beans and peas	488,308	462,691	1,700	447	1,188
Potatoes	612,671	718,581	595,184	400,982	168,567
Turnips	1,512,535	1,225,240	271,771	199,204	48,677
Mangolds	488,486	424,649	81,700	81,709	1,845

The following table shows the total produce of the principal crops of the British Isles:

Mineral Production. The principal economic resource of the British Isles was coal,

Crops	Great Britain		Ireland	Northern Ireland	Irish Free State
	1912	1922	1912	1922	1922
Wheat	6,979,795	7,979,000	195,493	5,725	32,232
Barley	6,404,841	5,804,000	871,059	2,066	151,581
Oats	13,741,883	14,101,000	6,858,196	306,594	573,248
Beans and peas	1,455,165	1,115,000	8,403	.....	.....
Potatoes	3,179,632	5,203,000	2,546,710	1,251,709	2,179,532
Turnips	20,278,639	17,788,000	3,783,218	764,005	2,673,770
Mangolds	8,836,718	8,595,000	1,301,048	80,669	1,298,943

One of the economic resources of the British Isles was the pasture land on which were raised the large flocks of sheep. These flocks were the early foundation of the textile industry, which continues one of England's greatest. During the latter part of 1923 a serious epidemic of hoof and mouth disease broke out in England and large numbers of cattle and sheep had to be killed before it was brought under control. The following table shows the number of live stock in 1912 and 1922:

	1912	1922
England and Wales		
Horses	1,248,003	1,119,545
Cattle	5,841,720	5,722,661
Sheep	18,053,365	13,438,020
Pigs	2,496,670	2,298,936
Scotland		
Horses	193,020	188,851
Cattle	1,184,376	1,146,807
Sheep	7,004,367	6,684,097
Pigs	159,127	150,884
Ireland		
Horses	544,332	.....
Cattle	4,848,498	.....
Sheep	3,828,829	.....
Pigs	1,323,957	.....
Northern Ireland		
Horses .....	.....	115,363
Cattle .....	.....	830,331
Sheep .....	.....	499,048
Pigs .....	.....	117,277

which served as fuel not only for industry, but also for the British merchant marine and as a return cargo for vessels entering British ports. It was one of the principal articles in export trade, for production was in excess of home consumption. The 10 years 1914-24 were difficult because of the war demands and the subsequent period of depression. The record year for production of coal was 1913; from then a gradual decline was recorded until 1918, which was followed by two years of slight increase, but in 1921, because of the strike which lasted 88 days, a very low record of production was shown. The years 1922 and 1923 showed decided improvement; 1923 was the second highest year on record. Employment in the mines followed somewhat similar lines, except that the lowest number employed was in 1915 and the greatest in 1920. The year 1921 was difficult for miners; they were out on strike for nearly three months because of wage disputes. The trouble finally ended in an agreement to base wages on the cost of living index and the volume of business. In January, 1924, general dissatisfaction with this wage agreement resulted in ballot vote by the miners to serve the required three months' notice of termination. Negotiations were, in the summer of 1924, proceeding for a new wage agreement. The following table shows the number of wage earners, total out-

put, exports, and bunkered coal for the period 1913 to 1923:

Year	Persons Employed	Output	Coal and Coke	Bunker
		Tons	Export Tons	Tons
1913	1,127,820	287,411,869	76,688,446	21,023,693
1914	1,133,746	265,664,393	61,830,485	18,535,616
1915	953,642	253,206,081	45,770,344	13,630,964
1916	998,063	256,348,351	41,157,894	12,988,172
1917	1,021,340	248,473,119	37,800,705	10,227,952
1918	1,008,867	227,748,654	34,173,915	8,756,476
1919	1,191,313	229,779,517	38,466,593	12,004,812
1920	1,248,224	229,295,000	28,862,895	13,914,903
1921	1,126,000	164,303,000	26,246,839	11,046,548
1922	1,129,500	233,899,000	67,939,476	18,292,000
1923	1,178,500	278,499,600	84,486,728	18,158,188

One of the outstanding factors in the above table was the decline in the exports of coal during the War, when a heavy domestic demand cut down the amount available for export by half. The years 1922 and 1923 were normal years in the export trade; in fact, the exports during 1923 were the largest on record. The principal export areas were the South Wales and north-eastern fields. The largest factor in the in-

of stimulation by the occupation of the Ruhr, but in the long run this brought on adverse results in the increased price of fuel and the delayed revival of confidence. The following table shows the number of furnaces in blast and the output of pig iron, steels ingots, and castings in 1913, 1920, 1921, 1922, and 1923.

Year	Furnaces in Blast	Output	
		Pig Iron Tons	Steel Ingots and Castings Tons
1913	338	10,250,000	7,660,000
1920	285	8,007,900	9,056,800
1921	95	2,611,400	3,624,800
1922	132	4,899,500	5,820,500
1923	200	7,438,500	8,488,900

After the War, British manufacturers not only were burdened with heavy taxation but also had to meet keener competition from foreign producers, especially in countries of depreciated exchange. Total exports in 1913 were 4,969,224 tons; in 1922, 3,397,185 tons; and in 1923, 4,319,571 tons. These totals were made up as follows:

Commodity	1913 Tons	1922 Tons	1923 Tons
Pig iron and ferro alloys	1,124,181	793,763	894,298
Iron bars, rods, angles, etc.	141,452	81,403	43,615
Steel	251,059	221,109	354,144
Hoops and strips	45,708	48,281	71,619
Plates and sheets not under ½ in.	126,380	95,462	193,789
Black plates and sheets under ½ in.	139,927	224,836	338,978
Galvanized sheets	762,075	513,110	602,390
Tin, terne, and other coated plates	497,497	449,273	552,338
Rails	506,585	258,987	306,904
Railway material	267,254	218,370	186,537
Tubes, pipes, and fittings, cast and wrought	399,608	162,476	242,200
Wire	60,532	51,500	78,596
Wire manufactures	55,739	34,677	52,572
Total, including other items	4,969,224	3,397,185	4,319,571

creased exports of 1923 was the occupation of the Ruhr, which upset a large producing area and put a heavier share of the burden of supplying the European demand on the British mines. The greater part of the exports went to Europe, chiefly to France, Germany, Italy, Belgium, and Holland. The War completely upset some of the large markets, but most of them were regained after the Armistice.

The following table shows the principal countries to which Great Britain exported coal during 1913, 1921, 1922, and 1923:

Country	1913 Tons	1921 Tons	1922 Tons	1923 Tons
France	12,775,909	6,395,651	13,579,417	18,826,352
Italy	9,647,161	3,383,083	6,341,743	7,592,735
Germany	8,952,328	817,877	8,345,606	14,806,232
Russia	5,998,434	188,878	584,069	476,205
Sweden	4,563,076	1,282,904	2,522,820	3,168,867
Argentina	3,693,572	887,344	2,021,092	2,461,074
Egypt	3,162,477	1,017,748	1,743,643	1,696,054
Denmark	3,034,240	1,803,561	2,866,238	3,170,269
Spain	2,534,131	1,021,472	1,711,021	1,145,801
Norway	2,298,345	694,316	1,566,969	1,609,758
Belgium	2,031,077	618,066	3,489,419	6,504,592
Netherlands	2,018,401	1,787,678	6,067,789	6,794,346

The iron and steel industry was not, by 1924, restored to pre-war activity, but in 1923 the pig iron output was about 74 per cent of that of 1913 and nearly three times that of 1921. The output of steel ingots and castings substantially exceeded the output for 1913 and was two and one-third times that of 1921. As in the case of coal, the War caused a general disruption of the industry and its chief markets, and they had not, by 1924, returned to the normal pre-war condition. An increase was recorded in 1923 because

Textile Industry. The cotton and woolen industries of Great Britain were located near the coal fields, the linen industry mainly at Belfast and Dundee, the lace industry at Nottingham, Derby, and Kilmarnock, and hosiery factories at Derby, Leicester, and Nottingham. The cotton industry depended entirely on imports of raw materials, while the woolen industry had to import two-thirds its wool, and the linen industry had to import one-half its flax. The cotton industry suffered more serious disorganization by reason of the War than any other industry. A large part of the cotton spinning and manufacturing machinery of France and Belgium was in the zone of hostilities, while the cotton factories of Russia were ruined in the early months of the Revolution, and England suffered a lack of raw material because of the submarine danger. Following the Armistice, England, with all her machinery intact, enjoyed a period of prosperity. Toward the close of 1920 the boom ended, and a serious depression set in, from which the industry had not recovered by 1924. During 1923, the short crop in America, plus the increased consumption by American mills, helped to cause a rapid rise in prices of raw materials. Economic disturbances in the chief markets of British cloth, i.e. China and India, caused them to cut down their purchases. The total number of cotton spindles in 1923 was 55,583,000, of woolen spindles 3,111,085, of worsted spindles 3,609,545, and of twisted spindles 1,352,196. The table on the next page shows the total imports of raw cotton, wool, and flax.

The principal sources of raw cotton were the United States, with 15,847,605 cents in 1913

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	1913	1922	1923	1913	1922	1923
Cotton (centals of 100 lbs.)	21,742,996	14,319,898	12,925,854	£ 70,570,547	£ 85,550,189	£ 91,243,550
Wool (centals of 100 lbs.)	8,485,764	11,535,226	7,782,196	36,632,255	61,941,142	49,468,885
Flax (tons)	102,453	39,582	33,685	4,771,219	3,943,711	3,007,669

and 6,691,028 in 1923; and Egypt, with 4,026,694 centals in 1913 and 3,486,322 in 1923. The three leading sources of raw wool were Australia, with 2,650,785 centals in 1913 and 2,764,787 in 1923; New Zealand, with 1,811,814 centals in 1913 and 1,811,006 in 1923; and South Africa, with 1,332,242 centals in 1913 and 1,124,377 in 1923.

The following table gives the total exports of cotton yarn and cotton piece goods during the pre-war year and four post-war years:

Cotton Yarns			Cotton Piece Goods		
Year	Pounds	£	Yards	£	
1913	210,099,000	15,006,291	7,075,252,000	97,775,855	
1920	147,432,400	47,585,814	Square yards. 4,435,405,000	315,717,631	
1921	145,894,900	23,924,879	2,902,288,900	137,132,298	
1922	201,220,800	26,436,489	4,181,176,300	142,415,686	
1923	145,019,500	21,011,911	4,141,903,700	138,354,185	

The three principal markets for cotton yarn were Germany, with 51,905,400 pounds in 1913, and 25,483,300 in 1923; Netherlands, with 39,255,300 pounds in 1913, and 34,233,400 in 1923; and India, with 37,422,400 pounds in 1913, and 20,862,900 in 1923. The principal destinations of cotton piece goods are shown in the following table:

	1913	1922	1923
	Linear yards	Square yards	Square yards
India	3,057,350,600	1,401,142,300	1,411,699,600
China (including Hong Kong)	716,532,500	308,992,000	234,710,200
Turkey (including Syria and Iraq)	360,741,700	190,953,200	220,833,300
Dutch East Indies	304,927,700	137,253,000	136,290,300
Egypt	266,623,400	206,995,600	207,292,000
Argentina	199,118,300	148,764,800	173,209,100
Australia	167,914,600	227,995,200	171,237,500
Straits Settlements	131,298,100	56,707,500	77,625,800
Canada	110,499,100	42,390,700	54,303,100
United States	44,415,000	95,384,000	174,922,200

The total exports of other textiles were as follows:

	1913	1922	1923
Woolen and worsted yarns (lbs)	80,415,300	62,190,500	56,562,900
Woolen tissues *	105,883,600	121,590,600	148,641,300
Worsted tissues *	62,490,100	62,337,700	62,948,400
Linen piece goods *	193,681,300	77,435,600	89,671,700
Jute piece goods *	173,484,200	137,784,900	158,057,038
Jute yarns, (lbs.)	41,766,100	36,862,700	35,663,600

* Linear yards in 1913 and square yards in the other years.

Shipping and Shipbuilding. The shipping and shipbuilding trades were prosperous during the War. After the signing of the Armistice this abnormal demand ceased, and an excess of tonnage was the immediate result. The lack of demand for tonnage caused rates to fall, which, added to the fluctuating exchanges and unsettled economic conditions, caused considerable hardship to shipowners. The excess tonnage was further augmented by the tendency to convert many old vessels to the Diesel type, which gave more cargo space and less fuel space. In the shipbuilding trade a dispute of the boiler-makers caused a seven months' strike during

1923, which curtailed launchings. Great Britain led the world in size of merchant marine, which in 1913 consisted of 8514 steam vessels of 18,273,944 tons and 700 sailing vessels of 422,293 tons, or a total of 9214 vessels (over 100 tons) of 18,696,237 tons; and in 1923 it was made up of 8299 steam vessels of 19,115,178 net tons and 395 sailing vessels of 166,371 tons, or a total of 8694 vessels (over 100 tons) of 19,281,549 net tons. During the War there were lost through enemy attack 2197 vessels of 7,638,020 tons.

The number and tonnage of vessels launched were as follows:

	1913	1922	1923
Vessels launched—number	688	235	222
Gross tonnage	1,932,153	1,031,081	645,651

Despite the poor year in 1923 for shipbuilding, Great Britain and Ireland maintained their

leadership in the world output of vessels. The tonnage of vessels entered and cleared at the

	1913	1922	1923
ports of the British Isles was about the same for 1913 and 1923. The total for 1913 was 116,883,387 tons; 1920, 73,108,000; 1921, 73,507,000; 1922, 103,006,072; and 1923, 116,854,335. The table on page 564 shows the entrances and clearances by nationalities for 1913 and 1923:			

Railways. The railways of Great Britain went through trying years in the post-war period. During the War the government operated the railways. From the Armistice until Aug. 14, 1921, they were operated by the government in preparation to turning them back to private ownership. After that date they reverted to

Entered with Cargo

Cleared with Cargo

	1913	1923	1913	1923
	Tons	Tons	Tons	Tons
British	32,291,262	30,952,475	40,101,944	39,394,023
Norwegian	3,284,789	2,647,701	4,683,138	4,398,783
German	3,166,353	1,784,842	5,729,543	3,265,715
Swedish	1,891,207	1,710,644	3,015,650	2,336,306
Dutch	1,702,192	2,385,322	2,535,552	3,937,526
Belgian	1,369,298	937,014	956,582	1,318,017
Danish	1,160,560	1,328,818	2,613,198	2,564,340
Spanish	1,059,948	911,070	1,694,089	1,289,695
French	999,228	1,443,936	1,974,820	4,026,793
United States	724,473	2,847,070	370,258	1,314,022
Greek	220,875	423,207	1,071,583	939,693
Japanese	139,623	448,050	281,705	519,454
Italian	122,228	344,185	954,800	1,442,346
Other nationalities	930,948	819,981	1,837,551	1,173,307
Total	49,062,984	48,934,315	67,820,413	67,920,020

private ownership, but the War disclosed a number of important problems for the companies. Costs of operation had increased tremendously and rates were advanced to the point where industries were suffering. The Railways Act of 1921 was passed, involving a reorganization of the roads in order to do away with expensive overhead and excessive competition. The roads were reorganized into the southern, western, northwestern, midland, west Scottish; northeastern, eastern, and East Scottish groups. Under this Act a rates tribunal and a wages board were also set up to deal with rates and wages. The effective date of the consolidation was Jan. 1, 1923. Considerable progress in new developments and new services were noted at the end of the first year. Rates on merchandise were reduced during 1923, by an average of 50 per cent of pre-war figures. The total mileage of track open for traffic, reduced to single track and including sidings, was 50,604 miles in 1913, 51,586 in 1922, and 51,782 in 1923. In 1923 this mileage was made up as follows: length of road, 20,233 miles; reduced to single track, 36,853 miles; and sidings, reduced to single track, 14,929 miles. On Dec. 31, 1923, the number of locomotives was 24,180 steam and 40 electric, as compared with 24,238 steam and 81 electric in 1922, and 23,581 steam and 83 electric in 1913. The number of merchandise, mineral, and special vehicles was 713,976 in 1923, 722,639 in 1922, and 735,294 in 1913. The traffic was divided as follows:

	1913 Tons	1922 Tons	1923 Tons
General merchandise	67,755,470	52,844,446	58,773,000
Coal, coke and patent fuel	225,601,127	200,102,316	222,239,000
Other minerals	71,067,357	48,678,846	61,983,000
Total	364,423,954	301,625,608	342,995,000

The total number of passengers carried in 1923 was 1,430,715,629, with total passenger train receipts of £85,581,142 as compared to £64,525,821 in 1913. Total goods train receipts were £64,254,895 in 1913, and £106,567,677 in 1923. The total capital expenditure in 1913 was £1,141,543,561, and £1,181,200,000 in 1923. The total number of originating live stock carried during 1923 was 16,891,237, of which sheep made up 11,000,242 and cattle 3,278,680. No statistics were published on the railways of the Irish Free State. It was estimated that it had 2705 route miles of road.

Economic Conditions. British economic conditions continued to suffer from war influ-

ences, the intense industrial activity and over-expansion immediately following the Armistice, and the severe depression of 1921. Toward the end of 1922 a revival set in, based largely on the stability of the national financial position and the clearing away of overexpanded credits of 1919 and 1920. The revival continued through 1923, though not on as great a scale as was expected. The occupation of the Ruhr by France and Belgium, the capital levy proposal, and the general election, caused industrialists to hesitate. Perhaps the best evidence of the real progress made by Great Britain after the War was the steady rise of the pound sterling from the low post-war slump. The average annual rates were as follows: par value, \$4.8665; 1914 average, \$5.14; 1915, \$4.78; 1916, \$4.76; 1919, \$4.43; 1920, \$3.66; 1921, \$3.85; 1922, \$4.43; 1923, \$4.57.

The most unfavorable aspect of 1924 British conditions was the large number of unemployed. Unemployment increased tremendously at the close of 1920 and early in 1921 during the severe depression. The highest number on the unemployment registers was recorded on June 24, 1921, when 2,178,000 were out of work. A steady decline in this number followed, until Mar. 31, 1924, when only 1,038,000 were on the registers. The improved condition of trade materially aided this decrease, and also the large programmes of municipal and private works of improvement and repair which gave employment to many thousand workers. The passage of the Trade Facilities Act in 1921, whereby the Treasury could guarantee the payment of loans for the purpose of carrying out capital undertakings, also helped decrease unemployment. The following table shows the percentage of trade union members unemployed:

End of	1913	1920	1921	1922	1923
	(Per cent)				
January	2.2	2.9	6.9	16.9	13.7
February	2.0	1.6	8.5	16.3	13.1
March	1.9	1.1	10.0	16.3	12.3
April	1.7	0.9	17.6	17.0	11.3
May	1.9	1.1	22.2	16.4	11.3
June	1.9	1.2	23.1	15.7	11.1
July	1.9	1.4	16.7	14.6	11.1
August	2.0	1.6	16.3	14.4	11.4
September	2.3	2.2	14.8	14.6	11.3
October	2.2	5.3	15.6	14.0	10.9
November	2.0	3.7	15.9	14.2	10.5
December	2.6	6.0	16.5	14.0	9.7

* Excluding coal miners.

There was, during the period surveyed, an increasing tendency to better the position of the laboring class and to legislate for their welfare.

In 1891 the total expenditure for social services was £22,629,379, which increased to £62,994,667 in 1911, to £306,737,843 in 1921, and to £371,716,891 in 1922. The principal schedules of expenditures were as follows, in thousand pounds sterling:

Items	1891 £	1911 £	1921 £	1922 £
National insurance (health)			29,875	30,634
Unemployment insurance			10,768	71,216
War pensions			100,949	88,921
Old age pensions		7,360	20,750	21,989
Education	11,488	33,490	88,788	92,375
Housing	242	888	4,693	5,220
Relief of the poor	9,351	16,747	35,626	46,846

Numerous industrial disputes occurred during 1923; chief of these were the seven months' lockout of the boilermakers and the "outlaw" strike of dockmen. In January, 1924, the coal miners gave notice of the termination of the wage agreement, the railway men went on a nine-day strike, and in February the dockmen walked out for 10 days. See UNEMPLOYMENT.

Commerce. The British Board of Trade estimated the total favorable balance of trade for Great Britain in 1923 as being £97,000,000. This represented a considerable decline, when compared with the balance of £155,000,000 in 1922, £252,000,000 in 1920, and £181,000,000 in 1913. The following table shows the comparative make-up of this estimate, in millions of pounds sterling:

Items	1913	1920	1922	1923
Excess of imports of merchandise and bullion	158	343	170	203
Net income from overseas investments	210	200	175	150
Net national shipping income	94	340	110	110
Commissions	25	40	30	30
Other services	10	15	10	10
Total invisible exports on balance	339	595	325	300
Available for investment overseas	181	252	155	97

British overseas trade was slowly recovering from the effects of the War which greatly upset many of the chief markets of the world. Previous to 1914 European markets were the chief outlet for British manufactures, but with the post-war economic uncertainties Great Britain sent more and more produce to her dominions and colonies. Following the War several plans were tried, to increase the foreign trade. The Export Credits scheme was passed in 1920; this authorized the Treasury to guarantee the payment of 80 per cent of the cost value of shipments to the new countries of Europe. In 1921 the Trade Facilities Act was passed, authorizing the Treasury to guarantee the payment of principal and interest on loans to be used for capital undertakings within the

Empire so long as it decreased unemployment and the material was purchased within the Empire. The Safeguarding of Industries Act was passed to prohibit the import of key commodities unless it was impossible to obtain a sufficient quantity in Great Britain. In Oc-

tober, 1923, the Imperial Economic Conference met in London and adopted resolutions for the further application of preferences to Empire goods, but the defeat of the Conservative government at the general election in December and the advent of the Labor government pledged to free trade brought that programme to an end.

The total trade of Great Britain in 1913 was £1,403,555,065 and in 1923 it was £1,983,916,935, an increase of 41 per cent. In considering a comparison of pre-war and 1923 figures, two things must be borne in mind, first, the great increase in prices over pre-war prices, and secondly, the fact that after Apr. 1, 1923, the trade of the Irish Free State was considered foreign trade. The increases occurred in all three cat-

egories, imports, exports, and reexports, and each year showed an adverse visible trade balance. The excess of imports was greater during the post-war years than in 1913, as shown in the following table:

	1913	1922	1923
			Excess of Imports (Millions of £)
1913			133.9
1914			171.7
1915			367.9
1916			344.6
1917			467.4
1918			783.8
1919			662.8
1920			375.4
1921			275.2
1922			179.9
1923			212.1

	1913	1922	1923
Total	£	£	£
Imports	768,734,739	1,003,098,899	1,098,015,585
Exports	525,253,595	719,507,410	767,328,656
Reexports	109,566,731	103,694,670	118,572,694
Food, drink, and tobacco			
Imports	295,149,630	471,881,370	510,532,556
Exports	33,875,845	36,301,190	44,345,276
Reexports	16,256,082	21,757,353	24,543,604
Raw materials and articles mainly unmanufactured			
Imports	269,939,720	298,338,680	324,952,756
Exports	66,173,319	101,965,214	130,808,728
Reexports	63,699,566	55,063,197	66,773,626
Articles mainly or wholly manufactured			
Imports	201,038,872	229,749,590	257,109,440
Exports	413,820,434	568,524,060	580,025,749
Reexports	29,504,972	26,821,234	27,171,075

	1913	1922	1923
Animals not for food	£	£	£
Imports	488,411	362,156	1,543,405
Exports	2,229,868	1,475,544	1,400,379
Reexports	106,111	52,886	84,389
Parcel Post			
Imports	2,118,106	2,767,103	3,877,428
Exports	9,154,129	11,241,402	10,748,524

The increases in trade and its general trend are shown in the two preceding tables of trade by major classifications in 1913, 1922, and 1923.

The above table shows clearly the type of commerce in which Great Britain was engaged; i.e. the import of large quantities of foodstuffs and raw materials for industries, and the export of manufactured products. The following table gives the imports and exports of principal commodities, by quantities, which for comparative value eliminates the price factor:

	1913	1920	1922	1923
		(In thousands of £)		
EXPORTS				
Coal (tons)	73,400	24,932	64,198	79,449
Iron and steel, and manufactures of (tons)	4,969	3,251	3,401	4,319
Machinery (tons)	689	462	403	432
Cotton yarns (lbs.)	210,099	147,432	201,221	145,019
Cotton piece goods (linear yds.)	7,075,252	4,435,405	4,312,667	4,286,248
Woolen tissues (sq. yds.)	105,884	187,233	121,489	148,641
Worsted tissues (sq. yds.)	62,490	77,355	62,458	62,948
Linen piece goods (sq. yds.)	193,681	93,045	77,421	89,672
Boots and shoes (dozen pairs)	1,453	819	492	796
Paper and cardboard (cwts.)	3,499	2,350	2,455	4,348
IMPORTS				
Cotton, raw (centals)	21,743	19,028	14,341	12,945
Wheat (cwts.)	105,878	109,328	96,380	100,930
Wool, raw (centals)	8,486	8,934	11,535	7,772
Butter (cwts.)	4,139	1,702	4,269	5,125
Sugar (cwts.)	39,385	27,427	38,179	31,366
Bacon (cwts.)	4,858	5,612	5,932	7,793
Tea (lbs.)	365,043	431,196	419,005	457,199
Meat (cwts.)	23,278	24,550	26,447	31,193
Tobacco (lbs.)	165,954	222,615	186,350	175,541
Total grain and flour (cwts.)	220,704	183,788	179,454	186,529

The changes in the direction of British trade may be seen in the following tables:

	ORIGIN OF IMPORTS	
	1913	1922 1923
United States	£141,652,072	£221,817,421 £211,227,465
British India	48,420,490	47,719,039 67,025,023
Australia	38,065,250	64,793,760 49,067,789
Argentina	42,485,391	56,620,803 66,084,756
Canada	30,488,374	54,874,201 53,447,832
New Zealand	20,338,057	48,510,239 42,969,456
France	46,352,718	48,537,887 58,473,471
Denmark	23,830,633	40,309,067 46,275,638
Netherlands	23,677,841	34,146,582 37,095,883
Germany	80,411,057	26,523,337 35,000,916
Egypt	21,394,735	32,252,896 34,671,817
Irish Free State*		
Russia	40,270,539	8,102,829 9,308,232

* From Apr. 1, 1923.

	DESTINATION OF EXPORTS AND REEXPORTS	
	1913	1922 1923
United States	£59,453,281	£77,268,870 £85,563,421
Australia	37,829,482	65,529,195 61,891,470
British India	71,670,281	98,422,012 87,214,331
France	40,881,707	66,156,503 68,298,245
Germany	60,499,693	49,096,559 60,838,440
Russia	27,693,953	4,611,027 4,488,383
Netherlands	20,522,031	40,562,469 35,210,289
Belgium	20,660,362	35,679,685 35,452,667
Argentina	23,437,343	23,324,615 28,859,103
China	15,010,418	23,137,949 18,780,055
Japan	14,827,270	24,457,273 26,579,901
Canada	27,307,193	27,784,617 30,334,573
Irish Free State*		
New Zealand	11,789,863	16,829,575 21,695,130

* From Apr. 1, 1923.

As already mentioned, the Irish Free State did not publish trade statistics from Apr. 1, 1923, when it was formally separated from the British Customs Union, up to December, 1923.

Beginning with January, 1924, the Free State Government was to publish monthly statistics. In 1920 the ascertained direct exports from all of Ireland to countries other than Great Britain amounted to only £1,846,417 out of a total export trade of £204,715,138, or 0.9 per cent of the whole. During 1921 such exports amounted to £2,414,678 out of a total export trade of £129,621,000, or 1.86 per cent of the whole. The total trade of Ireland for the years 1911 to 1921 is shown by the table below.

The table on page 567 shows the estimated values of the principal items of the import and export trade of Ireland during the calendar years 1913, 1920, and 1921.

	Imports	Exports
1911	£67,610,000	£65,071,000
1912	73,953,000	67,168,000
1913	74,467,000	73,877,000
1914	74,125,000	77,311,000
1915	87,257,000	84,463,000
1916	104,517,000	107,171,000
1917	119,181,000	133,805,000
1918	126,016,000	152,931,000
1919	158,716,000	176,052,000
1920	203,750,000	204,715,000
1921	118,971,000	129,621,000

Finance. One of the most striking achievements of the British government after the Armistice was the very large reduction in government expenditures and the balancing of the budget. In contrasting the large post-war expenditure of the British government with the pre-war rate, it should be borne in mind that the annual debt charge was, by 1924, about £307,000,000, as compared to only £19,000,000 in 1913-14. The budget was balanced at approximately £200,000,000 in 1913, but due to heavy war charges it was balanced at £1,000,000,000 in 1921, at £900,000,000 in 1922, at £800,000,000 in 1923. Actual returns showed a surplus of £1,000,000 in 1913, of £230,000,000 in 1920-21, of £46,000,000 in 1921-22, of £101,000,000 in 1922-23, and of £48,000,000 in 1923-24. The tremendous surplus in 1920-21 was not the result so much of real savings as of large receipts from sales of surplus war materials. The standard rate of the income tax was reduced from six to five shillings on the pound sterling, for it was expected that the revival of business due

	1913	1920	1921
IMPORTS			
Drapery	£ 5,817,118	£ 6,905,042	£ 4,518,390
Cotton goods	5,168,473	20,556,300	10,519,155
Maize	4,154,054	7,438,580	5,860,387
Wheat	3,868,903	9,717,267	5,408,000
Coal	3,269,344	12,283,852	6,233,132
Wheat flour	2,629,049	9,998,044	7,385,755
Flax	2,300,115	4,212,323	2,100,847
Bacon	2,048,116	3,883,339	3,774,331
Sugar	1,903,106	5,697,543	3,393,277
Boots and shoes	1,673,990	6,758,743	3,944,361
EXPORTS			
Linen goods	14,112,918	40,501,340	22,891,000
Store Cattle	7,741,730	12,590,627	8,702,551
Fat Cattle	6,307,811	20,724,142	13,569,470
Butter	3,735,645	8,897,384	6,340,224
Bacon	3,582,925	8,677,050	7,819,472
Steam vessels	3,148,000	12,720,000	10,106,500
Eggs	3,019,167	14,307,726	9,740,908
Cotton goods	2,722,350	12,896,900	6,133,365
Porter	2,269,340	7,246,187	6,514,229
Home-made spirits	2,008,500	8,406,871	4,905,179
Machinery	785,978	4,038,225	2,645,465

to lowered taxation would increase receipts. Results justified this bold policy, and in the 1923-24 budget the standard rate of the income tax was reduced to 4s. 6d. per pound, and the corporations profit tax was also reduced. Contrary to the usual British practice, supplementary credits totaling £13,078,100 for various unexpected contingencies had to be voted during January and February, 1924. The actual receipts in 1913-14 were £198,242,897, and in 1923-24, were £837,169,000, while expenditures were £197,492,969 and £788,840,000, respectively. The table below shows the exchequer receipts in the fiscal years 1913-14 and 1923-24:

REVENUE	1913-14	1923-24
Customs	£35,450,000	£119,958,000
Excise	39,590,000	147,970,000
Motor duties		14,691,000
Estate duties	27,359,000	57,800,000
Stamps	9,966,000	21,570,000
Land tax, house duty, etc..	2,700,000	2,760,000
Land value duties	715,000	
Income tax	47,249,000	269,331,000
Super tax		60,640,000
Corporation profits tax		23,340,000
Post office	30,800,000	52,800,000
Crown lands	530,000	920,000
Interest on loans	1,579,972	12,607,000
Miscellaneous	2,303,925	52,782,000
Total	198,242,897	837,169,000

For expenditures during the same years see table at top of next column.

The funded debt on Mar. 31, 1914, was £586,717,872; liability in respect of terminable annuities, £29,552,219; unfunded debt, £35,000,000, making a total "dead weight" debt of £651,270,091. Additional capital liabilities of £56,384,010 brought the gross debt to £707,654,110. The

EXPENDITURE	1913-14	1923-24
National debt services	£19,271,515	£307,309,000
Sinking fund	5,228,485	40,000,000
Road improvement fund	1,394,951	14,090,000
Local taxation accounts	9,734,128	13,662,000
Land settlement		1,209,000
Payments for Northern Ireland		3,967,000
Other consolidated funds	1,693,890	2,803,000
Army, navy, and air force	77,179,000	105,800,000
Civil services	53,901,000	239,366,000
Post office and revenue departments	29,090,000	60,634,000
Total	197,492,969	788,840,000

following table shows the standing of the public debt on Dec. 31, 1922, and 1923:

ITEMS	Dec. 31, 1922	Dec. 31, 1923
(In hundred thousands)		
Funded debt	£314	£314
Terminable annuities	15	14
3½ per cent conversion loans	690	683
Other war loans	2,548	2,571
Short-dated bonds	1,839	1,842
National savings certificates	350	367
Other debt	1,071	1,149
Other capital debt	67	68
Floating debt—		
Ways and means advances	222	211
Treasury bills	719	649
Total	7,835	7,868

On Apr. 29, 1924, Philip Snowden, Chancellor of the Exchequer, presented an estimated budget for 1924-25, balancing at £794,050,000. The chief feature of this budget was the repeal of the McKenna duties on motor cars, musical instruments, clocks, and films, effective Aug. 1, 1924. The corporation tax was to be repealed, entertainment tax reduced, and the "breakfast table" duties reduced by half:

REVENUE	000's omitted	EXPENDITURE	000's omitted
Customs	£101,800	National debt services	£350,000
Excise	135,900	Northern Ireland	3,500
Motor duties	15,600	Road improvement fund	15,000
Estate duties	56,000	Local taxation accounts	13,150
Stamps	21,000	Land settlement	750
Land, etc.	1,250	Other consolidated funds	2,440
Income	265,000	Army	45,000
Super tax	61,000	Navy	55,800
Excess profits	8,000	Air service	14,511
Corporations	20,000	Civil services	227,573
Post office	53,500	Customs department	11,221
Crown lands	900	Post office department	51,081
Interest on loans	12,250		
Miscellaneous:			790,026
Ordinary	11,850		
Special	30,000	Surplus	4,024
	794,050		794,050

Although the Irish Free State was to be given full fiscal autonomy by the Irish Free State Act of 1922, taxation in force at the time of establishment of the Free State continued unaltered until Mar. 31, 1923, and British and Free State finances were intertwined to a considerable extent during the 1922-23 fiscal year. For that year total expenditures amounted to £29,600,000 and total revenue to £27,900,000. After adjustments in the accounts of the two governments, the total deficit was approximately £4,000,000. The following table shows the result of the 1923-24 budget and the estimates for 1924-25 as presented to the Dail on Apr. 25, 1924:

ITEMS	1923-24	1924-25
Revenue:		
Customs	£8,220,000	£7,789,000
Excise	9,337,000	7,744,000
Estate duties	1,000,000	925,000
Stamp duties	490,000	485,000
Income and super tax	5,175,000	5,000,000
Excise profits	100,000	.....
Corporation tax	360,000	250,000
Motor duties	400,000	350,000
Postal, telegraph and tele- phone services	1,970,000	1,792,300
Miscellaneous	4,403,600	3,352,000
Total	31,455,600	27,687,300
Expenditure:		
Central fund services	3,226,199	4,472,482
Supply services		
Army	10,581,214	3,927,145
Property losses compensation	4,106,308	7,333,000
Public education	3,832,763	3,650,679
Old age pensions	3,144,138	2,919,200
Post office	2,604,001	2,666,960
Other services	11,144,732	11,376,777
Total	38,639,355	36,346,243

HISTORY

On the Eve of the War. So numerous and so vitally important were the events crowded into the decade 1914-24 that the historian may well regard these momentous years as one of the most significant periods in British history. Under the shock of worldwide war, the balanced poise of the two-party system and the complacent political moderation inherited from the Victorians were suddenly destroyed; and epochal changes, to consummate which in calmer times would have required generations, were accomplished with startling rapidity. By a Reform Bill (1918) more sweeping than those of 1832, 1867, and 1884, were enfranchised 8,000,000 citizens; the Labor party, stimulated by world unrest, grew from infancy to maturity almost over night, and a socialistic Labor government, hitherto considered a subject only for imaginative novelists and fanatical revolutionists, became a reality in 1924; the Gordian knot of Irish home rule, at which successive generations of cautious British statesmen had vainly fumbled, was cut with one brusque stroke in 1921; the self-governing dominions, suddenly coming of age, required a swift transformation from empire into commonwealth, while Indian and Egyptian nationalism, taking a sudden spurt, made what before 1914 would have been considered incredibly rapid progress toward autonomy.

Before dealing with these and other events in detail, it may be helpful to summarize the situation in Great Britain on the eve of the War. Since 1906 the Liberals had been in power, under the leadership, first, of Sir Henry Campbell-

Bannerman and then of Herbert H. Asquith. The latter, keen of intellect, coldly brilliant in debate, temporizing and conciliatory but always dignified in action, had skillfully presided over a Liberal cabinet comprising both aggressive chauvinists like Winston Churchill and reputed pacifists like Sir Edward Grey, Lord Morley, and John Burns; radical reformers like David Lloyd George and men of more conservative liberalism, such as Reginald McKenna; and he had held together a parliamentary majority precariously combining about 270 Liberals, 84 Irish Nationalists, and about 42 Laborites (figures for elections of December, 1910). Such a coalition, inherently weak, was necessary to confront the 274 Unionists who solidly filled the Opposition benches. To reward its loyal Irish Nationalist supporters, the Liberal cabinet had persistently, though perhaps without personal enthusiasm, endeavored to pass an Irish Home Rule Bill (introduced in 1912, passed by the Commons and rejected by the Lords twice in 1913, passed by the Commons a third time in the spring of 1914). To conciliate the Labor party, and also defer to the sincere convictions of the more radical Liberals, salaries had been given to Members of Parliament, trade unions had been protected in their industrial and political action by favorable laws, and a remarkable series of social reforms had been enacted, such, for example, as the extension of workmen's compensation (1906), regulation of sweated industries (1909), the minimum wage law for miners (1912), old age pensions (1908), and national sickness insurance for workers (1911), government labor exchanges (1909), and free meals for poor school-children (1906). In pursuance of traditional Liberal policies, the House of Lords had been curbed (1911); a measure against plural voting and another against the privileges of the Established Church in Wales had been brought forward, though not yet finally carried over the Lords' stubborn obstruction; a "land reform" campaign against the landed aristocracy had been rather luridly launched by the valiant and vitriolic Chancellor of the Exchequer, Lloyd George, in 1913-14; and, above all, the sacred principle of free trade had been faithfully preserved against imperialist and protectionist assaults.

In July, 1914, just before the war clouds broke, the political atmosphere in Britain was unusually electric. Suffragettes were attempting to win the franchise by violent demonstrations; London was in the throes of a building trades strike; titled landlords were nervously awaiting the impending conflict over land reform; the stalwarts of the House of Lords were predicting dire civic convulsions if the cabinet should carry out its announced intention of promulgating the Irish Home Rule and Welsh Church Disestablishment bills, which, having been passed by the Commons a third time in the spring of 1914, could now, under the Parliament Act, be presented for royal signature regardless of the Lords' opposition; high army officers had virtually mutinied rather than accept responsibility for maintaining order in Ulster; and in Ireland unlawfully organized volunteer armies, representing respectively the Ulster Unionists and the Irish Nationalists, were arming themselves with smuggled rifles for an apparently inevitable civil war. Indeed, blood had already been spilled at Dublin in a clash between soldiers and National Volunteers. Like leaves be-

fore the hurricane these issues were swept into the background by the tempest which arose in the Balkan storm centre in midsummer, 1914.

Entry into the War. That the British Secretary of State for Foreign Affairs, Sir Edward Grey, sincerely desired if possible to avert the catastrophe of August, 1914, post-bellum historical research seems to have proved almost beyond question: that by secret understandings with France (1904, 1906, 1912) and Russia (1907, 1908) he had so tied his hands as to make British intervention in any general war virtually inevitable, seems also to be the verdict of scholars; but whether he could have preserved peace by taking a position more openly and unreservedly either for or against France and Russia, is debatable. Though he had been warned by the German ambassador as early as July 6 that the Serajevo incident might produce an Austro-Russian crisis, Grey waited, inertly hopeful, until July 23, when he asked the Austrian Ambassador what action Vienna intended to take against Serbia. Although disinterested in the merits of the Austro-Serbian dispute, Grey feared Austro-Russian complications, and on July 24 proposed mediation by the four other Great Powers. While the British fleet, which had assembled on July 16 for practice manœuvres, was ordered by the ever-watchful Churchill on July 26 to remain mobilized, Grey continued during the next nerve-racking week to urge mediation, while he urged the cabinet to decide for intervention or neutrality in the coming struggle; if neutrality, he added, some other man must be given his portfolio. But the cabinet, almost equally divided, could make no decision, and therefore Grey of necessity had to use many "ifs" and "buts" in his communications to European capitals; he was able neither to offer unqualified pledges to France nor to make unreserved threats to Germany. In fact, as late as July 29 he told the French Ambassador, Cambon, that Britain's course was still undecided; to the German Liebnowsky he issued the famous warning that "if the issue did become such that we thought British interests required us to intervene, we must intervene at once." When the German government, taking alarm, offered a pledge not to annex French territory (not including French colonies), Grey heatedly refused to "bargain away" his loyalty to France or his interest in the neutrality of Belgium. If Germany made any "reasonable" pacific proposal, and France and Russia rejected it, Britain would stand aloof, he later informed Germany; otherwise "we should be drawn in." Even on July 31, while Russia and Austria were mobilizing, while Unionist journals in England were urging intervention and the Liberal press was advocating neutrality, while Poincaré and Cambon were pleading for a definite promise of aid, Grey was still endeavoring to keep a "free hand." To a German offer to respect Belgian neutrality and the French colonies, Grey still reiterated, "We must keep our hands free." On August 2, however, Unionist leaders, Lord Landsdowne and Bonar Law, sent a letter to the Premier stating their opinion that to hesitate in supporting France and Russia "would be fatal to the honor and security of the United Kingdom." With this letter before them, the cabinet ministers authorized a promise to defend France against hostile action of the German fleet. Four ministers, strongly opposed to intervention, offered their resignations, but only

two, Burns and Lord Morley, insisted on withdrawing from a government which they felt was now committed to war. Meanwhile, the German ultimatum had been presented to Belgium, August 2, and Belgium appealed to England for "diplomatic intervention," August 3. Such was the situation on the day when Grey made his celebrated speech before Parliament in revelation of the secret Grey-Cambon correspondence of 1912 and his promise of August 2 to defend the French coast; he discussed the menace to Belgium and lightly declared, "If we are engaged in war, we shall suffer but little more than if we stand aside." Bonar Law pledged support; John Redmond, the Irish Nationalist leader, offered Ireland's loyalty; only the Labor leader, Ramsay MacDonald, seemed unconvinced. Assured of Parliamentary backing, the government on August 4 instructed Sir Edward Goschen, British ambassador in Berlin, to demand from Germany before midnight a pledge to respect Belgian neutrality. As expected, Germany refused, and on August 5 Premier Asquith informed the Commons that Great Britain was at war with Germany, "to fulfill a solemn international obligation" (to Belgium) and "to vindicate the principle that small nationalities are not to be crushed, in defiance of international good faith, by the arbitrary will of a strong and overmastering Power." Such undoubtedly was the feeling of many Englishmen, but it is certainly not less true that England's entanglement in the Triple Entente through imperialist bargains with France (1904) and Russia (1907) was also so strong a reason for intervening that Grey had favored intervention even before he knew that Belgium's neutrality would be violated.

Immediate Effects of War. Navy and army alike were prepared for the crisis, and efficiently prepared in so far as pre-war statesmen considered necessary. The navy, already mobilized, steamed forthwith to its war stations in the North Sea, with Admiral Sir John Jellicoe in command, under the enthusiastic though perhaps too imaginative supervision of Winston Churchill, First Lord of the Admiralty. The army had been organized by Lord Haldane (War Minister) to provide a Home Defence Force and a small Expeditionary Force of four infantry divisions and one cavalry division. Everything was ready "down to the last gaiter button," when the Expeditionary Force was ordered to France under Sir John French in August. Lord Kitchener, famous for his military exploits in South Africa and the Sudan, took charge of the War Office and began to organize by voluntary enlistment a new army, "Kitchener's Army," to reinforce the troops in France; for the war, he predicted, would last three years. Parliament, in patriotic loyalty, dropped its pre-war partisan quarrels and consented to act as a rubber-stamp for the government's war measures, obediently voting a war credit of £100,000,000; an army increase of 100,000 men; a navy increase of 67,000 men; governmental control of railways and war insurance of trade; a Defence of the Realm Act providing court-martial for spies; restriction of the liquor traffic; a moratorium; and other emergency measures. Even when the ministry decided to promulgate as laws the controversial Welsh Church and Irish Home Rule bills, in September, 1914, together with a Suspensory Act, postponing their operation, the Unionists acquiesced, albeit

Bonar Law and Sir Edward Carson, while declaring their loyalty, accused the Asquith Cabinet of violating the "party truce" which had been tacitly adopted in the presence of external peril. Despite the Suspensory Act, Mr. Redmond, as Nationalist leader, was willing to cry "God save England," when Parliament closed its session on September 19, and in a manifesto he exhorted Ireland to contribute its share of recruits for Kitchener's army. As for the Labor party, the pacifist Macdonald was replaced by the patriot Arthur Henderson as chairman, and only a minority continued to condemn the War. When Parliament reassembled in November, to grant an additional war credit of £225,000,000, a 100 per cent increase of the income tax as well as increased taxes on tea and beer, and an addition of 1,000,000 men to the army, the country began to realize the shortsighted levity of Sir Edward Grey's prediction that England would suffer "but little more" as a belligerent than as a neutral. Nevertheless loyalty and the party truce were still observed, and the government was permitted to conduct the war in secret, without political opposition or interference. So overwhelming was the pressure of multifarious unfamiliar problems on the cabinet that for greater efficiency, or rather for less inefficiency, the management of military and naval affairs was transferred in November, 1914, from the full cabinet to a War Council in which Asquith, Lord Kitchener, and Churchill, with the assistance of technical experts, decided major questions of war policy. Even so, there was much blundering and more negligence by well-intentioned but overburdened ministers. Lord Kitchener, particularly, insisted on bearing a load of War Office routine which bowed even his broad shoulders. Such mistakes naturally invited criticism; nor were the Unionists sufficiently bound by the party "truce" to refrain from pointing out the ministry's shortcomings. See NAVIES OF THE WORLD.

Fall of the Liberal Government. When Bonar Law said in December, 1914, that perhaps the Opposition had not criticized the government enough, he was in effect heralding the advent of renewed though more or less covert partisan controversy, which ultimately compelled Premier Asquith to silence his critics by granting them portfolios in his cabinet. What the Opposition particularly censured was the government's failure to provide adequate munitions, but there were other grievances as well. Inflamed by German submarine outrages in the spring of 1915 and by the Bryce Committee's report on German atrocities in Belgium, the war spirit now burned so fiercely that it demanded more severe measures against enemy aliens and a more drastic blockade of Germany. England, it should be explained, had not yet cast off the restrictions of the Declaration of London on her right to interfere with neutral shipping. Consumers, moreover, were beginning to cry out against food profiteers and to demand rigorous price-control. The press was restive under the irksome restrictions on war news imposed by Sir Stanley Buckmaster's Press Bureau. Furthermore, the most ardent patriots were beginning to complain that voluntary enlistment for Kitchener's army not only failed to produce an adequate number of recruits but also operated very unfairly and drew workers and experts from industries in which they were indispensable, while shirkers

stayed at home. Above all, two military fiascoes brought the cabinet under fire. One was the Dardanelles campaign, originally undertaken with Lord Kitchener's approval as a means of relieving the Turkish pressure on the Russians, who had appealed for aid. This attack on the Straits in the spring of 1915 was eagerly sponsored by the civilian First Lord of the Admiralty, Winston Churchill, who in his autobiographical *World Crisis* tells how, in his opinion, the plan offered a possibility of decisive strategic gains but was stultified by Kitchener's vacillation and preoccupation with the western front and by the opposition of Lord Fisher (First Sea Lord), the commanding admiral, and other naval officials. The failure, so tragically short of success, at Gallipoli, not only evoked bitter criticism from the public, but caused a serious rift in the War Council itself. This crisis coincided with a stormy public discussion of the shortage of munitions, provoked by the disastrous battle of Neuve Chapelle (March, 1915), in which the General Staff's hope of blasting a breach through the enemy lines was frustrated by a shortage of high explosive shells. At any rate, so Colonel Repington reported to the *Times* in May, and so the public believed, despite Asquith's denials. The popular charge that munitions production had been inefficient and shortsighted could hardly be refuted. Until March, 1915, Lord Kitchener had permitted skilled munitions workers to enlist in the army for service in France and had failed to evolve any policy which would avert strikes and permit "dilution" with unskilled labor in munitions works. Nor had he adequately curbed munitions profiteers, or effectively organized the industry. Until March, 1915, he had insisted on placing contracts only with the big armament firms, ignoring small independent contractors, and eschewing governmental control. A Defence of the Realm Act passed in the spring of 1915 and authorizing the government to take over munitions plants was allowed to remain virtually a dead letter. Spurred by criticism, the War Minister, however, did permit the formation in April of a committee headed by Lloyd George to control munitions contracts; it was the same Lloyd George who took the initiative in persuading the trade unions to put national security above labor interests, and who urged the Premier to reorganize the cabinet, including a department of munitions.

The Coalition, 1915-16. Pressure from the energetic Welshman, the Opposition's demand for a coalition, and the Churchill crisis combined to overcome Asquith's predilection for party government. The Opposition, Bonar Law later said, could have turned the Liberal government out at this time but instead consented to Asquith's plan for a coalition cabinet. In the coalition formed in May, 1915, eight Unionists were given ministerial posts, their leader, Bonar Law, taking the Colonial Office, Balfour the Admiralty (in place of Churchill, who received the Chancellorship of the Duchy of Lancaster), Austen Chamberlain the India Office. Arthur Henderson, Labor leader, accepted the portfolio of Education; the truculent spokesmen of Ulster, Sir Edward Carson, became Attorney General; but Redmond, the Irish Nationalist, declined to join the cabinet. Perhaps most significant of all was the creation of a new Ministry of Munitions (authorized by law, June 9,

1915) with Lloyd George in charge. With characteristic vehemence, this rising minister threw his whole dynamic personality into the task of persuading, cajoling, and coercing if need be, employers, workers, and officials to collaborate in the supreme task of preparing the means of victory. By a Munitions of War Act (July 2) he forbade strikes and lockouts, obtained authority to regulate wages and profits in "controlled" munitions plants, provided for the recall of skilled workers from the army, and suspended restrictive trade union rules. When the Welsh coal miners went on strike, he hurried in person to win them back to work. In person he begged the Trade Union Congress not to disgrace labor by shirking patriotic duty. In person he solicited the aid of experts and organizers. By July 28 he could report the enrolment of nearly 100,000 munitions volunteers and the establishment of 20 national factories. On his own responsibility, in August, he ordered preparation of munitions for an army of 100 divisions, though critics thought so huge a force inconceivable. His audacity in expanding the output of heavy guns and other supplies was soon vindicated, for in the later months of 1916 British artillery in France was firing as many tons of munitions in an hour as it had fired in a day during the first year.

It was Lloyd George, again, to whom the Cabinet had to turn in 1916 to deal with the Irish question, after the Easter Rebellion in Ireland (q.v.). Asquith had visited Dublin, and, having received the impression that the existing government had broken down, authorized the successful munitions minister to negotiate a compromise by which the Home Rule Act of 1914, hitherto a dead letter, might immediately be put into force. Lloyd George proposed to apply the act but to exclude six Ulster counties during the War and to preserve Irish representation at Westminster only through the war period. This was too much for the Unionists in the Cabinet to swallow, however, and Asquith, by weakly permitting them to qualify and denature the proposal, cut the ground from under the negotiations. The resulting failure merely antagonized the Nationalists, and thereafter the Cabinet allowed the Unionists to dictate repressive Irish measures, while the Sinn Fein movement in ensuing years gradually won the masses away from the more moderate Nationalist tactics.

In dealing with the man power question the Asquith Coalition was hardly less inept. Vainly attempting the impossible task of pleasing both the conscriptionist Northcliffe press and the anticonscriptionist trade unions, Asquith compromised at first on a National Registration Bill; then induced Lord Derby in October, 1915, to conduct a spirited voluntary recruiting campaign, reinforced with a threat to apply compulsion if this failed; then, early in 1916, put through a Compulsory Service Act, applying merely to bachelors and childless widowers between 18 and 40, excluding Ireland, and exempting clergymen, necessary war workers, sole supporters of families, conscientious objectors, and the physically unfit. Both the jingo press and the trade unions were displeased, for opposite reasons. Assailed by prominent critics in both houses of Parliament, the Premier had to plead for the life of the Cabinet, and prepare a new compromise in April, going a step further toward universal conscription, but still

with many reservations. This was so coldly received that at length, on May 3, 1916, the government produced a Universal Military Service Bill applying to all men between 18 and 41; Ireland was still excluded, and exemptions were so numerous that the Asquith government received little applause for its tardy and hesitant conversion to universal service.

During its term of office, from May, 1915, to December, 1916, the Asquith Coalition dealt with numerous other matters. Parliament should have terminated in December, 1915, under the Parliament Act, but it prolonged itself by statute, without elections. The blockade of Germany was tightened by increasing the list of contraband commodities and finally by abandoning the Declaration of London, in June, 1916. A Joint Air Board, representing army and navy interests, was set up in May, 1916, to stimulate production of airplanes. Huge votes of credit were granted; the cost of the war increased from £2,700,000 to £3,500,000 a day in the half year from March to September, 1915, and to £5,000,000 a day in November. By March, 1916, the votes of credit for the War reached a total of £1,782,000,000. Most of this expenditure was covered by war loans, but the income-tax, doubled by Lloyd George, was raised 40 per cent more by his successor, McKenna, in September, 1915; an excess profits tax of 50 per cent was applied to war profiteers; duties on sugar, tea, tobacco, etc., were increased, and heavy taxes levied on imported motor cars, films, and other luxuries. In April, 1916, McKenna again raised the income tax, to a maximum of 5 shillings on the pound, the excess profits tax to 60 per cent, and other taxes proportionately. In courageous self-taxation during the War, Great Britain was unique and financially prudent.

The Coalition Cabinet suffered more than one defection before it finally collapsed. Sir John Simon, Home Secretary, resigned as a protest against conscription; Sir Edward Carson, in November, 1915, because of the government's bungling Balkan policy; Winston Churchill, because he was excluded from the War Committee of the Cabinet which was formed on Nov. 11, 1915. Lord Kitchener, en route to Russia, was lost when his ship struck a mine, in June, 1916, and was replaced as War Minister by the indefatigable Lloyd George. Sir Edward Grey, incidentally, accepted the title of Viscount Grey of Falloden and entered the House of Lords, retaining the portfolio of Foreign Affairs, but leaving defense of the Coalition's conduct, in the Commons, to his able under-secretary, Lord Robert Cecil.

The Lloyd George Government, 1916-18. The fall of the Asquith Cabinet was caused by the long accumulation of ineptitudes, compromises, hesitations, vacillations, some of which have been chronicled above. It was precipitated by demands for a small war cabinet. Even in the autumn of 1915, Lord Cromer and Sir Edward Carson had exposed the unwieldiness of the cabinet. To meet their criticism, Asquith had formed a war committee (himself, Balfour, Lloyd George, Bonar Law, McKenna), but this was merely a committee of the cabinet. In December, 1916, Lloyd George, backed by the *Times*, demanded that supreme responsibility for war affairs be given to a committee, consisting of himself, Sir Edward Carson, Bonar Law, and a representative of Labor. This would have meant transferring war policy to

an inner cabinet headed by Lloyd George, with Asquith remaining the puppet premier of the ministry as a whole. Naturally Asquith refused; thereon Lloyd George resigned, and a cabinet crisis ensued. Bonar Law, on being invited by the King, confessed his inability to govern without Asquith's support and recommended the War Minister. Accordingly David Lloyd George headed the new Coalition Cabinet which was formed in December, 1916. To secure efficiency he instituted a striking constitutional innovation by creating a small war cabinet of five members, to sit daily, and to have absolute control of Britain's war effort. The Premier himself, Lord Milner of South African fame, and the Labor leader, Henderson, constituted the controlling triumvirate, but Lord Curzon, leader of the House of Lords, and Bonar Law, leader of the Lower House and Chancellor of the Exchequer, were also members, though more or less preoccupied with other duties. While the War Cabinet was narrowed down to five persons, the number of other ministers was increased. Five new ministries were created: Shipping Control (Sir Joseph Maclay, a shipping magnate), Food Control (Lord Devonport, a grocery magnate), Air (Lord Cowdray, a contractor and oil magnate), Labor (Hodge, a Laborite), and Pensions (George Barnes, another Laborite). Lord Grey, who refused to desert Asquith, was replaced at the Foreign Office by the aged veteran, Balfour; Sir Albert Stanley, previously director of omnibus and underground systems, headed the Board of Trade; Lord Rhondda, a coal baron, took charge of Local Government; Prothero, former manager of the Duke of Bedford's estates, was appropriately selected for Agriculture; H. A. L. Fisher, a famous historian, was well chosen for Education; Sir Edward Carson took the Admiralty; Lord Derby, the War Office; Walter Long, Colonies; Dr. Addison, Munitions; Sir Frederick Cawley, the sinecure Duchy of Lancaster; Sir George Cave, the Home Office; Sir Robert Finlay became Lord Chancellor, and Sir Gordon Hewart, Solicitor General. It will be observed that Premier Lloyd George, boldly departing from tradition, had preferred experts, especially business experts, to politicians as heads of administrative departments, and that the Unionists, hitherto a minority in the Coalition, now predominated in the War Cabinet and in the strategic ministerial posts.

Of the Lloyd George government great things were expected, for the name of its premier had become a synonym for patriotic energy. As budget-maker, then as Munitions Minister, then as War Minister, he had exhibited unsurpassed vigor and enthusiasm; he had stirred the Allied world by his ringing, if inelegant, declaration that the fight with Germany "must be to a finish," to "a knockout." To him Englishmen now looked for miracles. Of these, there was none, but of vigor there was much. The German peace offer made in December, 1916, was rejected. During the remainder of the War, new conscription laws were passed, raising the age limit, combining over the supposedly exempt and unfit, and culminating in the 1918 law which drafted men up to 55 years of age and which for the first time included Ireland. To defeat the aim of the German submarine campaign of 1917, the government assumed control of British shipping and built new tonnage with desperate haste. For zeal in this matter there

was indeed necessity, for in 1917 some 4,009,537 tons of British shipping, out of a total of 20,000,000, were sunk, as compared with only 1,163,474 built; and in the first nine months of 1918 the Germans succeeded in sinking only 1,925,512, as compared with 1,310,741 constructed. The submarine campaign, by lessening the cargo space available for food imports, threatened England with slow starvation; to avert this peril the government not only established food-rationing and price-regulation, but also offered bounties for domestic grain production and fixed a minimum wage of 25 shillings for agricultural labor. When reproached for not doing more, Bonar Law declared that in 1917, while putting 820,600 additional men into the army, the government had brought 1,000,000 more acres under the plow, producing 850,000 tons of grain and 3,000,000 tons of potatoes, and had built over 1,000,000 tons of shipping, as compared with about 500,000 the previous year. Furthermore, mines, textiles, railways, and the liquor traffic were brought under governmental control, for reasons dictated by war necessity. Votes of credit, of course, became larger and more frequent as the cost of the War rose to almost £7,000,000 sterling per diem in 1917-18. The total credits granted for the War were brought by appropriations in 1918 to the stupendous total of £8,742,000,000, of which about £1,465,000,000 was lent to other Allies. As before, the bulk of the burden was passed on in the form of debt to future generations, but Great Britain in the years 1917-18 taxed herself unflinchingly. The normal income tax was raised to 6 shillings in the pound, with super-taxes running up to 4s. 6d.; increases were put on liquor, tea, sugar, tobacco, luxuries, postal rates, etc. Of the many measures adopted to preserve the morale of labor and industry under the stress of war, perhaps the most significant was the Whitley Reconstruction Committee's Report, June, 1917, proposing the establishment of Joint Industrial Councils representing capital and labor in each industry, to settle disputes amicably, and, more important, to nip misunderstandings and controversies in the bud. The proposal was only a recommendation, not a compulsory law, but it was voluntarily adopted in some trades, and it bore witness to the government's desire to build for a future beyond the anticipated military victory. Another of the Lloyd George Cabinet's war measures, of far less importance in the long run, was the wholesale Anglicization of the royal family, by substituting good English names for hereditary surnames of too Teutonic a flavor; in July, 1918, the reigning dynasty, the house of Saxe-Coburg and Gotha, became the house of Windsor; a month earlier, the Prince of Teck had been ordered to change his family name to Cambridge, and the Battenbergs translated themselves into Mountbattens.

Important Reforms. Constitutional and political reforms of far-reaching significance were adopted in the midst of frenzied efforts to win the War, during the years 1917-18. Probably the most remarkable of these was the Representation of the People Act of January, 1918. The desire for reform of the franchise had been bruited before Asquith's fall, particularly by the suffragettes, but the Asquith Cabinet, divided against itself, had been unable to take any decided stand on the issue. The Lloyd George government took action on the basis of

a report from a Speaker's committee representing all parties, and in May, 1917, presented a bill embodying the committee's proposals and allowing the Commons to do as they pleased regarding the controversial questions of woman suffrage and proportional representation. By 214 to 17, the house incorporated woman suffrage; but proportional representation it rejected, excepting for university elections. The vote was given not to all women (that would have been too radical a step for British politicians), but to women over 30 years of age, who were qualified as local government electors by occupying land or premises of the yearly value of not less than £5, or of a dwelling house, or whose husbands occupied such property; moreover, women over 30, graduates of universities, were entitled to votes for their university representatives in Parliament. It may be remarked, by the way, that later in the same year a bill was passed enabling women to sit in Parliament, and that in 1922 three women were elected; in 1923, eight. The complicated existing franchises for men were swept away and replaced by a simple six months' residence requirement for all males over 21 (except conscientious objectors) and sailors and soldiers (who were included at the age of 19). Plural voting was restricted; a citizen could vote for his place of business or for his university as well as his residence, but not in more than two constituencies as of old. The registration period was reduced from 12 months to six. Also all polls were to be held on the same day, in a general election. Finally, the membership of the House of Commons was increased from 670 to 707, the seats being distributed one for each 70,000 inhabitants in Great Britain, and one for each 43,000 in Ireland. It is hardly an exaggeration to describe this as the greatest of England's historic Reform Bills, for it enfranchised about 2,000,000 men and 6,000,000 women; and since only about 8,350,000 had been previously qualified to vote, the Act of 1918 almost exactly doubled the electorate.

A second reform of some importance was wrought by the Fisher Education Bills of 1917 and 1918, requiring compulsory school-attendance of children up to 14 years of age and either 280 hours of continuation schooling in the next four years or full-time education up to 16. Half-time employment in Lancashire cotton mills was prevented by a provision that children under 12 could not be employed at all and children over 12 only after school-hours to 8 P.M. Public elementary and continuation schools were to be free; the pay of teachers was increased; and a new system of grants or subsidies for secondary schools was established. These reforms added almost £15,000,000 sterling to the budget, but they corrected educational deficiencies which had long been deplored.

Lloyd George also endeavored to solve the Irish problem in this same busy period. In May, 1917, he addressed letters to Redmond and Carson, offering immediate Home Rule for southern Ireland, a five-year exclusion for the Ulster counties, and a joint council of "delegations" for all Ireland; as an alternative, he suggested that an Irish convention be asked to submit a better plan. The latter course was chosen, and on July 25 the Convention met at Dublin. Representative leaders of various parties and interests were nominated to participate. The Sinn Fein party, however, scornfully ab-

sented itself from a body which it regarded as misrepresentative and undemocratic. Without Sinn Fein, the Convention could hardly claim to speak for Ireland; nevertheless it drew up a report which was issued in April, 1918, and ignored by the British government as well as by Irish parties. See IRELAND.

The broader aspects of imperial statesmanship likewise challenged attention. Soon after the Lloyd George Cabinet was formed, the Colonial Secretary (Long) cabled to the premiers of the self-governing dominions an invitation to attend an imperial war conference. In March, 1917, the so-called Imperial War Cabinet began a series of sessions; it comprised the premiers of Canada, South Africa, New Zealand, Newfoundland, and Australia (Hughes of Australia arriving late), and the Secretary of State for India, together with the British War Cabinet. At the conclusion of the sittings, in May, Lloyd George said the experiment had been so successful that he proposed to make it a regular annual affair. True to his word, he convened the Imperial War Cabinet for a second session in the summer of 1918. In this way he hoped to solve the much-discussed problem of giving the dominions some voice in shaping imperial policy, without plunging into the difficulties inherent in any federal parliament. Side by side with the Imperial War Cabinet, in each of the years 1917 and 1918, there met in London an Imperial Conference, embracing a wider colonial representation, under the presidency of the Colonial Secretary. The effect of these conferences was not only to knit more closely the bonds of imperial political loyalty, but also to reinforce the tendency toward imperial economic solidarity, involving, for the mother country, abandonment of the traditional free trade dogmas. Even before the conference of 1917, a committee on commercial policy headed by Lord Balfour of Burleigh had recommended, in February, 1917, the establishment of additional customs duties, with colonial preference and artificial stimulation of colonial production. The Conference of 1918 recommended measures to control raw materials, especially minerals, and to safeguard essential industries. At its conclusion, Bonar Law, Unionist leader, boasted that the principle of imperial preference was at last established. Even without this boast, it was clear enough that in forming a cabinet in which Unionists predominated, a cabinet dependent chiefly on Unionist votes in the Commons, Lloyd George had made defense of the Liberal free trade principle against Unionist protectionism difficult if not impossible. (See BRITISH EMPIRE.) It may be added in this connection that the Lloyd George government, desirous of conciliating India, permitted India nominally to participate in the Imperial War Cabinet and Imperial Conference, allowed India also to establish a protective customs duty on cotton, and permitted the Secretary of State for India, Mr. Montagu, in collaboration with the viceroy, Lord Chelmsford, to draft a scheme of Indian self-government which, inadequate as it might appear to Indian Nationalists, was scarcely less than revolutionary from the Downing Street viewpoint. See INDIA.

Several important ministerial changes in the period 1917-18 should be noted in passing. An investigating committee's report on General Townshend's ill-starred Mesopotamian campaign revealed such serious mismanagement on

the part of the Indian government that in July, 1917, Chamberlain resigned the Secretaryship for India, was replaced by Montagu, but reentered the cabinet in 1918 without portfolio, later to become Chancellor of the Exchequer. Lord Rhonda, replacing Lord Devonport as food controller in midsummer, 1917, instituted more drastic regulation of prices, and ration cards; at his death in July, 1918, the office was passed on to a Laborite, Clynes. Churchill, who had been serving in the field as a major in the Grenadier Guards since resignation from the Asquith Cabinet, was recalled to become Minister of Munitions in July, 1917. General Smuts of South Africa, a statesman of recognized imperial calibre, became a member of the War Cabinet about the same time. Sir Auckland Geddes, as Director of National Service, George Barnes, as Labor's representative in the War Cabinet, Sir Eric Geddes as First Lord of the Admiralty, Dr. Addison as Minister of Reconstruction, Hayes Fisher as President of the Local Government Board, John Hodge for Pensions, and George Roberts for Labor, were also appointed in the summer of 1917. In April, 1918, when the Germans were making their supreme effort in France, the able Lord Milner assumed the portfolio of War, leaving his seat in the War Cabinet to Mr. Austen Chamberlain; and Sir William Weir became Air Minister.

Victory and Diplomacy. Meanwhile the exhausting conflict which had convulsed the world since 1914 was being pushed to a successful conclusion, thanks in no small part to the energy of the British people. Although at the outset Great Britain had sent only five divisions to France, during the entire War the United Kingdom enlisted 6,211,427 men, of whom 743,702 were killed and 1,693,262 wounded; the other parts of the Empire had supplied 3,284,943 men, of whom 202,321 were killed and 428,644 wounded. For the United Kingdom alone, the proportion of men mobilized to total population was 13.6 as compared with 17.9 for France, 11.3 for Italy, and 5.2 for the United States. British expenditures during the War amounted to about £9,000,000,000 sterling, of which £2,730,000,000 were obtained by heroic self-taxation, about £1,360,000,000 by foreign borrowing, mainly from the United States, and the remainder, more than half, by floating war loans at home. Some £453,000,000 had been loaned to France, £382,000,000 to Italy, £650,000,000 to other Allies, and £150,000,000 to British dominions. The British national debt was over £7,000,000,000 sterling at the close of the War, 10 times its amount in 1914. Furthermore, while British armies fought in Picardy and Flanders, in Gallipoli and Macedonia, in Palestine and Mesopotamia, and in Africa, the British navy had policed the high seas, safeguarding supplies of troops and matériel, and slowly starving the enemy. British propaganda and diplomacy had been influential in bringing the United States and other neutrals into the War and in preserving Allied solidarity. No statesman of the Entente was more determined than Lloyd George to fight "to the finish," and to coordinate the military efforts of the Allies. At the Rapallo Conference in 1917 he succeeded in having a Supreme War Council of the Allies established, but even this was insufficient, as he said in his sensational luncheon speech at Paris in November. After Clemenceau, a

kindred spirit, became French premier, he and Lloyd George were able to strengthen the Council, including staff officers in its membership, despite the opposition of Sir William Robertson, British chief of staff, who resigned in protest. The credit of achieving a united command and making Marshal Foch generalissimo has been claimed for Clemenceau, Painlevé, Milner, Haig, and others, but to the English Premier certainly a large share must be assigned when all the evidence has been taken.

Hardly had the booming of the great guns ceased when the opening salvos of an electoral campaign were fired in England. The War Parliament, elected in December, 1910, should normally have expired in December, 1915, but it had been kept alive by successive prolongations during the emergency, until a general election could be held in peace; it dissolved a fortnight after the Armistice. At last on Dec. 14, 1918, the long-postponed election was held; a "khaki election" it has been called, because, occurring a month after the Armistice, while millions were still in uniform, it was essentially a war election in spirit. The Prime Minister, hoping to obtain an overwhelming nonpartisan backing on the issue of patriotism before he entered the Peace Conference, joined with the Unionist leader, Bonar Law, in an appeal for electoral support of the Coalition and preservation of national unity in the peace negotiations. Their electoral promises, official and quasi-official, were lavish: to hang the Kaiser, obtain a bounteous indemnity (a figure exceeding \$100,000,000,000 was popularly mentioned), create a League of Nations, reduce armaments, foster agriculture, care for veterans, give tariff preference to colonies, protect "key industries," solve the Irish question without coercing Ulster, grant partial self-government to India, and reform the House of Lords. On this platform the Coalition won a sweeping victory; 478 loyal supporters were elected to sit on the government side of the House, against a heterogeneous Opposition of 229 members. The Labor party, having seceded from the Coalition and increased its strength from 42 (in December, 1910) to 63, became the official Opposition. Asquith's forlorn contingent of 28 "Independent Liberals" also opposed the government and hoped for better times. From Ireland came 25 Unionists and only seven Nationalists, since 73 seats, almost three-quarters of the Irish quota, had been captured by Sinn Féin irreconcilables, who refused to sit in the Westminster Parliament (see IRELAND). On the morrow of the elections, the premier reorganized his ministry by transferring the Exchequer from Bonar Law to Austen Chamberlain, the Colonial Office to the indispensable Lord Milner, the Admiralty to Walter Long, War and Air to Churchill, who was still criticized for the Dardanelles disaster, Labor to Sir Robert Horne, Supply (previously Munitions) to Lord Inverforth (formerly Andrew Weir), Ways and Communications to Sir Eric Geddes, and the post of Attorney General to Lord Birkenhead (Sir Frederick Smith). The normal practice of full cabinet sittings was not resumed until October, 1919, after the Peace Treaty was signed.

Strong in the knowledge of his secure majority—nay, spurred on by his ultrapatriotic parliamentary supporters—Premier Lloyd George entered the Paris Peace Conference of 1919 prepared to obtain Britain's full share of the

fruits of victory. Forgotten now was his celebrated war-aims declaration of Jan. 5, 1918, in which, largely to conciliate Labor, he had promised that self-determination would be applied to the German colonies, and "their exploitation for the benefit of European capitalists or governments" prevented; that "reparation" should not cover an attempt to recover war costs; that the European settlement should be based on consent of the governed; that an international organization should be established to limit armaments and prevent wars. At Paris in 1919 his primary concern was to gratify the demand of British imperialists for a major share of German colonies, the demand of British taxpayers for a generous indemnity, and the demand of the British Admiralty for unrestricted sea power. After these interests were secured, he could afford to play the rôle of disinterested mediator between the French policy of *ex victis* and the Wilsonian "Fourteen Points" (so strikingly similar to his own war aims of Jan. 5, 1918). With him he took to Paris some 200 "experts" and assistants, with as many typists and clerks, a staff sufficient to fill five hotels. His own will dominating the British delegation, strictly subordinate rôles were assigned to the other British plenipotentiaries: Bonar Law, Viscount Milner, Balfour, and Barnes. (The dominions and India were separately represented. See BRITISH EMPIRE.) As the history of the Peace Conference is told elsewhere (see PEACE CONFERENCE AND TREATIES), suffice it here to summarize the successes and failures of the British delegation. The British Premier's warning that any peace ignoring Russia must be inadequate, his desire to effect an immediate limitation of armaments, his insistence on Germany's immediate or at least early entry into the League, his demand for punishment of the Kaiser and German war criminals, his proposal for an Anglo-American guarantee of French security, his belief that Germany should have "full access to raw materials and markets of the world" (inconsistent with his own earlier pronouncements) and be "put upon her legs once more"—all were either disregarded or balked. On the other hand, the British representatives did succeed in somewhat restricting French designs on the left bank of the Rhine; Lloyd George himself was responsible for the plebiscite on Upper Silesia; the mandate system, along with several other features of the League, were of British origin; the British dominions and India obtained separate votes in the Assembly, and an Englishman was appointed first Secretary General of the League. As regards special British interests, Wilson was persuaded to drop the freedom of the seas from his "Fourteen Points"; reinforced by a strong telegram in April from 370 Members of Parliament, demanding reparation for Britain, the British delegation inserted marine losses and pensions into the reparation account; by dramatic appeals from the Dominion delegates, Mr. Lloyd George frustrated President Wilson's aim of entrusting the German colonies to small powers, and obtained for South Africa a mandate over German Southwest Africa; for Australia, German Papua; for New Zealand, German Samoa; for the Empire, the phosphate island of Nauru; and for the mother country, Mesopotamia; Palestine, full ownership of Egypt and Cyprus, most of German East Africa, and parts of Togoland and Cameroon. Persia

(q.v.), moreover, and the Hedjaz (q.v.), by arrangements independent of the Peace Treaty, had become practically British protectorates. If Disraeli could boast in 1878 that he brought home peace with honor, the fiery Welshman might well have vaunted a greater victory and richer spoils in 1919.

Signature of the peace treaties brought no surcease of international problems, but the contrary. After Premier Lloyd George had returned to London in 1919 there began a series of frequent meetings of the Supreme Council and conferences with French premiers, conferences which enabled the versatile Welshman to display his statesmanship, and incidentally his golf, at many a European spa—San Remo, Boulogne-sur-Mer, Cannes, Spa, Lucerne, besides London, Paris, Genoa, Brussels. Only the barest sketch of British policy in these negotiations is here appropriate. Toward Germany, Lloyd George took a more lenient attitude than pleased French chauvinists; his desire to fix the reparation total at a moderate figure and his willingness to accept diminution or postponement of scheduled payments brought him into continual conflict with France; likewise in reopening trade relations with Russia and endeavoring to restrain the eastward course of Polish territorial greed, he collided with the pro-Polish and anti-Bolshevik Quai d'Orsay; the same Anglo-French divergence was seen in the difficult negotiations over Upper Silesia, the cession of which to Poland was urged by Paris and opposed by London; and again in the Near East the two western Powers were at odds, Britain backing the Greek adventure in Anatolia (see GREECE AND TURKEY), while France covertly encouraged the Turkish Nationalists against exasperated remonstrances from London. When Premier Lloyd George in September, 1922, indiscreetly allowed publication of a manifesto not approved by his Foreign Minister (Lord Curzon), proclaiming his intention of resisting by force any attempt of Kemal's Nationalist army to occupy the Straits zone or invade Europe, the rift in the Entente was painfully clear, for France ordered her troops to offer no resistance. Great Britain seemed about to face the Turks alone, and although an armistice was soon arranged, the British premier's precipitate and perhaps high-handed action was resented not only across the Channel, but still more keenly in England, where it was seized on by his critics as a major reason for a change of ministry. There were other discouragements. Persia (q.v.) refused to ratify the Anglo-Persian treaty and turned to America for advice and capital. Mesopotamia (q.v.) proved rebellious and so surprisingly expensive that it became a byword in Parliament. Afghanistan (q.v.) shook off British control, negotiated with Soviet Russia, and terrified British imperialism by spreading anti-British propaganda in Asia. India (q.v.), led by Gandhi, met the Montagu-Chelmsford "reform" with "passive resistance," while actual rebellion in Egypt (q.v.) necessitated a promise of independence. Opposition by the dominions to a renewal of the Anglo-Japanese Alliance (q.v.), and by British taxpayers to the cost of naval competition with the United States, was dexterously dodged by encouraging the latter nation to take the initiative, at the Disarmament Conference in Washington in 1921-22, in proposing naval ratios and a broader Pacific pact, but a satisfactory

arrangement was achieved only at the cost of abandoning Japan, accepting, nominally at least, a naval ratio on a par with the United States, promising to restore Wei-hai-wei to China, and admitting failure to curb military, air, and submarine armaments, of France particularly. Even so, the success of this conference tempted Lloyd George to sponsor a more ambitious assembly, the Genoa Conference, in the spring of 1922, whose declared aim was the economic reconstruction of Europe. But, as the uncompromising Poincaré had just become French premier, superseding the more pliable Briand and repudiating the Anglo-French alliance project which the latter had drafted with Lloyd George, French policy at Genoa was so resolutely guided in anti-British, anti-German, and anti-Bolshevik channels that the Welshman's grandiose plans of international reconciliation and reconstruction went on the rocks, and no one except Lloyd George himself could regard the conference as more than a disheartening fiasco. The breach in the Entente Cordiale seemed irreparable at the time, and one of the arguments which ultimately overthrew the Lloyd George government was that by ill-considered opposition and by undue charity toward an undeserving Germany, the Premier had transformed a cordial understanding into irritable antagonism.

Reconstruction Problems. The four years following the Armistice presented domestic problems hardly less grave than the international questions which have been described. The cost of living soared in the first post-Armistice year to 225 per cent of its pre-war level; reaching its peak, 276 per cent, in October, 1920, it subsided only gradually to 195 per cent in November, 1921, and 181 per cent in April, 1922. The percentage of trade union members unemployed was 2.4 at the beginning of 1919, but instead of decreasing, it rose to 6 before the end of 1920, attained the alarming level of 23.1 in June, 1921, and was still over 16 at the beginning of 1922. The actual number unemployed in January, 1921, was 1,060,000; in July, 1921, it was 2,170,000, plus 988,000 on short time; in March, 1923, it was 1,300,000. If figures can ever be eloquent, these must tell a tragic story of privation and hunger, of silent factories and bankrupt industrialists, of idle workmen and pauperized families losing their morale with their hope. A palliative, not a remedy, was provided by the Unemployment Insurance Bill which the Lloyd George government introduced in December, 1919, and promulgated the following August, extending previous laws, and granting benefits of 15 shillings a week for involuntarily unemployed men, 12 shillings for women, for a maximum of 15 weeks a year. The very genuine hardships of unemployment and high prices made industrial unrest inevitable; and the stimulus which the Russian Revolution and Socialist parliamentary victories on the Continent gave to all labor movements was not without effect in England. In vain the government conceded an eight-hour day to railwaymen; in vain it enacted a law restoring trade practices; in vain it convened an Industrial Conference (February, 1919) of employers and workers, and set the Sankey Commission to investigate coal miners' grievances. In Parliament, the Labor Opposition was implacable; outside Parliament, strikes multiplied. A railway strike in the fall of

1919, ominous though it appeared, was settled in 10 days. Of longer duration and graver import were the coal strikes. After the Armistice the miners demanded a six-hour day, a 30 per cent wage increase, and nationalization of the mines. Though the Sankey Commission effected a truce, wage increases being granted and a Department of Mines established, the miners by a fortnight's strike in October, 1920, gained a further increase, and again went on strike for three months in the spring of 1921. The government survived these and similar disturbances, but more than once there seemed a likelihood that by direct action the so-called "Triple Alliance" of miners', railwaymen's, and transport workers' unions would use their control of vital industries as a weapon with which to coerce the government and enforce the demand of radicals for nationalization of mines and communications.

The increased wages of government employees, the staggering burden of unemployment insurance, the costly endeavors of the administration to relieve the grave housing shortage, the miscellaneous measures of social legislation designed to ease the pains of reconstruction, and the continuance of huge military and naval expenditures made it necessary to increase rather than diminish the weight of war taxation in 1919 and 1920, and though some reductions were made in 1921-22, taxpayers yearned for relief, and many hoped that a less ambitious premier might also be less extravagant.

While the stormclouds of political opposition were gathering on Lloyd George's horizon, he accomplished one more of the feats of political dexterity which had earned him the not altogether complimentary soubriquet of "Welsh wizard." His earlier attempts to solve the Irish question during the War had simply made matters worse in that distracted island. Sinn Féin, having won the 1918 elections, had proclaimed an independent republic and inaugurated a guerrilla war against the British army of occupation. As repressive decrees and reprisals seemed but to add fuel to the conflagration, the Lloyd George government in February, 1920, introduced, and in December carried, a Home Rule Bill to create two parliaments, one at Dublin and the other at Belfast, and a joint council for Ireland, with decidedly limited powers of self-government. Regardless of Sinn Féin indignation, Lloyd George endeavored in 1921 to put this law into effect, and succeeded easily in establishing the Belfast Parliament, but utterly failed in southern Ireland. Undismayed by this check, he now suddenly altered his tactics, invited the Sinn Féin leaders and the Ulster premier to a three-cornered peace conference in London, and on Dec. 6, 1921, signed an epoch-making treaty with them, for the creation of an Irish Free State with dominion status. (See IRELAND.) This political *coup de main* will probably go down in history as one of the outstanding achievements of the long Lloyd George administration; certainly it put a new complexion on the Irish problem and left critics breathless with surprise, if not admiration. But it did not long save the cabinet.

The Unionists in Power. As wartime passions cooled and the lustre of Premier Lloyd George's war services was dimmed with passing years, the Coalition Cabinet, resting on the "khaki elections" of 1918, began to totter. In by-elections up to the end of 1921 the Coalition

suffered a net loss of 13 seats. The Labor Opposition grew bolder, and Asquith began to tax the government with reckless extravagance. The Near Eastern crisis and the rift in the Entente Cordiale were set down to the Premier's imprudence. But the *coup de grâce* was administered by the Unionist party leaders who voted, in a caucus at the Carlton Club on Oct. 19, 1922, to withdraw from the Coalition. Lloyd George immediately, and somewhat indignantly, resigned his office in favor of Andrew Bonar Law, who proceeded to form a Unionist cabinet on party lines, including the Marquis of Salisbury, Viscount Cave, Stanley Baldwin (Chancellor of the Exchequer), Marquis Curzon (Foreign Affairs), the Duke of Devonshire (Colonies), Viscount Peel (India), the Earl of Derby (War), and other less known Unionists. Parliament was of course dissolved, October 26, as the Unionists had only a plurality in the Commons, and new elections were held on November 15. With their campaign slogans of "tranquillity and stability" (an English version of Harding's "normalcy"), economy, conciliation of France, and abhorrence of one-man government, the Unionists polled 5,300,000 votes and returned 344 members to Parliament, a safe majority. Lloyd George, heading his own faction of "National Liberals" with a few Unionists who were personally loyal to him, pointed with pride to his war record, scoffed at the desire for less vigorous statesmanship, promised economy and peace, and delivered philippics against the menace of socialism, but returned to Parliament with only 56 supporters. The Asquith Liberals, adhering to traditional policies and emphasizing free trade and economy, won 60 seats. Labor, *enfant terrible* of British politics, had scandalized and terrorized the older parties by advocating a socialistic capital levy, taxation of land values, nationalization of mines and railways, increased old age pensions and unemployment doles, and a radical foreign policy; to the confusion of overly sanguine prophets, Labor failed to win a majority, although it did increase its delegation to 138 and polled 4,102,000 votes (as many as the two Liberal factions combined). It will be noted that, with the addition of minor groups, the total is only 615; to this figure the Commons was reduced in 1922, by excluding representatives from southern Ireland, but retaining 15 from northern Ireland.

With a safe majority of more than 100 votes (including some National Liberals), the Unionist government proceeded first to fulfill a campaign pledge, the enactment of a Constituent Act and a Consequent Provision Act, giving effect to Lloyd George's Irish treaty (see IRELAND); their promulgation on Dec. 5, 1922, accomplished England's part of the bargain. When, after the holiday recess, Parliament reassembled in February, 1923, Liberal and Labor opposition relative to the Ruhr and to Mesopotamia was crushed by the ministerial steamroller, and Parliament was plunged into budgetary calculations, made more acceptable by a reduction of sixpence in the pound on the income tax and by other tax cuts all along the line. Business was interrupted in May by Premier Bonar Law's resignation, occasioned by sickness which soon afterward caused his death (Oct. 30, 1923). His successor, Stanley Baldwin, a former business man, had earned golden opinions by his tactful negotiations in Washing-

ton for deferred payment of the British debt to the United States at reduced interest, and by his conduct of the exchequer in the preceding cabinet. Moreover, he was known to hold opinions unfavorable to French policy in the Ruhr. Retaining most of the old cabinet, Baldwin entrusted the Privy Seal to Lord Robert Cecil, who had attracted favorable attention by his statesmanlike activity in the League of Nations; Sir Samuel Hoare became Air Minister; Sir William Joynson-Hicks, financial secretary to the Treasury; and Sir Laming Worthington-Evans, Postmaster General. Subsequently the Exchequer was offered to Reginald McKenna, refused by him, and given to Neville Chamberlain, in August. Baldwin as premier found himself face to face with three major problems, all closely related. The "unemployment crisis," with 1,250,000 persons out of work five years after the Armistice, was no longer a crisis, but a chronic malady demanding remedy. The Ruhr crisis, if it could be so solved as to permit recovery of the German market, might help solve the unemployment problem, but Poincaré was adamant to Baldwin's arguments. The third problem, preferential tariff protection, was proposed by the Imperial Conference of October, 1923 (see BRITISH EMPIRE), as a remedy for industrial depression, but it proved Premier Baldwin's undoing. As Law had pledged his cabinet not to tamper with the tariff before the next election, Baldwin honorably but imprudently dissolved Parliament, Nov. 16, 1923, and ordered general elections, December 6. His party, fighting for tariff reform, polled as many votes as in 1922 but elected only 259 members. The reunited Liberals, defending Free Trade, polled 4,217,000 votes and increased their representation from 117 to 155. Labor, opposing protectionism and proposing a modified capital levy, along with other moderately socialist measures, increased its poll to 4,338,000 votes and its parliamentary representation to 191. Thus no party commanded a majority. Instead of resigning at once, in response to the adverse referendum, Premier Baldwin waited for the new Parliament, which assembled in January, 1924, to oust him. His fate was decided by Asquith, who as leader of the reunited Liberals held the balance of power, and who concluded that the uncertainties of a Labor government were preferable to the "confusion, vacillation, and impotence" of the Unionists. Joining forces with Labor, then, he helped vote Baldwin out, the vote being 328 to 256.

Labor in Power. James Ramsay Macdonald, veteran Labor leader, ostracized as a pacifist in the War but welcomed back to the fold in less patriotic post-bellum days, now formed a Labor cabinet, in which he took the difficult portfolio of foreign affairs, and in which were included J. R. Clynes, former textile worker, as Lord Privy Seal and leader of the Commons; Philip Snowden, former clerk, ardent pacifist and moderate socialist, as Chancellor of the Exchequer; Arthur Henderson, former iron worker, as Home Secretary; J. H. Thomas, a Welsh trade unionist, as Colonial Secretary; William Adamson, a miner, as Secretary for Scotland; Stephen Walsh, coal miner, as War Secretary; Noel Buxton, an ex-Liberal, of private fortune, as Minister of Agriculture; Sir Sidney Oliver, former colonial official and Fabian socialist, as Secretary for India, with a peerage; Brig.-Gen. C. B. Thomson, one of the ablest and

youngest generals, a recent convert to Labor, as Secretary for Air, with a peerage; Sidney Webb, eminent historian of trade unionism, as President of the Board of Trade; Lord Parmoor as President of the Council; Viscount Chelmsford, Conservative, for the Admiralty; John Wheatley, Health; C. P. Trevelyan, ex-Liberal, pacifist, recent convert to Labor, son of the distinguished historian, as President of the Board of Education; Thomas Shaw, prominent socialist, as Minister of Labor; Col. Josiah Wedgwood, for the duchy; and F. W. Jowett, for Works. Though a few opponents, notably Winston Churchill, vainly endeavored to arouse the country to the peril of a Socialist ministry, Premier Macdonald showed no inclination toward revolutionary fanaticism, but, rather, accepting the traditions of office, amiably visited the King, respected venerable ceremonials, and conducted his policy with irreproachable sobriety. His plans for more generous unemployment relief (which had cost the exchequer £170,000,000 since the Armistice) and for construction of 200,000 houses a year, to rent at 9 shillings a week each, were but extensions of established policies. The capital levy, Labor's most radical campaign proposal, was practically dropped; indeed, Premier Macdonald calmly permitted the bourgeois parties on April 1 to pass, by 325 to 160 votes, a resolution condemning the principle. In the budget presented by the Socialist Chancellor of the Exchequer, April 29, there was provision for a reduction of £40,000,000, lowered duties on tea, sugar, and coffee, discontinuance of duties on imported automobiles and films, repeal of the corporation tax, and inhabited house taxes; but not even Churchill could make social revolution out of these items. In foreign affairs Premier Macdonald displayed a refreshing candor, coupled with frank pacifism and confessed regard for British interests. With Poincaré he exchanged letters which on his side uttered bluntly England's objections to French armament and Ruhr policies, but also expressed a transparently sincere desire for reconciliation and coöperation. He abruptly granted recognition to Soviet Russia, February 2, for commercial reasons, as he said, though Bolshevism was repugnant to him. He announced on March 18 that he would stop fortification of the Singapore naval base, as a pacific gesture; but he insisted on customary naval appropriations. All treaties, his government promised, were henceforth to be submitted publicly to Parliament. In short, his was a moderately radical, conservatively pacifist, course of action, dictated by evolutionary socialism rather than revolutionary communism, and scarcely more perturbing to "tranquillity and stability" than the pre-war social reforms of an Asquith cabinet, for all its tremulous dignity, or the dazzling political legerdemain of a Welsh wizard, or the quietist *fainéance* of a Bonar Law, or the disconcerting protectionism of a Baldwin "business" government, all of which had been tried and found wanting in 10 memorable years.

GREAT BRITAIN, COMMUNIST PARTY OF. See COMMUNISM.

GREAT LAKES, COMMERCE OF. See SAULT SAINT MARIE.

GREBLE, EDWIN ST. JOHN (1859-). An American soldier, born at West Point, N. Y., and educated at the United States Military Academy. He was appointed second lieutenant.

During the Spanish-American War he served as captain and as assistant adjutant-general of volunteers and in 1899 was promoted to be major of volunteers. In the same year he was appointed captain of the Regular Army and was successively promoted to be major, lieutenant-colonel, colonel, and in 1916 brigadier-general. In the following year he became major-general. During the American administration of Cuba, he served as assistant to General Ludlow and to General Wood. From 1910 to 1914 he was a member of the General Staff in charge of field artillery and commanded the 6th Field Artillery on the Mexican border, from 1914 to 1916. In 1918 he was retired on account of disability incurred in active service.

GREECE. A republic in southeastern Europe. The Glücksburg dynasty was deposed on Apr. 13, 1924. The area is about 49,000 square miles, according to the boundaries fixed by the treaty signed at Lausanne, July 24, 1923. This area includes Old Greece, Thrace (west of the Maritza River), and the islands, with the exception of the Dodecanese, which belong to Italy, and Imbros and Tenedos, which now belong to Turkey. The population in 1924 was about 6,500,000, including 1,500,000 refugees from Turkey in Asia and Eastern Thrace. The area in 1914 was 41,933 square miles; the population, 4,363,000. Most of the population belonged to the Greek race. There were some Albanians, Jews, Vlacks, Slavs, and Armenians. The great majority of the inhabitants were adherents of the Greek Orthodox church, which, by the terms of the constitution of 1864, was declared the religion of the state. Complete toleration and liberty of worship were guaranteed to all other sects, the greater part of whom were Roman Catholics and Jews. Emigration, especially to the United States, was 38,644 during 1912-13. It decreased considerably during 1922 and 1923, partly because of the restrictions on immigration by the United States government. The principal cities of Greece are Athens, with 211,000 inhabitants; Saloniki, 154,000; Piræus, 97,000; Patras, 31,000; Corfu, 29,000; Hermoupolis, 28,000; Heraclium, 25,000; Volos, 24,000; Canea, 24,000; Kalamata, 20,000; Cavalla, 19,000.

Agriculture. Greece is mainly an agricultural country, with four classes of land proprietors: large land owners; peasant proprietors; monastic institutions; and the government. The large land owners were proprietors of one or more villages, with the adjoining land. Their estates varied in size from 2000 to 15,000 acres. There were very few of these large estates left, however, by 1924. Peasant proprietors owned from 25 to 150 acres each. The land belonging to monasteries was farmed chiefly by the monks. Government lands were mostly uncultivated and consisted chiefly of forests, marshes, and mountain pastures. During 1923-24 many refugees were given government lands and government loans large enough for them to build their houses and buy implements and seeds for their crops. The principal crops, in addition to cereals, were currants, tobacco, olives, and figs. The principal cereals grown were wheat, barley, oats, rye, and corn. The area planted to wheat in 1923 was 1,071,000 acres, with a production of 13,359,000 bushels; oats, area, 180,000 acres, production, 5,994,000 bushels; rye, area, 217,000 acres, production, 2,679,000 bushels; corn,

in 1921 (the last year for which figures were available), area, 494,000 acres, production, 7,880,000 bushels. Greece did not raise enough cereals for local requirements and had to import large quantities. A large amount of wheat, principally from Canada, the United States, and Bulgaria, was imported in 1922; barley, principally from Rumania and Egypt; corn, from Rumania and Bulgaria; flour, from Egypt and the United States (the flour from Egypt was probably reexported); rice, from the United States, Italy, and Egypt. The principal crops for export were currants, tobacco, olives, and figs. During 1923, there were 186,000 acres planted to currants, with an approximate production of 104,000 short tons. Currants exported during 1922 amounted to 80,000 short tons, principally to the United Kingdom, the United States, and the Netherlands. During 1920 (the latest figures available) 105,000 acres were planted to tobacco, with a production of 37,000 short tons. The tobacco crop for 1923 amounted to 71,000 short tons. Exports of tobacco during 1922 amounted to 106,000 short tons, chiefly to Germany and Egypt. The production of olive oil in Greece for 1923 amounted to 17,000,000 gallons. Exports of olive oil during 1922 amounted to 18,000 short tons; mostly to Italy, France, Turkey, and the United States. The fig crop for 1923 was 94,000 short tons. Fig exports during 1922 amounted to 12,000 short tons, chiefly to the United States, Italy, and the United Kingdom. Over 400 tons of cheese were exported during 1922. Besides currants and figs, Greece produced, in 1922, 152,000,000 oranges, 63,000,000 mandarins, and 49,000,000 lemons. The estimated numbers of live stock in Greece at the end of 1923 were 250,000 horses; 140,000 mules; 310,000 asses; 1,000,000 cattle; 7,500,000 sheep; 5,500,000 goats; and 460,000 swine. The forested area was nearly 4,000,000 acres. The principal trees were oak, beech, Aleppo pine, and silver fir.

Mining. Greece possessed a great variety of mineral deposits, the most important of which were salt, lignite, iron, magnesite, iron pyrites, and santorin earth. The production of these metals during 1922 (the last figures available) was as follows: emery, 13,000 metric tons; salt, 68,000; lignite, 132,000; iron, 49,000; magnesite, 57,000; iron pyrites, 55,000; and santorin earth, 28,000.

Manufacturing. Industry, after the War, was making considerable progress in Greece, especially in the manufacture of foodstuffs, leather, textiles, and soap. A number of émigrés from Turkey, who were skilled in the carpet and rug industry, practically denuded that field in Turkey and added this industry to those already practiced in Greece. Industrial concerns at the close of 1923 numbered 3512 and were distributed as follows: foodstuffs, 2000; leather, 450; chemical, 200; wood, 200; paper and printing, 150; mechanical, 150; housing, 150; textile, 125; tobacco (privately owned), 60; electrical, 25; and metallurgical, 2. The relations existing between employers and employees were amicable and it was only during recent years that trade unionism made any headway. To these unions women were admitted. Until recently strikes were practically unknown. Several occurred during 1923, especially on the electric railways. Legislation was passed during 1919-24 dealing with workmen's compensation, inspection of mines and factories,

hours of labor, employment of women and children, etc.

Cost of Living. The cost of living in Greece, as was the case in the majority of other countries of eastern Europe, increased rapidly after 1914. The index of the cost of living (1914 as 100) rose as follows: 1915, 121; 1916, 167; 1917, 289; 1918, 382; 1919, 341; 1920, 359; 1921, 421; 1922, 778; 1923, 1213; January, 1924, 1325.

Commerce. The total value in dollars of imports into Greece and exports from Greece during 1912-13 (average), 1921, and 1922, was as follows:

	Imports	Exports	Total
1912-1913 (average) ..	\$32,385,000	\$25,589,000	\$57,974,000
1921	100,792,000	55,357,000	156,149,000
1922	101,636,000	81,859,000	183,495,000

Conversions for the above table were made in drachmas at par for 1912-13 (\$0.193); for 1921, 1 drachma = \$0.0592; 1922, 1 drachma = \$0.033. The trade balance of Greece was generally adverse. The main sources of revenue to offset the excess of imports over exports during the period were the expenditures of the Allies' armies during the War, foreign investments in public utilities, mining, and agricultural enterprises, tourists' expenditures, emigrants' remittances, and government borrowings. The principal imports into Greece were agricultural products, textiles, and minerals and metals, including machinery and agricultural implements. The principal exports were agricultural products, mainly tobacco, currants, olives, raisins, and citrus fruit; minerals and metals, raw; alcoholic drinks, and olive oil. The principal countries selling to Greece during 1922 were the United States, the United Kingdom, Italy, France, Germany, and Egypt. The principal countries receiving exports from Greece were the United States, Germany, the United Kingdom, Italy, the Netherlands, France, and Egypt.

Communications. The length of railways in 1923 was about 1700 miles; 75 per cent of this was standard gauge. Most of the railroads were state-owned. The number of locomotives during 1922 was 262; passenger cars, 677; and freight, 4913. There were 10,600 miles of telegraph line in 1923; 22,325 miles of wire; 550 offices; 3973 miles of cable in 1920; total telegrams (1922), 4,294,662; miles of telephone line (1920), 4914. The Greek Merchant Marine in 1923 consisted of 1522 vessels, with a gross tonnage of 914,136. Shipping entering Greek ports in 1921 totaled 3963 vessels of 4,274,915 tons; cleared, 3898 vessels of 3,805,112 tons.

Finance. Gold and silver stock on hand in November, 1923, was 37,330,000 francs, which did not include 25,000,000 francs in the Bank of England. The banknote circulation at the end of 1913 was 245,893,000 drachmas. This increased to 1,909,638,000 drachmas in 1920; 2,507,638,000 in 1921; 3,099,141,000 in 1922; and stood at 5,406,036,000 at the end of December, 1923. The total external debt of Greece, according to official government statistics on Dec. 31, 1923, was 1,644,270,000 gold drachmas (\$317,334,110 converted at par). The total internal debt on the same date was 7,761,000,000 drachmas (\$131,937,000 converted at the average exchange value of the drachma for 1923, \$0.017). A little over half of this in-

ternal debt bore interest. The total budgeted revenues, ordinary and extraordinary, during 1922-23, other than paper money issues, was \$141,881,000; expenditures, \$160,467,000. The total anticipated revenues for 1923-24 were \$67,000,000, and the total expenditures, \$112,608,000.

Education. According to the latest census, 1917-18, there were 6799 primary schools, with 8641 teachers and 476,695 pupils; 76 high schools; and 425 middle schools, having 55,408 pupils. In 1921, there were 10,131 teachers in elementary schools and 2,018 in secondary schools, and two agricultural schools with 150 students. There were two universities in Athens, the National University and the Capodistria University, as well as the Polytechnic with 22 professors and 170 students, and 17 commercial schools with 2800 students. There was an American School of Archæology at Athens and a British School of Archæology.

History. At the outbreak of the War the Greek ruling class vacillated between two opinions. King Constantine (q.v.) favored union with the German cause or at least a policy of neutrality; Venizelos, who had been premier since 1910, saw in an espousal of the Allies' purposes the realization of the long desired expansion in Northern Epirus (q.v.), as well as the possible acquisition of territories in Asia Minor at the expense of Turkey. But the fear of Bulgarian participation stayed Venizelos's hand, while the known sympathies of the King and the well timed German propaganda, which kept the population eager for peace, contributed toward the maintenance of Greek neutrality. To Venizelos, the attack on the Dardanelles in February, 1915, seemed an auspicious occasion for the Greeks to throw their support definitely on the side of the Allies; but the King persisted in his opposition, with the result that Venizelos was forced out of office and the Chamber dissolved. A new ministry, under Gounaris, was constituted frankly on a neutral basis, and though the Venizelists won a clear majority in the elections of June, 1915, on the issue of intervention, it remained in power to the complete disregard of the principle of ministerial responsibility. Only on August 23 was Venizelos summoned to the palace. His foreign policy centred in the maintenance of the Græco-Serbian accord, and he continually proclaimed to the Allies and Germany that a Bulgarian attack on Serbia would be followed by hostilities. With Bulgarian mobilization in September, Greece, so far as Venizelos was concerned, was ready for war. The Allies were requested to supply the 150,000 men necessary for the protection of the Græco-Serbian frontier, and Greece stood prepared to meet her obligations. But the King stubbornly refused to countenance a war declaration, and aided by the general staff, which owed its German sympathies to its German military training, he frustrated any attempts to succor Serbia. The French troops were refused a landing at Saloniki; in October, Venizelos was once more dismissed in spite of the fact that he commanded a majority. The succeeding events seemed to indicate that the King and not Venizelos was to triumph. Under the Zaimis and Skouloudis ministries the Græco-Serbian treaty was repudiated and aid to the Allies refused in spite of the tempting offer of the cession of Cyprus. The King was determined to break the Venizelist opposition and once more called for a general election. In

the balloting of December 19, as a result of the abstention of Venizelos and his followers from the polls, the government was accorded the confidence of the electorate and persisted, therefore, in its policy of neutrality.

Whether it willed or no, Greece was to serve the Allies' purposes. In December, 1915, an Allied force under General Sarrail took possession of Saloniki, and that city served throughout the War as the seat of the Allies' operations in southeastern Europe. On June 3, 1916, martial law was proclaimed in the city; from June 21 on, when the Allies demanded of Constantine the demobilization of the army and the calling of a general election, the French and English played an increasingly important rôle in Greek affairs. Greek protests to the United States were unavailing. A blockade was enforced, the right of search exercised, and the import of food seriously curtailed. The Skouloudis ministry fell, and on June 27, the King was forced to yield to all the Allied demands. Cabinet crises followed in rapid succession amid the uncertainties of a Bulgarian invasion of Macedonia, the entry of Rumania into the War, and a growing turbulence on the part of the Venizelists, who formed revolutionary committees for the purpose of forcing intervention. In fact, prompted by this motive, Venizelos repaired to Crete in an attempt to stir up the national ardor for a common move on Bulgaria; and the agitation had all the marks of a revolutionary movement, even to the forming of a provisional government, though Venizelos continued to protest his loyalty to the dynasty. On November 24, aroused by the operations of irregular Greek bands and fearing a more general movement, Admiral du Pournet, in command of the Allies' fleet, demanded the surrender of a large portion of the Greek artillery. Greek refusal led to the occupation of the Piræus and a march on Athens. Street fighting at once became general; the Venizelists in particular were singled out for outrages. The tone of the Allies now assumed a marked severity. In the demand for reparations the following points were stressed: withdrawal of Greek troops to the Peloponnesus, where, of course, they could be watched; the dispersal of armed bands of reservists; the release of political prisoners; the reestablishment of Allied control over means of communication. A rigorous blockade was set up and the Venizelist provisional government at Saloniki was recognized. On Jan. 16, 1917, the Greek government accepted the terms; on January 13 it complied with the terms of another ultimatum, though the blockade continued in force. The nonappearance of a German army in Macedonia, the entry of the United States into the War, and the displacement of Briand by the more truculent Ribot as the head of the French government, all contributed toward the creation of a more docile royal policy. But with or without official knowledge, the reservists continued to operate and by uniting with German agents in Thessaly succeeded in seriously embarrassing the Allies' purposes. Once more the Allies coerced Greece, this time at the instance of powerful French opinion. On June 6, Jonnart made his appearance at Saloniki as commissioner for Great Britain, France, and Italy, and at once despatched a note to Constantine demanding his abdication as well as that of his oldest son. On June 12 the King gave in and designated his second son, Alexander, as ruler

of the country. Known German sympathizers were banished; the ministry in power resigned; and on June 27 Venizelos was called to head a new government. Thus a revolution was effected by Allied intervention, though it is possible that Venizelos, had he gained the consent of the Entente, would have brought about the same end, for his adherents at this time numbered some 50,000.

On June 30, Greece broke off diplomatic relations with the Central Powers and formally entered the War on the side of the Allies. The Chamber of June, 1915, was summoned, and after a vote of confidence had been given the governments, steps were taken to put the country on a military footing. As a result of mobilization, some 250,000 men were called to the colors and under the direction of the French General Braquet were whipped into fighting shape so rapidly that by 1918 they were able to give the Allies a great advantage on the southeastern front. By Greece's entry the domestic situation was relieved through heavy importations of grain, the restoration of a considerable number of merchant ships, and French aid in the reconstruction of the national finances.

Before the Peace Conference, Venizelos was undoubtedly the most important single eastern European figure. He pressed with vigor the Greek claims to Northern Epirus, Thrace, Smyrna, and the Dodecanese (qq.v.), and met at once with an initial success in the treaty of Neuilly. By this document western (Bulgarian) Thrace was ceded to the Allies (in trust for Greece), and Bulgaria was thus deprived of access to the Aegean. Another hope seemed well on the way to realization when Venizelos received the Allies' sanction for the despatch of a Greek force to Smyrna, nominally for the protection of the Christians (May 15, 1919). The Peace Conference looked favorably on the Greek claims to the Aegean islands and seemed disposed to grant the Greek requests for the Epirus in view of the cession of Valona to Italy by the Treaty of London of 1915. The turn in Greek fortunes came, however, late in 1920. In spite of Turkish protests, so impressed was the Supreme Council with Venizelos and his apparent hold on the Greek people that by the Treaty of Sèvres, later discredited, Greek sovereignty was extended over eastern Thrace up to 20 miles of Constantinople; Smyrna was provisionally assigned to Greece; and the islands of Tenedos and Imbros, as well as those in the Aegean Sea already occupied by Greece, were ceded. At the same time the Dodecanese, by agreement with Italy, were promised to Greece. Never did a statesman see his efforts crowned with greater success than did Venizelos when he quit the Supreme Council in the summer of 1920. Yet his long absence from home, and the high-handed character of the administration, the continuance of martial law, a drastic censorship, mobilization practically continuous since 1912, the effective pro-Constantine propaganda, and the general war weariness, contributed to his fall. The sudden death of King Alexander on October 25 at once made the return of Constantine the leading issue for the forthcoming election. In the light of the returns, the repudiation of Venizelos was complete. Of the Opposition, 246 were elected against 120 Liberals (Venizelists). Venizelos immediately retired from the country; a new ministry was formed under Rhallis; and King Constantine

returned in triumph on December 19, after receiving an almost unanimous vote in a plebiscite. It was inevitable that the Allies' attitude toward Greece, hitherto so favorable, should now be completely reversed. On December 3 the Supreme Council announced the withdrawal of all financial support to Greece. In the spring of 1921, largely at the instigation of the French, who feared for their own interests in Asia Minor as the Turkish Nationalist movement under Mustafa Kemal took on strength, the Supreme Council turned its attention toward a revision of the Treaty of Sèvres as far as Greece was affected. By March it was evident that the Supreme Council meant to repudiate the cession of Smyrna to Greece. Under these circumstances the Greeks began a war on the Nationalists on March 24 by marching on Afium-Karahissar and Eskishehr, on the line to Angora. Both cities soon fell; Eskishehr, however, was retaken on April 2 by the Turks; the first offensive thus closed without spectacular results. The war spirit in Greece reached fever pitch. Encouraged in a belief that Great Britain was actively championing their interests and that surcease from the pressing domestic problems would be found in great victories abroad, the Greeks renewed their demands for a continuance of the war. The second offensive began on June 10. A bloody battle was fought before Kutahia, July 16-17, and the Greeks occupied the town. On July 21, Eskishehr was once more entered, and the army pushed east on the road to Angora. Not until after the Greeks crossed the Sakharra in September did they receive their first check. In a 10 days' battle early in September the Greeks were disastrously defeated and were compelled to fall back with heavy losses on the earlier Brusa-Afium Karahissar line. Thus the year closed with practically no results. Meanwhile at home the newly elected Chamber had constituted itself a Constituent Assembly and was confronted by an advanced programme of political and economic reform prepared by Gounaris. It was idle to hope for any real reconstruction in view of the depletion of the treasury and the Chamber's preoccupation with the idea of indemnifying the victims of the Venizelist régime during the War. How precarious the situation was immediately became evident. With the beginning of 1922 the serious nature of affairs, little known at home and abroad because of a continuous official mendacity, began to appear. Turkish attacks on Greeks throughout western Asia Minor became frequent, and imprisonments and deaths were numerous. These atrocities were merely forerunners of the larger movements of the summer. In the last week of August the Greek army, inadequately commanded, was suddenly beset in the Afium-Karahissar and Eskishehr districts by an immeasurably superior Turkish force and struck a staggering blow. Panic at once ensued. Flight toward Smyrna was general, while thousands of soldiers took to their ships and made for Greece. The city of Smyrna, filled with refugees, was turned over to the Allies on September 8 and was entered by the Turks three days later. On September 14 a fire broke out in the foreign quarter and destroyed the whole section on the water front; some 100,000 were left homeless. Thus, in 15 days, the Turks had swept Anatolia free of the invaders and restored a balance that for more than a year had

seemed all but lost. The Greeks were compelled to evacuate eastern Thrace as a condition for an armistice. The reaction on home affairs was instantaneous. Beginning in the islands of Mytilene and Chios and spreading to the fleet and the soldiers in Thrace and Macedonia, the demand for Constantine's abdication gained such headway that on September 27 the King once more relinquished his throne, this time in favor of his oldest son, George. Constantine died suddenly at Palermo on Jan. 11, 1923. Until the meeting of the new National Assembly affairs were in the hands of a revolutionary committee which, in order to gain popular approval, proceeded to an investigation of the late disaster. A report published on November 8 condemned all the anti-Venizelist governments from 1915 to 1922 and demanded the indictment of the ex-ministers, Gounaris, Stratos, Protopapadakis, Theotokis, Baltazis, Goudas, and Stratigos, on a charge of treason. A speedy trial took place, and the following, to the horror of Europe, were sentenced to death and duly executed: Gounaris, Stratos, Protopapadakis, Theotokis, Baltazis, and General Hadjianastis, commander of the forces in Asia Minor. Such an act only strengthened the hand of the French diplomats who sought to pacify Turkey at the expense of Greece. The Treaty of Lausanne, as finally signed on July 24, 1923, (see TURKEY) meant the complete humiliation of Greece and the dissipation of those hopes of a greater Greece dominating the Southeast which had been the dream of politicians since the outbreak of the War. Eastern Thrace, Smyrna, the Dodecanese, were lost; those Greek nationals, some 600,000 living in Turkish territory, notably in Asia Minor, whose commercial activities added much to the wealth of the fatherland, were to be torn from their homes and settled lives and deported to Greece, in exchange for Turkish nationals. A further blow was struck at Greek prestige when on August 20 as a result of the murder, at Janina, two days earlier, of the Italian commissioners who had been at work on the delimitation of the Græco-Albanian boundary, Mussolini, presuming Greek responsibility, delivered an ultimatum to Greece which demanded official apologies, execution of the unknown murderers, and the immediate payment of 50,000,000 lire. The refusal of Greece to pay so large a sum at once led to the Italian bombardment and occupation of the island of Corfu, August 31. Greece thereon appealed to the League Council, under Articles XII and XV of the Covenant. Expressions of disapprobation in the Assembly and Council of the League, and, above all, English intercession for Greece, induced Mussolini to abandon his truculent attitude, accept terms of settlement proposed by the Council of Ambassadors, and withdraw from Corfu. Greece accepted the terms on September 9 and shortly thereafter made the required ceremonial apologies, besides depositing 50,000,000 lire as a forfeit, which was turned over to Italy after an impartial commission had reported that although not responsible for the murders, the Greek government had been negligent in proceeding against the assassins. (See ALBANIA and ITALY.) International bankruptcy was merely one face of the shield; domestic affairs revealed the same deplorable breakdown. The revolutionary government, headed by Gonatas, though Colonel Plastiras was the virtual dicta-

tor, continued in control throughout 1923, maintaining its uneasy position only by the suppression of the constitutional liberties. The Venizelists, the party at the head of affairs, were hopelessly disunited; and with a lack of leadership, for both Venizelos and Zaimis were in political retirement, the country drifted helplessly. A half-hearted gesture at reconstruction was made on August 1 when the first army contingents were demobilized. In October a revolt led by General Metaxis broke out and soon spread over the Peloponnesus, and only with difficulty was the government able to cope with it. Again popular opinion seemed to consider a republican constitution a universal palliative. The weeks preceding the general election of December 16 witnessed a revival of republican sentiment; attacks on the dynasty even appeared in the army and navy, hitherto generally loyal. The elections proved favorable to the Venizelists and the republicans; two days later George and his wife Elizabeth were invited to leave the country, and a regent, Admiral Koundouriotis, was installed in the palace. The year 1924 thus saw Greece again about to commence a new and perilous journey. The Glücksburg dynasty was deposed, only temporarily, it was claimed, but quite definitely so far as public opinion was concerned; a National Assembly convened on January 2; and on January 4, Venizelos, the man to whom all Greece looked, appeared in Athens after an exile of three years and consented first to head the National Assembly and then, on the resignation of the Gonatas cabinet, the government itself, on January 11. To Great Britain and the United States the new régime appeared to possess all the elements of stability, and recognition was formally accorded during the course of the month. But it seemed that Greece's well-wishers were to be doomed to eternal disappointment and that despair was to be the lot of those Greeks who were laboring to save their country from chaos. Venizelos was forced to relinquish his post because of illness, and although a cabinet completely made up of Venizelists succeeded him on February 6, it refused to permit the National Assembly to abolish the dynasty forthwith but insisted on a popular plebiscite. Venizelos himself had been won over with difficulty to the need for prompt action, and the plan of his followers to employ dilatory tactics so dispirited him that on March 4 he announced his intention to quit the country. The republicans and the military party now joined forces with the result that the government fell, on March 8, and Papanastassian, the republican leader, was summoned by the regent to form a new cabinet. The republican ministry, having obtained a vote of confidence in the National Assembly, lost no time in changing the name of the "Kingdom of Hellas" to the "Hellenic State," interdicting prayers for the royal family, and preparing in various other ways for the transition from monarchy to republic. The goal soon was attained. On March 25, while guns boomed and Athens rejoiced, the Assembly unanimously voted a resolution proclaiming Greece a republic, confirming Admiral Koundouriotis provisionally in his powers as regent, and permanently exiling the members of the Glücksburg dynasty. King George was permitted, however, to retain his title and four-fifths of his income for life. The Assembly's resolution was overwhelmingly rati-

fied in a plebiscite on April 13, by 758,742 republican against 325,322 monarchist votes, and accordingly Premier Papanastassian notified foreign powers that Greece had become a republic, and that Koundouriotis was henceforth to be styled Provisional President. On May 18 the draft of the new Greek constitution was made public. The most vexing problem confronting the new government was the repatriation of 1,000,000 or more Greek refugees from Asia Minor and eastern Thrace, and this might well have proved insuperable but for the yeoman work done by the League of Nations' Commission headed by Henry Morgenthau of New York. To aid in the settlement of these unfortunates on the land and in industry, the Bank of England floated two loans of £1,000,000 each; but according to Mr. Morgenthau at least £6,000,000 more was needed. See SMYRNA; also NAVIES OF THE WORLD.

GREELEY, WILLIAM BUCKHOUT (1879-). An American forester, born at Oswego, N. Y., and educated at the University of California and Yale Forest School. From 1904 he served with the United States Forest Service and was at various times inspector of forest reserves in California, supervisor in charge of the Sequoia Natural Forest, and government forester in Washington. In 1920 he was chief forester of the United States. During the War he served with the American army in France as lieutenant-colonel of the 20th Engineers and Chief of the Forestry Section. He wrote many bulletins and circulars relating to forestry.

GREEN, THOMAS EDWARD (1857-). An American lecturer and author, born at Harrisville, Pa., and educated at McKendree College, Princeton University, and Princeton Theological Seminary. From 1880 until 1903 he was active in the ministry of the Presbyterian and Protestant Episcopal churches at Mt. Carmel, Sparta, and Chicago, Ill., and at Cedar Rapids, Iowa. He was elected Bishop of Iowa in 1898 but did not accept the office. After 1903 he was lecturer and chaplain in various national organizations, foundations, and universities. During and after the War he was identified with several movements for peace or war relief. Among his publications are *The Mantraps of the City* (1884); *The Hill Called Calvary* (1898); *In Praise of Valor* (1899-1900); *The War Trust* (1914); *The Truth About Japan* (1915); *Eugenic Democracy* (1917); and *The Dream of the Ages* (1921).

GREENE, ARTHUR MAURICE, JR. (1872-). An American mechanical engineer, born in Philadelphia, and educated at the University of Pennsylvania and in Germany. After serving as instructor at the Drexel Institute, he was appointed professor of mechanical engineering at the University of Missouri in 1902 and served there until 1907, when he became professor of mechanical engineering at the Rensselaer Polytechnic Institute. He remained there until 1922, when he was appointed dean of the School of Engineering and professor of mechanical engineering at Princeton. During the War he was a member of the National Research Council and several other important organizations. He was a member of many scientific and other societies and wrote *Pumping Machinery* (1911); *Elements of Heating and Ventilation* (1912); *Heat Engineering* (1914); and *Elements of Refrigeration* (1916).

GREENE, JEROME DAVIS (1874-). An

American banker, born at Yokohama, Japan, and educated at Harvard and the University of Geneva. He was a member of the faculty of arts and sciences at Harvard (1905-11), general manager of the Rockefeller Institute for Medical Research in New York City (1910-12), trustee and secretary of the Rockefeller Foundation (1913-17), a member of the firm of Lee, Higginson, and Company, bankers of New York (1918), the same of the London branch (1919-), director of the Manhattan Railway Company (1914-), executive secretary of the Reparation Commission at the Paris Peace Conference (1919), and a trustee and member of several prominent institutions and societies.

GREENLAND. With Australia classed as a continent, Greenland is the largest island of the world. It has an estimated area of 840,000 square miles, of which about 5 per cent is habitable along the ice-free coasts; the remainder is covered by an unbroken ice-cap, exceeded in extent and thickness only by that of the continent of Antarctica. In 1921 the population numbered 14,355, practically all Eskimo. This was a gain of 896 over 1911. The births and deaths of the later years showed a steady gain of natives, probably the only instance in which a primitive people has thus thrived under a civilized and alien government. Fortunately the detached natives have come under Danish control. These form communities living in the Smith Sound region, between Cape York and Etah, and in the smaller settlement in the district of Angmagssalik on the east coast. Almost the entire population of what is commonly known as Danish Greenland is concentrated on the southwest ice-free region, facing Baffin Bay, extending northward along the coast for 1200 miles from Cape Farewell to Tasiussak. The two districts, northern and southern, are each governed by a royal inspector who has magisterial powers and is aided by assistants at the more important places. The largest settlement in 1921 was Syd Proven (901 inhabitants) and the smallest Skansen (49). These officials act under control of the Royal Greenland Board of Trade (Copenhagen) who most efficiently guard the interests and welfare of the natives. Schools, churches, and hospitals are maintained, and the Danish Eskimos are a literate, Christian people. Trade is confined to the summer months, owing to the obstructing ice. Imports and exports, each about \$1,000,000 annually, usually balanced; the exports were mostly fox skins and the products of the seal fishery. Danish energy and daring had explored the fauna, flora, geology, ethnology, etc., of this vast region with a thoroughness unequalled in any other Arctic land. The 63 volumes of *Meddelelser* (Communications) *om Gronland* are invaluable contributions to Arctic science. A notable event was the visit of the Danish royal family to Greenland in 1922, to celebrate the bicentenary celebration of the introduction of Christianity into Greenland. Latterly, the exploration of extreme northern Greenland, the northernmost known land of the world, was made by expeditions under Rasmussen and Koch. The former discovered the journals of Mylius-Erichsen who perished in the expedition which completed the coast line of Greenland and who found that Peary Channel is non-existent. The latter found an interior lake which he suggests contributed to Peary's error. MacMillan's voyage of 1923-24 was expected

to contribute data regarding the ice age of western Greenland.

History. In 1919, Sweden, England, and the United States, realizing the hitherto benevolent nature of Danish policy, formally recognized Denmark's sovereignty over the whole of Greenland. But in 1921 a sharp controversy was precipitated when Norway questioned Denmark's exclusive jurisdiction. The whaling industry was gradually assuming importance; the catch in 1920 was valued at 300,000 kroner, and Norway in the interests of her fishermen controverted Denmark's claim to the economic monopoly which her sovereignty entailed. In short, it was not so much a question of mere political control as it was the right to develop Greenland's industries unchecked by Danish interference. The Danish mercantilist attitude was put on moral grounds; the native Lapps had to be defended from ruthless exploitation at the hands of foreigners. No understanding could be reached, and there was talk of appealing to the League of Nations.

GREENOUGH, CHESTER NOYES (1874-). An American university professor and dean, born at Wakefield, Mass., and educated at Harvard University where he was instructor in English (1899-1907). In 1907-10 he was professor of English at the University of Illinois and in the latter year returned to Harvard, where he has since remained, as assistant professor of English (1910-15), professor (1915-), dean of the college (1919-20), and dean (1921-). He is the author of *A History of Literature in America*, with Barrett Wendell (1904), and *English Composition* (1917).

GREGORY, AUGUSTA, LADY (?-). An Irish playwright (see VOL. X). Her recent plays include *The Golden Apple* (1916), *The Dragon*, and *Aristotle's Bellows*. Lady Gregory is a director of the Abbey Theatre in Dublin.

GREGORY, CHARLES NOBLE (1851-). An American jurist, born in Otsego County, N. Y., and educated at the University of Wisconsin. In 1872-94 he practiced law at Madison, Wis. In 1894-1914, he was dean of the law schools of the universities of Wisconsin and Iowa and George Washington University and became one of the editors of the *American Journal of International Law*. He was made a member of numerous law associations and contributed many articles to professional and literary periodicals. His works include *The Life of Justice Miller of the Supreme Court of the United States* (1907) and *Abstracts of Cases in Lloyd's Reports of Prize Cases* (1919).

GREGORY, JOHN (1879-). An American sculptor. Born in London, England, May 17, 1879, he came to the United States in 1893. After studying at the Art Students' League of New York, 1900-03, and at the Ecole des Beaux Arts, Paris, 1904-06, he won a fellowship in the American Academy in Rome, 1912-15. He was a pupil of George Grey Barnard and Anton Mercie. During the War he was with the camouflage section of the navy department, designing dazzle camouflage. In 1924 he became director of the sculpture department, Beaux Arts Institute of Design, New York. His art was strongly influenced by the archaic Greek style, but not to the detriment of his own individuality. Most of his works are garden figures of originality and charm, such as "Bacchante,"

"Wood Nymph," "Orpheus and Dancing Leopard," a powerful group; and most exquisite of all, "Philomela," in the possession of Payne Whitney, Long Island (replica in Metropolitan Museum, New York City).

GRENADÉ. See TRENCH WARFARE, and STRATEGY AND TACTICS.

GRETCHANINOV, ALEXANDER TICHONOVITCH (1864-). A Russian composer, born at Moscow. He studied at the Moscow Conservatory with Safonov (1881-91) and at the Petrograd Conservatory with Rimsky-Korsakov (1891-93). He never occupied any official position but devoted his entire time to composition and appeared occasionally as conductor of his own works. His instrumental works show the influence of the German romanticists, but his sacred compositions rank among the finest in all Russian music. Besides two complete liturgies, a *Laudate Deum* for chorus and orchestra, and many sacred choruses a cappella, the list of his works includes two operas, both produced at Moscow, *Dobrynya Nikititch* (1903) and *Sœur Béatrice* (1912); two symphonies, chamber music, and incidental music to Ostrovsky's *Snow Maiden* and A. Tolstoy's *Czar Feodor and Ivan the Terrible*. In 1917 he wrote *Gimn Svobodni Rossi* (Hymn of Free Russia), which was adopted as the national hymn, replacing the well-known anthem of Imperial Russia.

GREW, JOSEPH CLARK (1880-). An American diplomat, born at Boston, and educated at the Groton School and Harvard University. In 1904-16, he was successively clerk and deputy consul-general at Cairo (Egypt), third secretary of legation at Mexico City and St. Petersburg, Russia, and secretary or counselor at Berlin and Vienna. In 1917, when the United States broke off diplomatic relations with Austria-Hungary, he was counselor of embassy and chargé d'affaires at Vienna. He was then attached to the Department of State in Washington and served on various commissions there and in Europe at the time of the treaty of peace. In 1918 he was named secretary-general of the American commission to negotiate peace, with the rank of envoy extraordinary and minister plenipotentiary in Paris, and in 1919 was American secretary of the International Secretariat of the Peace Conference. In 1920 he became envoy extraordinary and minister plenipotentiary to Denmark; in the year following he went to Switzerland in the same capacity. He published *Sport and Travel in the Far East* (1910).

GREY, EDWARD, VISCOUNT (1862-). A British statesman (see VOL. X), who was again appointed Foreign Secretary in 1915 in Asquith's coalition government. In 1916 trouble with his eyes and the succession of Lloyd George as premier caused his resignation from office. He was created Viscount Grey of Faldoen. Viscount Grey had been in office 10 years, during which he steered his ship of state not with remarkable manœuvres but with an even balance of foresight and conservative patriotism. After a two-year rest he was well enough to represent England on a mission to Washington regarding the peace settlement. In 1920 he took keen interest and a prominent part in the founding of a British Institute of International Affairs. See WAR IN EUROPE, *Outbreak of the War*.

GREY, ZANE (1875-). An American

author, born at Zanesville, Ohio. He studied dentistry at the University of Pennsylvania and practiced in New York until 1904, when he turned to writing. His stories, laid in the West, include: *Riders of the Purple Sage* (1912); *Desert Gold* (1913); *The Lone Star Ranger* (1915); *Desert of Wheat* (1919); *The Mysterious Rider* (1921); *To the Last Man* (1922); and many others, all based on themes of heroic incident and thrilling adventure.

GRIERSON, SIR GEORGE (1851-). An English Sanskritist (see VOL. X). His recent works have been editions of W. M. Waterfield's translation of *Alh Khand, the Lay of Aka, a Saga of Rayput* (1923), Sir Aurel Stein's collection of *Hatim Tilawona, Kashmiri Stories and Songs* (1923), and in collaboration with Lionel Barnett *Lalla Yogiswari: the Wise Sayings of Lal Deda, a Poet of Ancient Kashmir* (1923).

GRIFFES, CHARLES TOMLINSON (1884-1920). An American composer, born at Elmira, N. Y. He received his entire musical education in Berlin, studying with Jedliczka and Galston (piano), Klatte and Loewengard (theory), and Rüfer and Humperdinck (composition). From 1907 till his death, which occurred in New York, Apr. 8, 1920, he taught at the Hackley School in Tarrytown. As a composer he belongs to the extreme futurists. His most ambitious work is a symphonic poem, *The Pleasure-Dome of Kubla Khan*. His other works are a dance-drama, *The Kairn of Koridwen*; a Japanese pantomime-play, *Shojo*; two pieces for string quartet; songs, and piano pieces. Two of the last, *The White Peacock* and *Clouds*, were also orchestrated.

GRIFFIN, FRANK LOXLEY (1881-). An American educator, born in Topeka, Kan., and educated at the University of Chicago. After serving on the staff of the Yerkes Observatory, he was appointed instructor of mathematics at Williams College in 1906 and was assistant professor in 1909. From 1911 he was professor of mathematics at Reed College in Portland, Ore. He wrote *Introduction to Mathematical Analysis* (1921), and *Periodic Orbits*, with F. R. Moulton (1920). He also contributed many articles on mathematics and astronomy to scientific papers.

GRIFFIS, WILLIAM ELLIOT (1843-). An American clergyman, educator, and author (see VOL. X). Among his later works are: *The House We Live In—Architect and Tenant* (1914); *The Mikado—Institution and Person* (1915); *Millard Fillmore—Constructive Statesman* (1915); *Bonnie Scotland and What We Owe Her* (1916); *Dutch Fairy Tales* (1918); *Belgian Fairy Tales* (1919); *Young People's History of the Pilgrims* (1920); *Swiss Fairy Tales* (1920); *Was Brant at Wyoming?* (1921); and *Welsh Fairy Tales* (1921).

GRIFFITH, ARTHUR (1872-1922). An Irish public official, born in Dublin. He was the son of a compositor and for several years was engaged in typesetting and proof reading. While at this work he acquired an acquaintance with foreign languages, metaphysics, mathematics, science, and history. He studied for a time at a university on the continent of Europe, and afterwards traveled widely. About 1890 he returned to Ireland, where he established *The United Irishman*. In 1905 he founded the Sinn Fein organization, which in 1916 brought about the Easter rebellion. He was elected a

member of Parliament in 1918, and was an outstanding figure in negotiations with the British government for securing Irish independence. With the establishment of an Irish Parliament he was elected president of the Dail Eireann in January, 1922. He died in August, 1922.

GRIFFITH, DAVID (LEWELYN) WARK (1880-). An American motion picture director, born at La Grange, Ky. He was formerly an actor and for a time was a member of James K. Hackett's company. He became connected with motion pictures first as an actor and then as director for the Biograph Film Company. His best productions include *The Birth of a Nation*; *Hearts of the World*; *Broken Blossoms*; *Intolerance*; *Way Down East*; *Orphans of the Storm*; *America*.

GRINNELL, JOSEPH (1877-). An American zoölogist, born at Wichita, Okla., and educated at Stanford University. At 20 years of age he became instructor at Troop Polytechnic Institute, Pasadena, Cal. He taught ornithology, biology, zoölogy, etc., for 22 years in various California institutions and in 1920 became professor of zoölogy in the University of California. He was editor of *The Condor* and published numerous articles on the birds and mammals of California and Alaska.

GRINNELL COLLEGE. A coeducational, nonsectarian institution at Grinnell, Iowa, founded in 1847. The student enrollment increased from 512 in the College and 192 in the School of Music in 1914 to nearly 900 in 1924, and the number of teachers in the faculty from 50 to 89. An extensive building campaign was inaugurated in 1914; in the decade following, a large modern building known as Alumni Recitation Hall, six residence halls for men, and five cottages and a central hall forming a women's quadrangle were erected. The elective system was greatly extended during the period and many new courses were added to the curriculum, especially in the departments of political science, history, economics, and business administration. The library increased from 50,000 to 73,000 volumes, and the endowment from about \$1,500,000 to nearly \$3,000,000. President, J. H. T. Main, Ph.D., LL.D.

GRIPPE. See INFLUENZA.

GRISCOM, LLOYD CARPENTER (1872-). An American diplomat (see VOL. X). In 1917 he was appointed a major in the department of the Adjutant-General of the United States army and afterwards became Assistant Adjutant-General.

GRISWOLD, SHELDON MUNSON (1861-). An American bishop, born at Delhi, N. Y., and educated at Union College and the General Theological Seminary. From 1885 to 1902 he held pastorates at Ilion, Little Falls, and Hudson, N. Y. In 1902 he was elected and in the following year consecrated missionary Bishop of Salina. In 1917 he was made suffragan Bishop of Chicago.

GRODNO. See LITHUANIA.

GROLL, ALBERT LOREY (1866-). An American painter (see VOL. X). His preoccupation with desert scenes with conspicuous cloud effects continued until 1921, when he reverted to his earlier interest in foregrounds. In some later pictures, among them "A Breezy Day—California," and "Wind Storm in Nevada," his clouds no longer dominate.

GROSSMITH, GEORGE (1874-). An

English comedian, son of George Grossmith and brother of Weedon Grossmith. He first appeared in an operetta by his father at the Shaftesbury Theatre and became a popular figure in musical comedy in London. He was the author or joint author of many musical plays, songs, and revues. He became lessee and manager of several playhouses in London in association with Edward Laurillard.

GROSSMITH, WEEDON (1853-1919). An English comedian, born in London. He was educated to be a painter but in 1885 he turned to the theatre and joined Rosina Voke's company, touring in the provinces and the United States. His first appearance in London was as Woodcock in *Woodcock's Little Game* (1887), and he gained his first notable success in *A Pantomime Rehearsal*. In 1894 he successfully produced his own play, *The Night of the Party*. Among his best parts are the rôles of Archibald Bennick in *The New Boy*, Jimmy Jinks in *Baby Mine*, the Earl of Tweenway in *The Amazons*, and the Judge in *Stopping the Breach* (1917), and the last rôle in which he played. He wrote an autobiography, *From Studio to Stage* (1913).

GROSVENOR, GILBERT HOVEY (1875-). An American geographer (see Vol. X). In 1920 he was president of the National Geographic Society. In 1919 he discovered a lake in Alaska 28 miles long, which was named Grosvenor Lake in his honor.

GROTHER, HUGO A. L. (1869-). A popular and prolific German writer on travel and on political and economic problems. He was born in Magdeburg and studied at the universities of Leipzig, Vienna, Munich, Würzburg, Rostock, and Berlin. He traveled in southern Europe, the Caucasus, Asia Minor and other countries. A volume of verse and of light fiction excepted, he has written only books of economic, political and even international import, as *Tripolitanien und der Karawanenhandel nach dem Sudan* (1898); *Tripolitanische Landschaftsbilder und Völkertypen* (1899); *Die Bagdadbahn und das Schwäbische Bauernelement in Transkaukasien und Palästina* (1902); *Auf Türkischer Erde, Reisebilder und Studien* (1903); *Landeskunde von Rumänien* (1906); *Wanderungen in Persien* (1910); *Das Albanien und Montenegro* (1913); *Das Albanische Problem* (1914); *Deutschland, die Türken, und der Islam* (1914); *Die Türken und Ihre Gegner* (1915); *Das Auswanderungsproblem und die Deutsche Volkswanderung* (1920); and *Bulgarien, Natur, Staat und Volk* (1920).

GROUP MIND. See SOCIAL PSYCHOLOGY.

GROVER, FREDERICK WARREN (1876-). An American educator, born in Lynn, Mass., and educated at the Massachusetts Institute of Technology, Wesleyan University, and George Washington University, and in Germany. He served on the faculties of Harvard and Wesleyan Universities and Lafayette College, and from 1902 to 1907 was laboratory assistant and associate physicist for the National Bureau of Standards. From 1911 to 1920 he was professor of physics at Colby College, and from the latter date, assistant professor of electrical engineering at Union College. From 1918 he was consulting physicist at the Bureau of Standards. During the War he performed valuable service at the Bureau of Standards, in Washington. He was the author of various scientific articles and bulletins and was the joint author

of *Principles Underlying Radio Communication* (1918).

GRUBER, L. FRANKLIN (?-). An American clergyman, educator, and author, born near Reading, Pa., and educated at the Keystone State Normal School, Muhlenberg College, the Neff College of Elocution and Oratory, and the Mt. Airy Lutheran Theological Seminary. In 1901-02 he was professor of mathematics and English at Wagner College, Rochester, N. Y. On being ordained to the Lutheran ministry in 1901, he became a pastor at Utica (1902) and later at Minneapolis, Minn. In 1914 he was made pastor of the Church of the Reformation at St. Paul. His works include: *The Version of 1611* (1903); *The Truth About Tyndale's New Testament* (1917); *Documentary Sketch of the Reformation* (1917); *The Wittenberg Originals of the Luther Bible* (1918); *Creation ex Nihilo* (1918; republished in 1921 under the title *Whence Came the Universe?*); *The Theory of a Finite and Developing Deity Examined* (1918); and *Is the Doctrine of an Infinite and Unchangeable Deity Tenable?* (1921).

GUADELOUPE. A colony of France, comprising two islands and five island dependencies, in the Lesser Antilles in the West Indies. Area, 688 square miles; population (1922), 229,839, of whom 90 per cent were Creoles. The largest towns were Pointe-à-Pitre, 22,664 inhabitants; Basse-Terre, 8184; Le Moule, 10,000. Leading products, as reflected in the exports for 1921, were sugar (25,024 tons), rum (9,054,063 litres), and coffee (657 tons). Exports for 1913, 1920, and 1921, were 18,287,489 francs, 146,389,180 francs, and 74,601,693 francs. Imports for the same years were 20,174,930 francs, 117,858,064 francs, and 78,989,677 francs. The increased prosperity of the islands was occasioned by the heavy demands made on them for sugar and rum by France. The budget for 1922 had increased to 27,278,611 francs, from the 1911 budget of 4,560,000 francs.

GUAM. An island of the Marianas or Ladrones group, in the Pacific, belonging to the United States; area, approximately 226 square miles. The population of Guam increased from 12,652 in 1913 to 13,275 in 1920. Since the American occupation in 1901, the population increased about 3600. Between 1918 and 1919 population decreased because of a disastrous typhoon on July 6, 1918, and an epidemic of influenza which swept over the island in October and November of that year. From Nov. 1 to Dec. 31, 1918, there were 858 deaths. Of the population, 92 per cent are called Chamorros, a hybrid race with a Malayan strain predominating. The remainder of the population includes Filipinos, Japanese, Chinese, blacks, and whites.

Agriculture. Corn is by far the most important agricultural product, representing 60.3 per cent of the total. While there was an increase in agricultural production during the decade 1914-24, the island did not become self-supporting. There is more arable land than the present population can cultivate with the means at hand. Other agricultural products are sweet potatoes, yams, tobacco, cassava, rice, arrowroot, and sugar. The live stock includes carabao, horses, goats, hogs, and cattle. The carabao in 1916 numbered 6149 and the horses 4367. The carabao is the chief burden-bearing

animal and is used both for drawing carts and for plowing.

Commerce. The chief commercial product of Guam is copra, obtained from coconuts. The exports of copra to the United States increased from 259,360 pounds in 1915 to 1,140,924 in 1919. Considerable quantities were also sent to Japan. In 1915, 731,180 pounds were sent to that country and in 1919, 851,680.

Education. Under the early Spanish governors public education was discouraged; the rulers believed that the natives would be more tractable if they remained illiterate. In later years free schools were established, and by the time the United States resumed control of the island, a majority of the natives could read and write in Spanish. The efforts of the Americans to teach the Chamorro children to use the English language did not prove very successful. The percentage of illiteracy in 1920 was 21.8 and was especially large among the adults. The total number of persons able to speak English in 1920 numbered 4384. During the decade 1914-24 considerable progress was made in the development of an educational system. By the end of that period in 1923, 14 primary schools, one intermediate school, and one high school were operated by the Department of Education. There were also several private schools. The total expenditure for education amounts to about \$40,000 annually. The registration in the schools in 1923 was 3509 and the average daily attendance 2265. A compulsory education law compelled the attendance of all children between the ages of 7 and 12.

Finance. The receipts amount to about \$100,000. In 1916 they were \$91,816; in 1923, \$106,719. Expenditures in 1916 were \$87,058; in 1923, \$106,719.

GUATEMALA. The largest of the five Central American republics, with an estimated area of 48,290 square miles, and a population, according to the 1920 census, of 2,004,900. The population in 1912 was 2,119,000. Guatemala, the capital, had 91,330 inhabitants in 1921. Earthquakes from Dec. 25, 1917, to Jan. 24, 1918, completely destroyed the city; but by 1922 much of the work of restoration had been completed. Other towns are Quezaltenango (35,000), Coban (30,770), and Totonicapan (28,310). Education was on the increase in 1922-23, with 2766 elementary schools as compared with 1837 schools in 1912. The total number of pupils was 82,997, of whom 4715 were taking secondary courses. In 1918 the University of Guatemala was opened, and by 1923, 482 students were enrolled. Expenditure for education in 1922-23 was 50,806,700 pesos.

Industry. Coffee planting continued the most important single activity, and coffee exports included more than three-fourths of the exports. In 1922 there were 1500 plantations covering 242,062 acres, and 95,918,000 pounds were exported in 1923 as compared with 76,219,800 in 1912. Bananas and sugar came next in importance as export crops. Food crops were being cultivated more extensively in 1922; 526,322 acres were under corn, 9226 under rice, and 31,940 under wheat. Forest products were beginning to play larger roles in the country's trade, for by 1922 chicle to the value of \$306,038 was exported (\$142,108 in 1913), and timber to the value of \$526,442 (\$247,757 in 1913). Mineral production was still back-

ward because of lack of transportation and capital. Chrome was discovered in 1916, and oil seepages were reported in 1922. Total mineral exports in 1920, to the United States chiefly, were valued at \$226,645. (In 1912, the figure was only \$2737.) In December, 1915, the state took over all the ore lands in the country, to be exploited under leasehold only. Imports and exports for selected years follow:

	Imports	Exports
1914.....	\$9,331,115	\$12,754,027
1920.....	18,344,463	18,102,906
1923.....	18,763,499	14,725,531

Proportions by countries of origin of imports were, for 1922, the United States, 63 per cent (50 in 1913); United Kingdom, 15 per cent (16 in 1913); Germany, 11 per cent (20 in 1913). Leading articles of importation were cotton goods, wheat flour, iron and steel manufactures, machinery, foodstuffs, drugs, and medicines. Proportions by countries of destination of exports were the United States, 68 per cent (27 in 1913); Germany, 16 per cent (53 in 1913); Netherlands, 8 per cent; the United Kingdom, 2 per cent (11 in 1913). Coffee went principally to the United States and Germany in the proportion of 4 to 1. The importance of the United States in the carrying trade increased enormously. In 1913, 803 ships entered Guatemalan ports, 23 per cent of which were American; in 1920, 758 entered, 61 per cent being American.

Communications. In 1914 the International Railways of Central America, purchased by American capitalists in May, 1924, acquired a 60-mile railroad from Santa Maria to Las Cruces and built an extension of 45 miles from Las Cruces to Ayutla on the Mexican border. This was part of a larger scheme to build a through route between Vera Cruz and Panama, extending along the entire western length of Central America. In 1916 a concession was granted for the construction of an intracostal canal skirting the Pacific coast for 80 miles from San José to the Esclaves River. The total railway mileage was 495. In 1920, there were 4512 miles of telegraph line and 416 miles of telephone.

Finance. For 1922-23, national revenues totaled 306,810,078 paper pesos and the budget for 1923-24 called for 351,705,125 paper pesos. Expenditures for 1922-23 were 41,679,823 pesos more because of payments made to the International Railways of Central America. On Dec. 31, 1922, the external debt, held in England, was £1,308,563. Amortization was going on rapidly, in 1921 a total of £323,340 being paid, and in 1922, £32,080. The internal debt on Dec. 31, 1921, amounted to 157,700,000 paper pesos and 1,381,570 gold pesos. In 1918 a National Bank was established, one of its chief purposes being the making of agricultural loans. On June 30, 1922, there were in circulation 367,435,298 paper pesos. Comparative figures are invalidated by the continuous depreciation of the paper peso, the currency in use. In 1912 the peso was worth 18 to the dollar; in 1922, 55.84 to the dollar. On May 31, 1923, it closed at 60.5.

History. At the expiration of his term in 1916, Estrada Cabrera was once more reelected president. His virtual dictatorship since 1898 was successfully broken in 1920, when the more progressive elements of the country organized

to effect a liberal administration. Cabrera was the first to resort to force, but his army deserted him, and he was compelled to resign. Dr. Carlos Herrera was appointed provisional president and on Sept. 15, 1920, took the oath for the unexpired term, 1916-23. He was immediately recognized by the United States. He applied himself to repairing the damages of the earthquake and was also instrumental in having Guatemala form the Central American Union (q.v.) together with Honduras and Salvador in 1921. On Dec. 6, 1921, however, he too was overthrown by a military clique incensed at the country's participation in the Union, and a provisional government was formed by General Orellana, chief of staff. Orellana was elected president in March, 1922; by July he was confronted by a rebellion which proved unsuccessful. The leaders were put to death, and two Catholic priests were expelled. It appeared for a time that the new government had no desire to aid in the formation of a federal Central American state, and in October, 1922, Orellana repudiated the pact signed on the U.S.S. *Tacoma* on Aug. 20, 1922, by Nicaragua, Honduras, and Salvador, though his government participated in the Central American Conference of 1923 at Washington and signed the conventions concluded. In June, 1924, however, Guatemala once again took a forward step in the furthering of amicable Central American relations when her Assembly was the first to ratify the important General Treaty of Peace and Amity and the Convention for the Establishment of International Commissions of Inquiry, both adopted by the Central American Conference in Washington in 1922. On Apr. 27, 1917, Guatemala broke off diplomatic relations with Germany and offered her transportation facilities to the United States in the prosecution of the War. On Oct. 3, 1919, peace was made with Germany.

GUCHKOV, ALEXANDER (1862-). A Russian politician, born at Moscow, and educated at the University of Moscow and under Professor Schmoller of Berlin. He led an adventurous youth as a volunteer in the Boer War (1899-1902) and with the Red Cross in the Russo-Japanese War. In the third Duma, after Khomiakov's resignation in 1901, he was elected speaker and as such attacked the Court and the Ministry of War for inadequate military preparations against Germany. During the War he came into prominence by his energetic attempt to concentrate the army forces. On the outbreak of the March Revolution in 1917 he was made Minister of War but resigned in the face of desertions and demoralization in the army. He eventually took refuge in Paris and was active there in collecting forces against the Red element in Russia.

GUEDALLA, PHILIP (1889-). An English author, educated at Rugby and Oxford. He read for the bar and practiced law for a time but soon turned to journalism and became a frequent contributor to the *London Times*, *New Statesman*, *Daily News* and the *American Vanity Fair*. His first work was published in 1911, but it was not until the publication of *The Second Empire* (1922) that he was accorded general recognition. In this work, with great skill and not a little malice, he succeeded to large extent in dissipating the Napoleonic myth and in sending down the heroic proportions of Napoleon the Little. The same qual-

ities were to be found in his essays *Supers and Supermen* (1920) and *Masters and Men* (1923).

GUERARD, ALBERT LÉON (1880-). A French philologist, born in Paris, and educated in Paris and London. After an interval of travel he became professor of literature and examiner in history at the Ecole Normale. In 1906 he became instructor in French at Williams College, and from 1907-13 was assistant professor of French at Stanford University. Since 1913 he has been professor at the Rice Institute in Houston, Tex. During the War he was in liaison service. His principal works are: *Prophets of Yesterday* (1913); *French Civilization in the Nineteenth Century* (1914); *Five Masters of French Romance* (1916); *L'Avenir de Paris* (1919); *French Civilization from Its Origin to the Close of the Middle Ages* (1920), and *International Languages* (1921).

GUERIN, JULES (1866-). An American painter and illustrator (see Vol. X). He was director of color and decoration at the Panama-Pacific International Exposition, 1915. Noteworthy among his works during the period were the decorations of the Pennsylvania Station, New York City, and those of the Lincoln Memorial Building, Washington.

GUEST, EDGAR ALBERT (1881-). An American press humorist, born at Birmingham, England, and educated in the public schools of Detroit. In 1895 he became connected with the *Detroit Free Press* and has since established a reputation as a writer of humorous verse and sketches. He is author of *A Heap o' Livin'* (1916), *Just Folks* (1917), *Over Here* (1918), *Path to Home* (1919), *When Day is Done* (1921), *Poems of Daily Life* (1922), and *All That Matters* (1923).

GUIANA, BRITISH. A British colony on the northeastern coast of South America, forming the western part of Guiana. Area, 89,480 square miles; population in 1911, 296,000; in 1922, 298,188. Georgetown, the capital, had 53,422 inhabitants in 1921. On Dec. 31, 1922, there were 124,338 East Indians in the colony, of whom 56,781 were residents on estates, and 67,557 resided elsewhere. The leading products were sugar cane, diamonds, balata, bauxite, rice, coconuts, coffee, cacao, wood, and timber. The steady decline of gold continued; the 1923 output was 5621 ounces as compared with 79,194 ounces in 1913. The diamond output showed increases with the discovery of new fields in 1922. Imports for 1913, 1922, and 1923, were \$7,734,862, \$11,004,414, and \$12,811,011. Exports for the same years, including transit trade, were \$10,526,976, \$14,042,322, and \$18,036,707. The eight principal imports in 1923 were flour, textiles, manure, pickled pork and beef, boots and shoes, butter, cement, and tobacco. These came largely from Great Britain, the United States, and Canada. Exports to the United States, which reached \$4,223,110 in 1920, chiefly in sugar shipments, dropped to \$309,477 in 1922, and recovered to \$762,066 in 1923. The general fall in prices after 1920 accounted for the depression. Total tonnage entered and cleared in 1911-12, 1920, and 1921, was 988,663; 899,748, and 876,709. Total tonnage entered in 1923 was 537,396. Revenues for 1913 and 1922 were \$2,786,140 and \$4,345,218; expenditures for the same years were \$2,704,121 and \$5,269,364. The public debt on Jan. 1, 1922, was £1,170,238.

Dutch Guiana or Surinam. Located be-

tween British Guiana on the west and French Guiana on the east. Area, 46,060 square miles; population in 1910, 86,233; in 1921, 113,181, exclusive of the Indians and Negroes living in the forests. Nationalities represented in 1919 were 1109 Europeans, 11,480 Javanese, 940 Chinese, and 26,096 British Indians. Paramaribo, the capital, had 35,346 inhabitants in 1910 and 50,560 inhabitants in 1920. The leading products were sugar cane (26,430,000 pounds in 1910; 24,433,000 in 1921), rice (4,386,000 pounds in 1910; 25,954,000 in 1921), cacao (3,702,600 pounds in 1910; 3,475,800 in 1921), coffee (445,000 pounds in 1910; 3,987,260 in 1921), and bananas (462,200 bunches in 1910; 297,605 in 1921). Gold production in 1910 was 1,081,476 grains, and only 291,347 grains in 1921; balata, 1,495,300 pounds in 1910 and 1,021,700 in 1921; and rum, 210,780 gallons in 1910 and 182,370 in 1921. Exports for 1912 and 1922 were \$3,391,050 and \$2,092,094. Imports for 1912 and 1922 were \$3,014,604 and \$3,894,402. In 1922 the United States furnished \$843,761 of the imports of Dutch Guiana, and in 1923, \$810,475. The United States took \$695,859 of her exports in 1922 and \$820,931 in 1923. Leading imports were provisions, hardware, clothing, and manufactured articles. Tonnage entered in 1910 was 210,998; in 1921, 372,431. Revenues, expenditures, and subvention for 1914 were 7,051,800 guilder, 6,260,530, and 790,260. For 1922 they were 8,300,000 guilder, 6,678,000, and 1,682,000 (nominal value of the guilder, \$0.402).

French Guiana. Forming the eastern part of Guiana. Area, 34,069 square miles; population in 1911, 49,009; in 1921, 44,202. Creoles made up four-fifths of the inhabitants. In 1922 the penal population totaled 6075 individuals. Cayenne, the leading town, had 13,527 inhabitants in 1911, and only 8500 in 1921. The industrial and agricultural development of the colony made little progress in the decade 1912-22, gold continuing to be the product of greatest economic importance. However, a marked decline was visible over the period. In 1910, 123,170 ounces were produced; in 1918, 80,477; in 1921, only 38,667. Of the total exports of 12,117,000 francs in 1912, gold accounted for 10,457,000 francs. Of the total exports of 23,144,060 francs in 1921, gold accounted for only 10,617,542. Next in importance in the latter year was balata, with 10,296,786 francs in exports. Other exports were rosewood essence, hides, and cacao. Rice, manioc, cacao, coffee, bananas, and vegetables were cultivated in small quantities for local consumption. Imports for 1912 and 1921 were 10,905,000 and 48,150,967. About 90 per cent of the exports were taken by France and her colonies in 1920, and 50 per cent of the imports came from France. The United States trade with French Guiana in 1923 was: imports, \$178,963; exports, \$350,169; as compared with \$334,988 and \$398,240, respectively, in 1922. The local budget for 1912 balanced at 3,592,000 francs; for 1922, at 7,102,587. Subventions from the French government were still necessary. The rivers remained the only decent means of transportation.

GUILD SOCIALISM. Guild socialism, an English social development, aims at "the abolition of the wage system and the establishment by the workers of self-government in industry," and ultimately, a new social order. Stress is

laid on a gradual rather than on a revolutionary change, although industrial action is preferred to political action. The movement is chiefly intellectual. The present industrial society is attacked on the ground that private profit and employers' autocracy kill the workers' incentive and interest in their work and thereby prevent their becoming healthy social beings. It is asserted that by giving the worker a definite function and a voice in the management of industry, the wrongs of capitalism will be eradicated, production increased, and productive incentive revived. Thus a new society with a definite function for everybody will be created. This emphasis on function and functional control is the basis and the distinctive quality of the guild philosophy. It is to be realized through the guilds. A guild is defined as "a self-governing association of mutually dependent people organized for the responsible discharge of a particular function of society." Organized therein should be "all the workers, by hand and by brain." All of society should be divided into guilds. The adherents of the movement, or National Guildsmen, as they term themselves, agree on two types: industrial and civic guilds. Some add a third, the distributive guild. The industrial guilds would engage in "the various branches of transport and manufacture," while the civic guilds would embrace the professions. Concerning the structure and government there is still much disagreement among guildsmen, but the theory of industrial democracy seems to prevail. Decentralization is also emphasized. The functions of the modern state would be carried on by certain definite guilds. Relations between the guilds would be provided for by "liaison" (akin to the present-day interlocking directorates) and guild councils. The latter would be local, regional, and national, and would take over many legislative and administrative functions of the state and the Trade Union Congress. As for the relations between the guilds and the community there were many conflicting theories. While guild socialism was accused of not providing any definite authority, its adherents claimed that by dividing society into functional organizations, sovereignty would also be adequately divided. It was generally conceded that the scheme's chief difficulty lay here.

The movement arose in the first decade of this century, through antagonism to the ruling collectivism in English radical thought, and was definitely formulated in 1906. Its first formal appearance, however, was in 1912. On Christmas, 1914, the Stonington Document, containing a statement of principles, was drawn up. On Easter, 1915, the present organization was completed, and the name of National Guilds' League was adopted. In the early years of the War, guild socialism grew slowly; its growth was more rapid during the last years of the War and after the Armistice. Although British trade unionists were rather unresponsive to guild ideas, the movement had nevertheless a considerable indirect influence on English labor, especially in the restive years after the War, when there was widespread unemployment, discontent, and strikes throughout the country. Guild socialism spread in one form or another, and with its increasing hold on the more revolutionary elements, it became itself more radical. The British Miners' Federation was always somewhat in sympathy with

guild ideas, and its proposal for the nationalization of the mines embodied a concept of guild socialism. The Union of Post Office Workers and the National Union of Teachers adopted resolutions to organize on the guild plan. Finally the guild idea found practical application in the Builders' Guilds, organized in conformity with guild principles. These guilds proved rather successful for a time. The guild plan spread subsequently to house furnishings, tailoring, engineering, and other trades. Partly on account of severe competition and partly on account of poor management, the Building Guild became involved in financial difficulties, and in November, 1922, it went into a receiver's hands and was later dissolved. In May, 1923, the National Guilds' League merged with the National Guilds' Council, and *The Guild Socialist*, the official monthly, ceased publication. After the year 1922, the Guild movement declined perceptibly. See *SOCIALISM, Great Britain*.

Outside of England the guild idea exerted more or less influence in the United States, Canada, Australia, New Zealand, South Africa, Japan, Russia, France, Germany, Hungary, and Italy. The National Guilds' League, the chief organization for the spread of guild principles, never had a large membership. In January, 1921, it had "something over 500." Its literary activity has been marked. From March, 1919, to May, 1923, it published *The Guild Socialist*. *The New Age* has steadily advocated guild socialism since 1912. The chief missionary work was done, however, though the books of important guildsmen such as Penty, Orage, Cole, Hobson, Douglass, Reckitt, Bechhofer, de Maetz, Taylor, and others.

GUILLAUME, CHARLES EDOUARD (1860-). A Swiss scientist, born in Fleurier. He studied at several European universities and in 1883 was appointed assistant of the Bureau of International Poids and Measures. In 1902 he was associate director of the bureau, and from 1915, director. He was awarded the Nobel Prize in 1920 and was a member of many scientific societies. He wrote *Nickel and Its Alloys* (1898); *Application of Nickel Steels* (1904) and many other works on scientific subjects.

GUISÉZ, JEAN (?-). A French surgeon, authority on the ear, nose, and larynx and on the use of the bronchoscope, his status in his country corresponding to that of Chevalier Jackson in the United States. He has produced a number of authoritative works comprising *Du Traitement Chirurgical de l'Ethmoïde Purulente* (1902); *Tracheobronchoscopie et Œsophagoscopie* (1905); *La Pratique Oto-rhino-laryngoscopique* (3 vols., 1908); *Œsophagoscopie Clinique et Thérapeutique* (1911); *Diagnose, Traitement, et Expertise des Séquelles Oto-rhino-laryngologiques* (1921); and *Diagnose et Traitement des Rétrécissements de l'Œsophage et de la Trachée* (1923).

GUITERMAN, ARTHUR (1871-). An American author and poet, born in Vienna, and educated at the College of the City of New York. He did editorial work on the *Woman's Home Companion*, *Literary Digest*, and other magazines. In 1912-15 he lectured at the New York University School of Journalism. Among his works are: *Betel Nuts* (1907); *The Laughing Muse* (1915); *The Mirthful Lyre* (1918); *Ballads of Old New York* (1920); *Chips of Jade* (1920); *A Ballad Maker's Pack* (1921);

and *The Light Guitar* (1923). These were mostly light verse. Mr. Guiterman has contributed to *Life* and other periodicals.

GUITRY, SACHA (1885-). A French actor and writer, son of Lucien Guitry (see Vol. X). He has written many comedies for the stage. Among the best known are *Les Nuées d'Aristophane*; *La Clef*; *Le Crin*; *Petite Hollande*; *Le Muffe*; *Un Sujet de Roman* (1923). As a playwright he works on the assumption that audiences do not want "too much realism" but recreation and amusement. His *Deburau* and *The Grand Duke* were successful in New York with Lionel Atwill in the leading parts.

GULICK, SIDNEY LEWIS (1860-). An American missionary, born at Ebon, Marshall Islands, and educated at Dartmouth College and Union Theological Seminary. He was ordained to the Congregational ministry in 1886 and in the next year went to Japan, where he remained for 27 years doing missionary work. At the same time he held the chair of theology at Dolshisha, Kyoto (1906-13) and lectured at the Imperial University at Kyoto (1907-13). He was secretary of the National Commission on American-Japanese Relations (1921-). Among his works are: *Evolution* (1910); *The American-Japanese Problem* (1914); *The Fight for Peace* (1915); *America and the Orient* (1916); *American Democracy and Asiatic Citizenship* (1918); and *The Korean Situation* (1919, 1920).

GUNNERY, NAVAL. The development of naval gunnery during the War was along lines laid down several years previous. The sole innovation was "spotting" the fall of projectiles by means of aircraft. This was used only on a few occasions and in comparatively minor operations against works on shore. No vessels were fitted to carry, send out, and receive airplanes early enough to take part in purely naval warfare. The German airships did much scouting but little spotting, and airships were not yet, in 1924, to be depended on for "spotting" except in the vicinity of their bases; while observation or kite balloons towed by ships had proved unsatisfactory except under favorable conditions. It is to be expected that when fleets and squadrons are accompanied by aircraft carriers, when all large vessels carry one or more airplanes or seaplanes, and when even destroyers and submarines may carry folding seaplanes, i.e. airplanes fitted to take off from and alight on the water, the conditions will be different; and aircraft may be as useful for "spotting" at sea as they are on shore.

"Director" firing, in which guns are laid in accordance with directions electrically transmitted from a central director station, received ample verification of its importance by the experiences of the War. It was yet susceptible of great improvement by the better training of the men at the guns and in the director station and by greater accuracy and efficiency of observing instruments and of the means and methods of combining their readings. These instruments consist of telescope sights on the guns and in the director tower or station, range finders, range clocks or keepers, change-of-range indicators, deflection indicators, course indicators, and mapping or combining apparatus. The range finder most in use during and after the War is the Barr and Stroud. (See *NEW INTERNATIONAL ENCYCLOPEDIA*, Vol. XIX,

p. 542). The range keeper is a dial or other form of register in the central station by which the range indicators at the guns are controlled. Change-of-range indicators are automatic calculating machines which, given the observed range at two moments, continue to apply the rate of change and indicate the probable range after each small interval of time. When new ranges are supplied to it, the ranges are corrected in accordance with the new rate. The ranges shown on the range keeper and range indicators at the guns are derived from the change-of-range instrument, and it may be directly connected to both; in this case the corrections to the range due to observed fall of the shot are applied to the ranges as supplied to the change-of-range instrument instead of to the range keeper. Deflection indicators keep track of the observed fall of the projectiles to the right or left of the target and transmit it to suitable dials at the guns, where the gun-sights are set in a new angle with the axis of the bore in order to correct the ascertained error due to various causes such as speeds of ship and target, changes of course, air currents, etc. Course indicators are used in connection with the plotting or combining apparatus or diagram or for solving the enemy's course and speed. The director tower or station is directly connected with the central station or plotting room and with the guns. The observer at the director sight fires the battery in whole or half salvos or singly in accordance with instructions. The fall of the projectiles is noted, and if necessary, corrections are made in range or deflection. The foregoing gives only a general idea of modern methods of the control of gun fire such as were used in the War and afterward. The details and the instruments used are closely guarded secrets, but the work performed is roughly as described. See ARTILLERY and ORDNANCE.

GUNS. See ARTILLERY.

GUNS, NAVAL. The calibre and power of the heavy guns of battleships increased steadily from 1910. By the terms of the Limitation of Armaments Treaty the maximum calibre was fixed at 16 inches, and guns of this calibre will probably be carried by all first class battleships and battle cruisers built in future. The length of the guns will be 45 or 50 calibres and the service muzzle velocity about 2800 feet per second. Higher velocities could readily be obtained, but they would greatly shorten the effective life of the gun; at 2800 feet the life is short enough. As "spotting" (of the fall of projectiles) from kite balloons or other aircraft will be possible in future naval battles, high-angle and long-range firing is being sought, and the gun mounts of recent battleships are arranged for an elevation of 30° or more. The largest calibre of gun that can be carried by cruisers under the treaty is 8 inches, and all 10,000-ton cruisers of modern design will carry six or eight 8-inch guns on high angle mountings.

The increased size of destroyers and flotilla leaders has caused some increase in the calibre of the guns in the auxiliary battery of battleships. The 43,200-ton battleships for the United States Navy, which were under construction but were scrapped by the treaty, were to have carried 6-inch guns in their auxiliary battery, and the new 35,000-ton battleships building in England are so fitted; but the Japanese, in their new battleships which were scrapped, con-

tented themselves with a very numerous battery (20 guns) of 5.5-inch calibre. The naval gun which was receiving widest attention in 1924 was the anti-aircraft weapon. The new British battleships were to carry 12 of these of 4-inch calibre. Much larger guns, using an improved shrapnel-shell, have been considered, but their general adoption awaits some convenient form of semi-automatic loading while held in the firing position. The new 10,000-ton Japanese light cruisers were reported to be fitted with 4.7-inch guns for use against either horizontal or aircraft targets. The details of the design were unknown in 1924. Automatic guns of unusual length and high velocity, firing projectiles of extra length and of calibres from 0.5-inch to 1.5-inch, were advocated by many naval officers. Such guns would have nearly as great range and sustained velocity as the present 4-inch guns, combined with a vastly increased number of projectiles and much greater ease of operation. See ARTILLERY; ORDNANCE; VESSEL, NAVAL; PROJECTILE; NAVIES OF THE WORLD.

GÜNTHER, SIEGMUND (1848-1923). A German geologist (see Vol. X). He became editor of the *Münchener Geographische Studien* in 1896 and published, in the period 1914-24, *Das Zeitalter der Entdeckungen* (1919), *Geschichte der Naturwissenschaften* (1919), and *Lehren der Revolution* (1920).

GURLITT, CORNELIUS (1850-). A German architect, art critic and historian, born in Nischwitz. After some years of activity as an architect in Cassel and Dresden, he was commissioned to write a work on the art monuments of Saxony. This publication, sumptuously illustrated, appeared in installments from 1894 to 1919. Gurlitt is the author of many works on art, of which the following are of general interest: *Kunst und Künstler am Vorabend der Reformation* (1890); *Beiträge zur Geschichte der Gothik* (1892); *Sir Edward Burne-Jones* (1894); *Die Kunst des Neunzehnten Jahrhunderts* (1900); *Geschichte der Kunst* (1902); numerous monographs on cities, including Berne, Zurich, Lyons, Liège, and Cambridge (1903-08); *Constantinople* (1907); *Das Französische Sittenbild im Achtzehnten Jahrhundert* (1912); *Schutz der Kunstdenkmäler im Kriege* (1915); *Die Klosterbauten in Belgien*, with Professor Clemen (1916); *Handbuch des Städtebaus* (1920); and *Pflege der Kirchlichen Kunstdenkmäler* (1921).

GUSEV-ORENBURGSKY, S. I. (1867-). A Russian novelist. His novels are realistic studies of the life of the Russian clergy in the rural districts and are filled with revolutionary feeling. He is the author of *Short Stories* (1899-1916), *The Land of the Fathers over the Meadow* (1909), and *Darkness* (1915).

GUTHRIE, WILLIAM NORMAN (1868-). An American clergyman, born at Dundee, Scotland, educated at the University of the South, and from 1889 to 1910 lecturer and professor of literature at several universities, including the University of Chicago. In 1910 he became rector of the Church of St. Mark's-in-the-Bow-erie, New York City. He attracted attention, in the latter part of 1922, by stating that dancers would be trained to interpret religion, and in March, 1923, he held an Egyptian sun-god dance at his church, and from time to time it was announced that certain pagan rites were celebrated there. Bishop Manning asked for an explanation, but was not satisfied of the pro-

priety of the dances and vetoed them in January, 1924. The rector continued the services, however, and in March, 1924, St. Mark's was deprived of episcopal ministrations pending the time when the Bishop's counsel should be heeded. His publications include: *Beyond Disillusion, a Dramatic Study of Modern Marriage* (1915); *Uncle Sam and Old World Conquerors* (1915); *The Gospel of Osiris* (1916); *Leaves of the Greater Bible* (1917); and *The Religion of Old Glory* (1919).

GUYER, MICHAEL FREDERICK (1874-). An American zoölogist, born at Plattsburg, Mo., and educated at the University of Missouri, the University of Chicago, and the University of Nebraska. He was assistant in zoölogy at the University of Nebraska (1894-97), professor of zoölogy at the University of Cincinnati (1900-1911), and professor of zoölogy at the University of Wisconsin (1911-). Professor Guyer published articles on cytology, genetics, and the transmission of acquired defects through the influence of antibodies, as well as *Animal Micrology* (1906; rev. ed., 1917), and *Being Well Born* (1916).

GYMNASTICS. See SPORTS.

GYPSUM. The production of gypsum and gypsum products remained an industry of ever growing importance in 1914-24. During this time the production of crude gypsum in the United States never fell below 2,000,000 tons, and in 1922 it amounted to 3,779,949 short tons, with a value for the crude and calcined products sold of \$29,361,151. In addition to the gypsum produced in the United States, crude, ground, or calcined gypsum to the amount of 410,937 tons, valued at \$552,516, was imported into the United States, of which 405,912 short tons, valued at \$539,990, came from Canada. The Canadian gypsum was largely sold in the vicinity of New York City. New York State is the largest producer, with Michigan, Ohio, Iowa, Texas, Nevada, and Oklahoma following in the order named and together accounting for over 80 per cent of the United States output. The accompanying table indicates the uses of the 1922 production of gypsum.

According to the United States Geological Survey, the 3,779,949 short tons of crude gyp-

GYPSUM PRODUCED AND SOLD IN THE UNITED STATES IN 1922, BY USES		
Calcined	Short tons	Value
Stucco	396,990	\$2,813,561
Neat plaster	1,333,261	12,126,811
Sanded plaster	80,455	1,165,771
Mixed plaster	^a 218,650	^a 1,914,572
Plaster of Paris, molding, casting plaster, etc...	^b 126,288	^b 1,198,819
Keenes cement	21,991	324,316
Plaster board	42,088	945,171
Wall board	120,591	4,500,725
Partition tile	68,338	915,449
Roof tile		
Special tile or blocks ..	44,834	368,068
Other purposes	^c 37,779	644,542
	2,491,265	26,917,805
Crude	770,725	2,443,346
		29,361,151

^a Includes small quantity of wood fiber plaster.

^b Includes dental plaster and plaster sold to plate-glass works.

^c Included under "Other purposes."

^d Includes roof tile and material used for pointing up wall boards.

sum produced in the United States in 1922 were an increase over 1914, when the production was 2,476,465 tons. The sales of agricultural gypsum amounted to 101,904 tons, valued at \$387,203, in 1922, as compared with the 1921 sales of 104,966 tons, valued at \$490,902. Gypsum was used not only for fertilizer but in connection with insecticides and as carriers for dust sprays used in combating the boll weevil. The sales of gypsum for use in Portland cement, paint, and other compounds, however, showed an increase in quantity and in value during the period from 1914 which amounted, in 1922, to 668,821 tons, valued at \$2,056,143.

Important applications of this material were gypsum blocks or tiles for nonbearing partitions in fireproof buildings and employment in roofs and floors. Gypsum wall boards by 1924 had become an important industry. In the manufacture of gypsum, leading developments were the use of rotary calciners and ball mill grinding, as well as mechanical packers.

GYPSY MOTH. See ENTOMOLOGY, ECONOMIC.

GYRO PILOT. See NAVIGATION.

H

HAAN, WILLIAM GEORGE (1863-). An American army officer, born at Crown Point, Ind. He graduated from the United States Military Academy in 1889, and began his military career as lieutenant in the 1st Artillery. He was promoted through the grades, and when the War broke out in 1914 he was a member of the General Staff. In 1917, he commanded the 57th Field Artillery Brigade at Camp MacArthur, Texas, and in 1918 the 32d Division at the Marne, Oise-Aisne, and the Meuse-Argonne offensives. He commanded the 7th Army Corps in the Army of Occupation in Germany from November, 1918, to April, 1919. On his return to the United States in 1919 he was appointed assistant chief of staff and director of war plans division of the General Staff and was made a major-general in the regular army on Mar. 8, 1921.

HAAS, ARTHUR E. (1884-). Professor of physics at the University of Vienna, born at Brunn and educated at the Gymnasium and the universities of Vienna and Göttingen. He taught at the University of Vienna in 1912, and in 1913 was appointed professor in the University of Leipzig. He returned to Vienna in 1921. He published many scientific articles, and also the following works: *Entwicklungsgeschichte des Satzes von der Erhaltung der Kraft* (1909); *Geist des Hellentums in der Modernen Physik* (1914); *Grundgleichheit der Mechanik, dargestellt auf Grund ihrer Geschichtlichen Entwicklung* (1914); *Einführung in die Theoretische Physik* (1919); *Naturbilder der Neuen Physik* (1920).

HAASE, HUGO (1863-1919). A German politician, born at Allenstein, East Prussia, and educated at the public school, the Gymnasium, and the University of Königsberg. He began practicing law in 1889, and was a member of the Reichstag from 1897 to 1907, being elected again in 1912. In 1914 he was the leader of the Social Democratic party in the Reichstag, but in 1916 he became the leader of the Independent Socialists. After the revolution of 1918, he was chosen to be one of the six commissaries who conducted the first provisional government of the new republic. His socialistic views were rather moderate than extreme. He was fired on by an assassin on Nov. 7, 1919, and died from the wounds received.

HABER, FRITZ (1868-). A German chemist (see VOL. X). He directed the Kaiser Wilhelm Institut for physical chemistry and electrochemistry in Berlin. He specialized on electrochemical investigations and received the Nobel prize for chemistry in 1919.

HACKETT, FRANCIS (1883-). A literary critic, born in Kilkenny, Ireland. He was educated in Ireland and came to America in 1900. He was with a law firm in New York in 1902 and did editorial work for the *Chicago Evening Post*, 1906-11. He has been associate

editor of the *New Republic* since 1914. Besides his numerous articles in magazines he wrote *Ireland, A Study in Nationalism* (1918); *Horizons* (1918); *The Invisible Choir* (1920). He has been one of the exponents of the modern school of literary criticism and has devoted much attention to modern political movements. In 1924, he contributed a series of articles to the *Survey*, on the League of Nations, following his visit to the League buildings in Geneva.

HACKETT, JAMES KETELAS (1869-). An American actor (see VOL. X), best known for Shakespearean characterizations. He played *Macbeth* (1916); *Out There* (1918); *The Better 'Ole*; *The Rise of Silas Lapham* (1919); *Macbeth* (in London and Paris, 1920); *Othello* (Paris and London, 1922). When he returned to the United States in 1924, he was given a public reception at the New York City Hall (the first one ever accorded to an actor). During the spring of that year, he played *Macbeth* in New York, with Clare Eames as Lady Macbeth.

HADLEY, ARTHUR TWINING (1856-). An American educator (see VOL. X). Included among his recent works are *Undercurrents in American Politics* (1915), *The Moral Basis of Democracy* (1919), and *Economic Problems of Democracy* (1923). He resigned from the presidency of Yale University in 1920, and later became a director of the Atchison, Topeka and Santa Fé Railway.

HADLEY, HENRY KIMBALL (1871-). An American composer (see VOL. X). He resigned as conductor of the San Francisco Symphony Orchestra in 1915 and returned to New York, to devote his entire time to composition. In 1920, he was appointed associate conductor of the Philharmonic Society, and in 1924 also regular conductor of the Worcester Festival. In 1921 and 1922 he conducted the first half of the Philharmonic Society's series of summer concerts at the Stadium, and during the winter of 1921-22 appeared as guest conductor of the San Carlo Opera Company. He wrote four operas, which were all produced soon after their completion: *Azora, Daughter of Montezuma* (Chicago Op. Co., 1917); *Bianca* (won the Hinshaw prize, New York, 1918); *The Garden of Allah* (New York, 1918); *Cleopatra's Night* (Met. Op. House, 1920). The more important of his recent works include two overtures, *Othello* and *The Spirit of the Elements*; a tone-poem, *The Ocean*; a cantata, *Prophecy and Fulfillment*; *Ode to Music* for chorus and orchestra (Worcester Festival, 1917); and an oratorio, *Resurgam* (Cincinnati Festival, 1923).

HAFNIUM. See PHYSICS.

HAGEDORN, HERMANN (1882-). An American author, born in New York City, and educated at Harvard University, University of Berlin and Columbia University. From 1909 to 1911, he was instructor in English at Harvard. He published, among other works: *The Silver Blade* (1907); *The Woman of Corinth*

(1908); *A Troop of the Guard, and Other Poems* (1909); *Poems and Ballads* (1912); *Faces in the Dawn* (1914); *You Are the Hope of the World* (1917, 1920); *Theodore Roosevelt* (1919, 1921); *That Human Being, Leonard Wood* (1920); *Roosevelt in the Badlands* (1921).

HAGEMANN, C. A. CARL (1871-). A German stage manager and author. He studied at Rostock, Berlin and Heidelberg, has managed theatres at Mannheim and Hamburg, and after 1921 was director of the principal theatre in Wiesbaden. He has written *Geschichte des Theaterzettels* (1900), *Regie, die Kunst der scenischen Darstellung* (1921), *Die Kunst der Bühne* (1923), a life of Oscar Wilde, and other works.

HAGEN, JOHANNES G. (1847-). An Austrian Jesuit and astronomer (see Vol. X). He was professor of mathematics and physics at American colleges, among them Georgetown University, and directed the observatory at the Vatican. He published *Die veränderlichen Sterne* (1920).

HAGEN, WALTER C. (1892-). An American professional golfer, born at Rochester, N. Y. He rounded out a record that never has been equaled for tournament play by winning the British open championship at Hoylake, England, in 1924, after having been the first United States player to bring this coveted trophy across the seas in 1922. He also has been the American open title holder twice, North and South open champion twice, Western open champion twice, metropolitan open champion twice, French open champion once and Professional Golf Association champion once.

HAGGARD, SIR HENRY RIDER (1856-). An English novelist (see Vol. X). During the War he served with the Royal Colonial Institute of which he was elected vice-president in 1917. He was also a member of the Empire Settlement Committee (1917). Among his later works are: *The Holy Flower* (1915); *The Ivory Child* (1916); *Love Eternal* (1915); *The Ancient Allan* (1920); *The Virgin of the Sun* (1922).

HAGGERTY, MELWIN EVERETT (1875-). An American psychologist. He was born at Bunker Hill, Ind., and was educated at Chicago and Harvard universities. After teaching at Indiana University, he became, in 1915, professor of educational psychology at the University of Minnesota. He was director of the psycho-educational clinics at that institution, and in 1920 he was made dean of the College of Education. After the Armistice he was attached to the Surgeon-General's office, in charge of the re-education of disabled soldiers. He served on the Virginia Education Commission and on the school surveys of North Carolina (1920) and New York State (1921).

HAGOOD, JOHNSON (1873-). An American army officer, born at Orangeburg, N. C. He graduated from the United States Military Academy in 1896, and began his military career as second lieutenant of the 2d Artillery. He was promoted through the grades, served in the Philippines (1913-15), and commanded the First Expeditionary Brigade, Coast Artillery Corps, arriving in France on Sept. 11, 1917. He headed the board that created the service of supply and was its chief of staff until the Armistice. He took part in the Meuse-Argonne offensive, and on Nov. 31, 1918, established headquarters at Hoir, Germany. He returned to the

United States in 1919, commanded the South Atlantic Coast Artillery District during 1920-21, and was sent again to the Philippines, in November, 1921.

HAHN, HERMANN (1868-). A German sculptor, born in Bavaria. At first, he was apprenticed to a woodcarver, then studied industrial art and finally entered the Academy at Munich. He traveled in the Orient and in America. His principal works are a "Goethe" monument in Chicago (1914), "Emil Rathenau" in Berlin (1916), "Goethe" in Wiesbaden (1919), "Blücher" in Kiel (1920), and an equestrian bronze in Hamburg (1919). His most recent works are a Bavarian monument for Munich, a war monument for Ludwigshof and a monumental fountain for Cassel.

HAIG, DOUGLAS, first EARL (1861-). An English general, born in Fifeshire and educated at Brasenose College, Oxford. After serving in the Sudan and in South Africa he held important posts in India, being chief of staff from 1909 to 1912. In 1912-14, he was general officer in command at Aldershot, and commanded the first army of the British Expeditionary Force in France, distinguishing himself in the retreat from Mons, at the Aisne, at Ypres and Neuve Chapelle. In 1915, he succeeded Sir John French as commander-in-chief of the Expeditionary Forces in France and Flanders, holding that post until 1919. During 1919-20, he held the office of field-marshal commander-in-chief of the forces in Great Britain. He wrote *Cavalry Studies* (1907). See WAR IN EUROPE, *Western Front*.

HAINES, THOMAS HARVEY (1871-). An American psychologist. He was born at Moorestown, N. J., and was educated at Haverford College and Harvard University. He studied neurology and psychiatry at Munich, Zurich and London, and received a medical degree from Ohio State University. He was first assisting physician at the Boston Psychopathic Hospital (1913-14) and clinical director of the Ohio Bureau of Juvenile Research (1914-17). From 1915 to 1920, he was professor of nervous and mental diseases at Ohio State University. Author of the mental deficiency bills of Tennessee and Mississippi, he took an active part in social work. His published writings include a monograph on *Mental Measurement of the Blind* (1915).

HAINISCH, MICHAEL (1856-). A president of the Austrian republic. He was a lawyer by profession and had been an official of the treasury department. For many years he took no active part in politics but devoted his time to reading and study. He was chosen Federal president in 1921, largely because of his friendliness with all political parties. He wrote many books on sociological subjects.

HAITI. An independent republic occupying the western four-elevenths of Haiti Island. Santo Domingo (q.v.) is the name of the remaining portion. Area of the republic estimated at from 10,204 to 11,072 square miles. Population in 1912 (estimate), 2,500,000; in 1923 (estimate), 2,045,000. Negroes made up 90 per cent of the population. Port-au-Prince, the capital, had 125,000 inhabitants in 1923.

Industry, Trade, Government. Agriculture continued to engage the majority of the population. Coffee culture occupied the place of leading importance, its export quantity in 1923 constituting 65 per cent of the total trade.

Other important crops were cotton, sugar, tobacco. Logwood and other valuable woods entered into the foreign trade. In 1923, exports totaled \$14,591,012, as against \$10,712,210 in 1922, and \$17,285,485 in 1913. For the same years, imports were \$14,157,963, \$12,350,271, \$9,876,555. As before, imports came largely from the United States, while the exports went to France. American intervention in 1915 led to the appointment, in the following year, of a group of American officials to the posts of financial adviser, receiver-general of customs, chief engineer, sanitary engineer, and chief of gendarmerie. The result was an increased stability in fiscal affairs. Expenditures for 1913-14 had been \$8,127,000; revenues, \$6,282,000. In 1922-23, revenues were \$6,496,889 and expenditures \$5,818,746. In 1912, the public debt amounted to \$12,763,000 and 119,286,000 francs, besides an unfunded debt of \$7,077,000. In July, 1923, the total public debt was \$19,329,808. In October, 1922, great interest was aroused in Haitian affairs by the action of the New York National City Bank which floated for Haiti a bond issue of \$16,000,000 to be secured by a second charge on customs and a first on internal revenues. The Haitian government received 92 per cent of the nominal value. The loan was used for the conversion of outstanding loans, particularly the French loan. As a result of American activity, Haiti was provided with a well-trained constabulary, officered by American marines. The constabulary consisted of 2688 men.

History. The internal disorders and upheavals which Haiti had experienced during the preceding years continued throughout 1914. President Divilmar Theodore was overthrown on Feb. 8, 1914, by Oreste Zamor, but regained control in October, to be ousted again by Vilbrun Guillaume Sam early in March, 1915. President Guillaume succeeded at first in firmly establishing his authority, but owing to his dictatorial methods and the brutal acts committed by his followers, notably the massacre of some 200 political prisoners, he was overthrown and killed in the course of a violent uprising at Port-au-Prince at the end of July, 1915. Immediately thereupon American troops were landed and took possession of the country. Haiti had previously become involved in serious difficulties with English, French, and German creditors, and on several occasions American troops had been landed. In the spring of 1915 President Guillaume had been informed that he must turn over to United States officials the administration of Haitian customs, in order to assure payment of foreign obligations. This he had refused to accept. Following the murder of Guillaume, United States marines occupied the country. Martial law was declared without the consent of Haiti, and American officials took charge of the greater part of the administration, although the Haitian civil government remained nominally in power. On Aug. 10, 1915, Sudre Dartiguenave was elected president by the Haitian Assembly, and on Sept. 16, 1915, a convention was signed between the United States and the Haitian government. After the American forces of occupation had successfully stamped out all armed opposition in the interior, this convention was ratified by the Haitian Chamber on Oct. 6, 1915, and by the Senate on November 3. In ratifying the treaty the Haitian Assembly had been effectively coerced by

the United States withholding all funds. Pending ratification by the United States Senate, which took place in May, 1916, a *modus vivendi* was reached for the immediate application of the treaty. The provisions were as follows: establishment of a Haitian receivership of customs under American control; establishment of a native constabulary force under the command of American officers; establishment of American control over Haitian finances to an extent necessary to safeguard the interests of the Haitian people and their American creditors; a term of 10 years during which the treaty was to remain in force, with the possibility of extending it at the expiration of that period if either of the signatories should so desire. Haiti thus became an American political and fiscal protectorate for at least 10 years, during which the United States agreed to intervene for the maintenance of Haitian independence and an orderly government if that should become necessary.

On July 20, 1918, Haiti entered the War on the Allies' side, ostensibly because of the sinking by German submarines of a French vessel which had Haitian citizens aboard. During the same year a new constitution was drafted, and on submission to a plebiscite on June 19, approved by a large majority. The chief novelty of this constitution was a clause providing that foreigners residing in the country and societies formed by them should have the right to own real property. Although constitutional government was formally in existence, the actual administration was in the hands of American officials. The American occupation resulted in a marked improvement of the economic and social conditions of the country. Particularly, town sanitation and the construction of modern roads progressed rapidly. Public order was guaranteed by the establishment of an efficient gendarmerie. These benefits, obvious results of the American occupation, nevertheless failed to reconcile a large part of the Haitian people with the existing status. Charges were advanced in Haitian and American quarters that the American force of occupation, composed exclusively of whites, was guilty of revolting acts of brutality against the Negro population of Haiti. The charges resulted during 1921 in an investigation by a committee of the United States Senate, the report of which on the whole exonerated the American troops. On Oct. 9, 1922, the National City Bank of New York offered a Haitian loan of \$16,000,000 in 30-year bonds, at 6 per cent. This aroused protests from the Haitians and criticism in the United States. By the unanimous vote of the Legislature, Luis Borno was elected president on Apr. 11, 1922, to replace President Dartiguenave, whose term had expired. In the spring of 1924 the American government withdrew its forces from the interior, leaving only skeleton forces in certain seaports. At the same time it was declared that because of the inability of the Haitians to guarantee the continuance of orderly government, complete evacuation was not yet in sight.

HALBE, MAX (1865-). A German dramatist and novelist (see Vol. X). His recent works are *Io*, a novel (1918), *Schloss Zeitvorbei*, a drama (1918), *Hortense Ruland*, a tragedy (1920), and *Kikekiki*, a comedy (1921).

HALDANE, JOHN SCOTT (1860-). (See Vol. X.) This British physiologist resigned

his professorship to become director of the Mining Research Laboratory at Birmingham. After 1914, he wrote the following books: *Organization and Environment* (1917); *The New Physiology* (1919); *Mechanism, Life and Personality* (1921); and *Respiration* (1922).

HALDANE, RT. HON. RICHARD BURDON, first Viscount of Cloan (1856-). A British philosopher and statesman (see Vol. X). He was the host of Einstein during the visit of the famous scientist to England. In his work on *The Reign of Relativity* (1921) he sought to link the physical theory with the general philosophy of idealistic relativism. *The Philosophy of Humanism* (1922) was published as the ethical counterpart to the idealistic criticism of science. Viscount Haldane was Lord Chancellor in the Labor party government which came into office in England in 1924.

HALE, GEORGE E. (1868-). An American astronomer (see Vol. X). He received the Bruce medal of the Astronomical Society of the Pacific in 1916, the Janssen medal of the Astronomical Society of France in 1917, the Galileo medal, Florence, in 1920, and the Actonian prize given by the Royal Institution in 1921.

HALÉVY, DANIEL (1872-). A French man of letters. He was educated at the Sorbonne, and devoted himself to history and criticism. By family tradition he inherited a cultural liberalism which was to find expression in the ideology of Dreyfusism. Before the War, he was affiliated with the group of Charles Péguy and the *Cahiers de la Quinzaine*, a fortnightly series of pamphlets, novels, and books of criticism and philosophy. After the Armistice, Halévy tried to revive Péguy's tradition on a more modest scale by editing the collection of the *Cahiers Verts*. His works include: *Essai sur le Mouvement Ouvrier en France*; *La Vie de Frederic Nietzsche*; *Luttes et Problemes*; *La Jeunesse de Proudhon*; *Charles Péguy et les Cahiers*; *Le Courrier de M. Thiers*; *Vaubain*; *Une Visite aux Paysans du Centre*.

HALÉVY, ELIE (1870-). A French philosophical writer. He was born at Etretat, and was educated at the Ecole Normale Supérieure. He was professor at the Ecole Libre des Sciences Politiques. His works include an analysis of Plato's philosophy of science, *La Théorie Platonicienne des Sciences* (1896); three volumes on the English utilitarians and radicals, *La Formation du Radicalisme Philosophique* (1901-04); and *Histoire du Peuple Anglais au XIX^{me} Siècle* (2 vols., 1913, 1923).

HALL, FRANCIS JOSEPH (1857-). An American Protestant Episcopal theologian (see Vol. X). He became professor of dogmatic theology in the General Theological Seminary in 1913. Among his later works are: *The Incarnation* (1915); *The Bible and Modern Criticism* (1915); *The Passion and Exaltation of Christ* (1918); *The Church and the Sacramental System* (1920); *The Sacraments* (1921).

HALL, GRANVILLE STANLEY (1846-1924). An American educator (see Vol. X). He became editor of the *Journal of Applied Psychology* in 1917 and has published *Jesus the Christ in the Light of Psychology* (1917), *Morale: The Supreme Standard of Life and Conduct* (1920), *Recreations of a Psychologist* (1920), and *Senescence* (1922). He retired from the presidency of Clark University in 1920.

HALOGEN GROUP. See CHEMISTRY.

HALSTEAD, ALEXANDER SEAMAN (1861-). An American naval officer, born at Philadelphia, Pa. He graduated from the United States Naval Academy in 1883 and was promoted through the grades, becoming captain in 1911. He served in the Spanish-American War and took part in the battle of Manila Bay. After commanding several battleships, he became supervisor of New York Harbor in 1915. He attended the Naval War College at Newport, R. I. during 1916-17; was commander of the district of Brest, France, during 1918-19, and commanded the naval forces in France in 1919. In October, 1919, he became commandant of the Navy Yard at Portsmouth, N. H., and remained there until 1920, when he was appointed commandant of the 12th Naval District at San Francisco. He was raised to the rank of rear-admiral on July 1, 1919.

HAMBIDGE, JAY (1867-1924). An American artist, born in Canada. He was a pupil at the Art Students' League in New York and of William Chase, and a thorough student of classical art. He conceived the idea that the study of arithmetic with the aid of geometrical designs was the foundation of the proportion and symmetry in Greek architecture, sculpture and ceramics. Careful examination and measurements of classical buildings in Greece; among them the Parthenon, the Temple of Apollo at Bassæ, of Zeus at Olympia and Athenæ at Ægina made him formulate the theory of dynamic symmetry, as demonstrated in his work, *Dynamic Symmetry: the Greek Vases* (1920). It created a great deal of discussion, an English critic saying that Hambidge did not try to formulate a new theory, but to recover a lost technique. He found a disciple in Dr. Lacey D. Caskey, the author of *Geometry of Greek Vases* (1922).

HAMILTON, JOHN McLURE (1853-). An American portrait painter and illustrator (see Vol. X). He served on the jury of awards at the Panama-Pacific International Exposition, 1915. In 1918 he was awarded a gold medal, Pennsylvania Academy of Fine Arts. A book by him, *Men I Have Painted*, appeared in 1921.

HAMILTON, SIR IAN (1853-). A British general (see Vol. X). At the outbreak of the War, he was given command of the 4th Army, which he organized in Egypt. In 1915 he was given charge of the land forces operating at Gallipoli but was relieved of this command in October of the same year. The failure of the Gallipoli enterprise resulted in severe criticism of his plan of campaign. He published an elaborate defense in the form of his *Gallipoli Diary*, in 1920. He was promoted to the rank of general in 1914.

HAMILTON COLLEGE. A nonsectarian college of liberal arts at Clinton, N. Y., founded in 1812. The enrollment increased steadily from 200 in 1914 to 350 in 1923-24. In 1922, the Board of Trustees unanimously voted to limit the number of students to 400, thereby definitely establishing Hamilton as a small college. During the decade the number of members of the faculty was increased from 20 to 31, the library from 62,000 volumes to 100,000 volumes and 25,000 pamphlets and the productive funds from \$1,100,000 to \$3,370,000. The covered playing field, called the Sage Building was completed in 1922, and in 1923-24 plans were in progress to provide a new laboratory to house the departments of biology and geology, and the

museum of natural history. Frederick C. Ferry, LL.D., succeeded Melancthon W. Stryker as president in 1917.

HAMLIN, CHARLES SUMNER (1861-). An American lawyer and public official (see Vol. X). From 1914 until 1916, he was governor of the Federal Reserve Board, and was reappointed a member of the board for the term 1916-26. He published the *Index Digest of the Federal Reserve Bulletin* (1921).

HAMLIN UNIVERSITY. A coeducational college under the Methodist Episcopal Church at St. Paul, Minn., founded in 1854. The student enrollment increased from 251 in 1914 to 530 in 1923-24, the teaching staff from 15 to 38, and the annual income from \$52,000 to \$185,565. The endowment rose from \$750,000 to \$1,187,000, and a campaign for \$1,500,000 for further buildings and increased endowment was planned for the fall of 1924. A new dormitory for women was completed in 1922 at a cost of \$201,851, and a new athletic field and grandstand at a cost of \$43,000. President, Samuel F. Kerfoot, D.D.

HAMMANN, OTTO (1852-). A German journalist and politician, born at Blankenhain. He followed a journalistic career from 1877 to 1893. From 1894 until 1916, he was director of the press section of the German Foreign Office, in this capacity acting as adviser to Prince von Bülow, and, in the nineties, taking the part of Count Caprivi, the Imperial Chancellor, and Baron Marshall von Bieberstein, the Foreign Secretary, against Bismarck's followers. After the formation of the German Republic, he published three volumes of reminiscences, in which he brought to light much of what he knew about the German secret policy: *Der neue Kurs, Erinnerungen* (1918); *Zur Vorgeschichte des Weltkrieges* (1919); *Um den Kaiser, Erinnerungen aus den Jahren 1906-09* (1919).

HAMMERSTEIN, OSCAR (1847-1919). An American theatre manager (see Vol. X). For the last 15 years of his life he worked to conquer operatic inertia in New York City, and with his keen understanding of the American public, he succeeded in stimulating public interest in the opera. He built the Manhattan Opera House and did much to enliven the Metropolitan Opera House, by securing many artists of note, among them Mary Garden and Tetrazzini.

HAMMOND, JOHN HAYS, JR. (1888-). An American inventor, born at San Francisco and educated at the Sheffield Scientific School of Yale University. He invented a wireless-controlled torpedo for coast defense and a system for firing torpedoes from battleships; also incendiary projectiles which were employed in the War, a radio system for the control of ships, and a system of aeroplane coastal patrol. He also took out a great number of patents for inventions in radiotelegraphy and telephony, among them being one that gives complete isolation of the sender and receiver of radio messages, so that there is no "listening in" possible. He was vice-president of the Radio Corporation of America and a member of many American and foreign organizations.

HAMOR, WILLIAM ALLEN (?-). An American chemist, born at Du Bois, Pa., and educated at the University of Pittsburgh. He was research chemist at the College of the City of New York, 1907-14, and assistant to the director of the Mellon Institute of Industri-

al Research at Pittsburgh, 1914-16. He was major in command of the Chemical Warfare Service of the United States Army in 1917 and served in France for 10 months as assistant chief of the Technical Division of the Chemical Warfare Service. He wrote: *History of Chemistry* (1909); *The American Petroleum Industry* (1916); *The Examination of Petroleum* (1920); *American Fuels* (1921).

HAMP, PIERRE (pseudonym of BOURILLON) (1876-). A French novelist. He was educated in the French technical schools and became a functionary in the railroad administration. It was there that he collected his observations for his series of impressionistic novels on *La Peine des Hommes* (Men in Labor). These novels combine, at times very successfully, a sociological documentation and artistic presentation of human experience. His works include *Marée fraîche* (1908); *Vin de Champagne* (1909); *Le Rail; Vieille Histoire* (1912); *L'Enquête* (1914); *Gens* (1917); *Le Travail Invincible* (1918); *Les Métiers Blessés* (1919); *La Victoire Mécanicienne*; *Les Chercheurs d'Or* (1920); *La Dérive du 4542*; *Compound 300 H.P. No. 243*; *Le Cantique des Cantiques* (1922).

HAMPDEN, WALTER (1879-). An American actor born in Brooklyn, N. Y. He studied at Harvard, 1896-97, and took his bachelor's degree from the Polytechnic Institute, Brooklyn, in 1900. He first appeared on the stage in England, with F. R. Benson's company in classical repertoire, in 1901, and then for three seasons was leading man at the Adelphi Theatre in London. In 1905, he appeared in *Hamlet*, succeeding the younger Irving. He came to the United States in 1907, supporting Mme. Nazimova, and then appeared in *The Servant in the House* (1908), *The Master Builder*, *The Yellow Jacket*, *Salome*, and other plays. He toured the country widely with his Shakespearian repertoire, his *Hamlet* in particular being a vigorous, fresh, and princely interpretation. His greatest single triumph has been *Cyrano de Bergerac*, which was judged to be the outstanding play in New York City during 1923-24. With his remarkable histrionic ability and insight into character, he gives a masterly presentation of Rostand's heroic comedy.

HAMPTON NORMAL AND AGRICULTURAL INSTITUTE. This institution, situated at Hampton, Va., two miles from Old Point Comfort, was founded by Gen. Samuel Chapman Armstrong in 1868 for the practical education of Negro and Indian youth.

The school opened in 1868 with two teachers and 15 students in a plantation house, gristmill, and army barracks. By 1924, it had developed into an industrial village, with about 2200 students (900 boarders, 400 in the Whittier Training School, and 900 in the summer school and extension classes), over 300 teachers and other workers, 149 buildings, and 1000 acres of land. There was a well-equipped trade school where 14 trades were taught, with a graduate course in the building trades. The normal, agricultural, domestic science, and business schools offered courses of collegiate grade. The Institute was controlled by a board of 17 trustees, Chief Justice Taft having been president of the board since 1914. The endowment fund, which amounted to about \$4,688,000, provided inadequate support, the budget for 1923-24

amounting to \$480,000, and the Institute was therefore partly dependent on public philanthropy. Hampton Institute was probably the first school in the country to combine successfully the training of the hand with that of the mind and character. Rev. James E. Gregg, D.D., succeeded the late Hollis Burke Frissell as principal in 1918.

HAMSUN, KNUT (1859-). A Norwegian author, born in Lom, Gudbrandsdal. Son of a tailor, he became a cobbler's apprentice. At 18 he had printed a poem and a novel. Hoping to become a Unitarian minister he went to America and tried various employments, which included lecturing on French literature. He went back to Christiania and attempted authorship without success, but after three years on a Newfoundland fishing boat his writing of *Sult* at once gave him prominence among the young authors of the North. Among his best known volumes are *Shallow Soil* (1914) and *Growth of the Soil* (1920). *Pan* (1894), his first love story, was republished in 1920. *Hunger* is another of his famous books. See SCANDINAVIAN LITERATURE, *Norwegian*.

HANEY, LEWIS HENRY (1882-). An American economist, born at Eureka, Ill., and educated at Wesleyan University, Bloomington, Ill. He was a lecturer at New York University in 1908, afterwards teaching in the universities of Iowa and Michigan, and from 1912 to 1916 he was professor of economics at the University of Texas. In 1916, he was in charge of the Federal Trade Commission's gasoline investigation, and in 1920-21, he was in charge of the cost of marketing division of the United States Bureau of Markets. In 1920, he became director of the New York University Bureau of Business Research and professor of economics. He wrote: *A Congressional History of Railways* (vol. i, 1908; vol. ii, 1910); *History of Economic Thought* (1911; rev. ed., 1919); *Business Organization and Combination* (1913); and various articles on economic subjects for periodicals.

HANIHARA, MASANAO (1876-). A Japanese diplomat, who came to the United States in 1902 as a member of the Japanese Embassy at Washington, was consul general at San Francisco in 1916-17, then returned to Japan as director of the Bureau of Commerce of the Japanese Foreign Office. He was a member of the Ishii Mission from which came the Ishii-Lansing agreement. He was also an influential member of the Washington Disarmament Conference. In December, 1922, he was appointed ambassador to the United States, and arrived in Washington in February, 1923. His protest, in April, 1924, on the passage of the immigration law by the United States government because it would bar the admission of Japanese to the country, was interpreted as "a veiled threat" by the Senate, and had quite an opposite effect from that intended. After the passage of the bill, it was rumored that Hanihara was to be recalled by the Japanese government. Although this was denied, it was soon announced that he would visit Tokyo on leave of absence.

HANNAY, JAMES OWEN ("GEORGE A. BIRMINGHAM") (1865-). An Irish novelist (see VOL. X). He published *Minnie's Bishop and Other Stories* (1915); *Gonnamer* (1915); *The Island of Mystery* (1918); *Up the Rebels* (1919); *Good Conduct* (1920); *Lady Bounti-*

ful (1921); *A Public Scandal* (1923), and others.

HANOTAUX, GABRIEL (1853-). A French historian and diplomat (see VOL. X). He wrote: *Histoire de la Guerre de 1914*; *L'Histoire et les Historiens*; *Le Traité de Versailles*; *Histoire de la Nation Française*.

HANSEN, NIELS EBBESEN (1866-). An American horticulturist, born in Denmark. In 1873, he came to the United States and graduated from the Iowa Agricultural College in 1887. From 1891 to 1895, he was assistant professor of horticulture at the Iowa Agricultural College and from the latter date, professor of horticulture at the South Dakota Agricultural College and Experiment Station. Professor Hansen made explorations in Europe, Asia and Africa, collecting new economic seeds and plants, and originating new fruits, especially the Hansen hybrid plum. He also introduced, from Turkestan and Siberia, new varieties of alfalfa, and imported the Siberian fat-rumped sheep. He wrote numerous horticultural bulletins and papers and was also author of a *Handbook of Fruit Culture and Tree Planting* (1890), and *Systematic Pomology* (with J. L. Budd, 1903). Professor Hansen was awarded the George Robert White medal for eminent service in horticulture by the Massachusetts Horticultural Society in 1917.

HANSON, HOWARD (1896-). An American composer, born at Wahoo, Neb. Having received his first training at the Luther College Conservatory (Neb.), he continued his studies at the School of Music of the University of Nebraska, at the Institute of Musical Art in New York, under P. Goetschius, and at the Northwestern University, Evanston, under P. Lutkin and A. Oldberg. In 1916-19, he taught theory and composition at the College of the Pacific, San José, Cal., and 1919-21 was dean of the School of Fine Arts. In 1921, he was the first recipient of a newly endowed fellowship in composition, awarded by the American Academy in Rome. The fellowship, determined by a composition in a prescribed form and submitted in open competition, provides for a three years' residence in Rome, with privilege of travel, and an annual allowance of \$2000. In 1924, after his return to the United States, he was appointed director of the Eastman School of Music of the University of Rochester. He appeared as conductor of his own works with several of the leading American symphony orchestras. In 1923, he conducted a programme of American music with the Augusteo orchestra in Rome. His works include: a *Nordic Symphony*; the symphonic poems, *North and West*, *Lux Aeterna*, *Exaltation*, and *Before the Dawn*; a *Symphonic Rhapsody*; a piano concerto; two piano quintets; and *The Soul of Sequoia*, a festival play for the California Redwood Park Festival (1920). He was commissioned to write a string quartet for the Berkshire Festival of 1925 and a choral work for the Leeds Triennial Festival of 1925.

HANSON, OLE (1874-). An American public official, born in Racine County, Wis. He was educated privately and after studying law was admitted to the bar. For many years he was engaged in real estate business in Seattle. He was a member of the House of Representatives, where he advocated measures favorable to labor. He was elected mayor of Seattle in 1918 and gained national prominence by prompt

and decisive measures in meeting and overcoming a general strike in February, 1919. He wrote *Americanism versus Bolshevism* (1920).

HAPGOOD, NORMAN (1868-). An American editor and critic (see Vol. X). He was editor of *Harper's Weekly* (1913-16), and American Ambassador from the United States to Denmark from February to December, 1919. Beginning in 1923, he was editor of *Hearst's International Magazine*.

HARA, TAKASHI (1854-1921). A Japanese prime minister. He served as an official in the Foreign Office at home and abroad, attaining the rank of vice-minister in 1895. In 1900, he was one of the organizers, together with the late Prince Ito, of the Seiyu-kai party and soon afterwards was made Minister of Communications. He held that portfolio again in the Seiyu-kai ministry of 1906-08. He was again a cabinet minister in 1915, holding the portfolio of Home Affairs and in 1918 became premier. He was strongly self-assertive as prime minister and practically dominated the government. In general, he was opposed to the too rapid absorption of European ideas. Other features of his policy were the more complete coöperation between the military and other branches of government service and a spirit of conciliation in foreign affairs. Many attempts were made to overthrow his cabinet, the opposition attacking it for its policy toward China in the matter of the 21 demands and for its Siberian policy, and demanding that the Japanese troops be withdrawn. Latterly negotiations with China over Shantung and the policy of the conference at Darien, in which Japan had hoped to come to an agreement with the Far Eastern republic of China, tended to sharpen the hostility between the political parties. His assassination, which occurred at Tokyo, Nov. 4, 1921, was just at the time when the Japanese delegation was gathering for the Washington Conference. See JAPAN, *History*.

HARAHAN, WILLIAM JOHNSON (1867-). An American railway official born in Nashville, Tenn., and educated at St. John's College, New Orleans. After holding several important positions, he was appointed chief engineer of the Illinois Central Railroad in 1902. He became general manager in 1904 and in 1907 was appointed assistant to the president of the Erie Railroad. He was vice-president of that road in 1911-12 and 1912-18 was president of the Seaboard Air Line, of which he was also Federal manager. He was a member of the United States Railway Board of Adjustment and became president of the Cincinnati and Ohio Railway and the Hocking Railway in 1920.

HARBEN, WILLIAM N(ATHANIEL) (1858-1919). An American story-writer (see Vol. X). His last three publications were *The Inner Law* (1915), *Second Choice* (1916), and *The Triumph* (1917).

HARBORD, JAMES GUTHRIE (1866-). An American army officer, born at Bloomington, Ill., and graduated from the Kansas State Agricultural College at Manhattan, Kan., in 1886 and from the Infantry and Cavalry School in 1895. He joined the 4th Infantry as a private in 1889, and reached the rank of colonel in 1903, in which year he went to the Philippines where he remained till 1914. He was chief of staff in the American Army in France during 1917-18, and commanded the Marine Brigade near Château-Thierry during June and July,

1918. He also served at Soissons, and commanded the Service of Supply during 1918-19. He was chief of the American Military Commission to Armenia in 1919.

HARDEN, MAXIMILIAN (ISIDORE WITTKOVSKY) (1861-). A German journalist and author (see Vol. X). It is said that during the War Harden was the most famous, feared, admired, and hated journalist in Europe. Ex-Ambassador Gerard declared that Harden voiced the only protest in Germany against the sinking of the *Lusitania*. He praised China for her anti-German attitude, admired President Wilson whenever he did anything especially obnoxious to Prussian pride, scoffed at the idea of a victorious German peace, and, in fact, made each copy of his newspaper *Die Zukunft* (which he had founded in 1892) of especial interest to German statesmen. The intrepid editor was put in jail at various times, but no physical harm came to him till 1922, when an attempt was made to assassinate him. He was twice suggested for the post of ambassador to the United States, once in 1919, and again in 1921.

HARDING, WARREN GAMALIEL (1865-1923). The 29th President of the United States, elected in November, 1920. He was born at Corsica, Morrow Co., Ohio, Nov. 2, 1865, and studied at the Ohio Central University. Entering the newspaper business, he became editor and publisher of the Marion (Ohio) *Star*. He ran for the office of governor of Ohio in 1910, but was defeated. In 1914, he was elected a Republican member of the United States Senate for the term of 1915-21. He nominated Mr. Taft in 1912 and was chairman of the Republican Convention in 1916, making the keynote speech. In politics he belonged to the "stand-pat" element which was bitterly opposed to the "insurgents" led by Roosevelt. He was a strong supporter of President Wilson's war policies during the conflict, but in the treaty fight he stood with Senator Lodge and signed the famous "round-robin" disapproving the linking of the League of Nations with the Peace Treaty. He voted for the submission of the Prohibition and Woman Suffrage Amendments, and in general supported the policies of the majority of his party. In 1920, through the efforts of his friend, Harry M. Daugherty, afterwards Attorney General, he was put forward prominently as a candidate for the Presidency. At the convention he was nominated on the 10th ballot, receiving 692½ votes. His selection was somewhat of a surprise to the people at large. The most difficult question before the Republican candidate was that of the League of Nations. A strong element in the Republican party was bitter against any form of participation, whereas a smaller but more influential body, represented by such men as Mr. Hughes, Mr. Hoover, and Mr. Root, favored some sort of coöperation. Mr. Harding put forward the idea of an association of nations to which the United States would belong but reserving the right of independent action, and he also favored an international court of justice. During the two years before his death, signs of revolt against the Republican organization were evident, and in 1922 the Republican majority in the House was greatly reduced in the Congressional elections. An agricultural bloc was forming in Congress as a result of the dissatisfaction of the farmers, especially those in the West.

Shortly before President Harding's death, Shipstead and Magnus Johnson were elected to the Senate and a new third party movement was threatened. The most conspicuous feature of the latter days of his administration was his advocacy of the Permanent Court of International Justice, which was sharply attacked by Senators Johnson, Borah, and other irreconcilables. President Harding died at San Francisco, Cal., on Aug. 2, 1923, on his return trip from Alaska.

HARDING, WILLIAM P. G. (OULD) (1864-). An American banker born in Greene County, Ala. After graduating from the University of Alabama he entered the bank of J. H. Fitts and Company at Tuscaloosa, from there went to the Berney National Bank at Birmingham, Ala., and from 1902 to 1914 was president of the First National Bank of Birmingham. He became a member in 1914, and governor in 1916, of the Federal Reserve Board at Washington, and has been closely associated with financial transactions of the United States Government. He was managing director of the War Finance Corporation in 1918-19.

HARDY, THOMAS (1840-). An English novelist (see VOL. X). His already long list of works was lengthened by *Selected Poems* (1916), *Moments of Vision* (1917), and *Late Lyrics* (1922). *The Dynasts* was produced at the Kingsway Theatre, London, early in the War, and again in London in 1920.

HARKINS, WILLIAM DRAPER (1873-). American university professor and eminent chemist, born at Titusville, Pa. He was graduated from Stanford University in 1900, after which he studied at the University of Chicago, Massachusetts Institute of Technology, and at Karlsruhe, Germany. He began his teaching career as instructor of chemistry at Stanford University in 1898, and in 1900 was made head of the department of chemistry in the University of Montana. He was chemist in charge of the Anaconda Farmers' Association's investigation of smelter smoke from 1902 to 1910, and did research work for the Carnegie Institution at Washington in 1911. He was professor of physical chemistry at the University of Chicago in 1917. He gave many lectures on industrial research, was editor of the section on general and physical chemistry of *Chemical Abstracts*, and wrote many technical papers giving the results of original researches.

HARRIES, GEORGE HERBERT (1860-). An American general, born at Haverfordwest, in Wales. In 1895-96, he was president of the Metropolitan Railroad Company of Washington, and from 1897 to 1915 commanded the military and naval militia of the District of Columbia. During the Spanish-American War he was colonel of the 1st District of Columbia Infantry, United States Volunteers. In the recent War he served as a brigadier-general of the United States Army in 1917. He acted as chief of the United States Military Mission at Berlin, Germany, in 1918-19, and was appointed brigadier-general of the Officers' Reserve Corps in 1920. He was national commander-in-chief of the Military Order of the World War, 1920-22, and held office in many important organizations.

HARRIS, CORRA MAY (1869-). An American author (see VOL. X). Her later books include: *The Co-Citizens* (1915); *A Circuit Rider's Widow* (1916); *Making Her His Wife* (1918); *From Runup to Sundown* (1919);

Happily Married (1920); *My Son* (1921); *The Eyes of Love* (1922); *A Daughter of Adam* (1923); *My Book and Heart* (1924).

HARRIS, WILLIAM LAUREL 1870-). An American mural painter (see VOL. X). He completed during this period his mural painting and decoration in the Paulist Church, New York, and fulfilled a similar commission for the Corpus Christi Chapel in that city.

HARRIS, FRANK (1856-). An English author (see VOL. X). Among his later works were *The Life and Confessions of Oscar Wilde* (1916), and *Contemporary Portraits* (1919, 1921).

HARRIS, HAROLD R. (?-). An American airman who made a world's record for speed for 1000, 1500 and 2000 kilometers at Dayton, Ohio, in 1923. He also made a record for duration, with a useful load of 551 pounds, on Mar. 27, 1924. Previously he held the records for duration and altitude with useful loads of 4408 and 6612 pounds respectively.

HARRIS, JAMES ARTHUR (1880-). An American botanist and statistician, born at Plantsville, Ohio. He was educated at the University of Kansas and at Washington University (Ph.D., 1903). He was assistant in botany (1901-03) at the Missouri Botanical Garden, instructor (1903-07) at Washington University, and botanical investigator at the Station for Experimental Evolution at Cold Spring Harbor, L. I. (1907-). His published work was mainly in biometry.

HARRISON, FRANCIS BURTON. See PHILIPPINES.

HARRISON, FREDERIC (1831-1923). A leader of the English Positivists, and philosophical writer (see VOL. X). During the War he was active in the anti-German propaganda, having been a constant critic of British indifference to the German peril, and having written for many years on the subject of the dangers of German imperialism. In 1917, in an open letter he urged the Allies to bind themselves to make no terms of any kind with the Hohenzollern or any other ruling house in Germany, all of whom he declared to be "treacherous, bloodthirsty, satanic." One of his sons lost his life in the war. Among his later works may be mentioned: *The German Peril* (1915); *On Society* (1918); *Jurisprudence and Conflict of Nations* (1919); *Obiter Scripta* (1919); *Novissima Verba* (1920).

HARRISON, HENRY SYDNOR (1880-). An American novelist (see VOL. X). His later works include *Angela's Business* (1915), *When I Come Back* (1919), *Saint Cecilia* (1922), and *Marriage* (1923), a volume of short stories.

HARSHBERGER, JOHN WILLIAM (1869-). An American botanist (see VOL. X). From 1911, he was professor of botany at the University of Pennsylvania, and from 1913 to 1921 he was in charge of ecology at the Marine Biological Laboratory, Cold Spring Harbor, L. I. He was a president of the Philadelphia Natural History Society, and a vice-president of the Ecological Society of America. Included among his later books are: *Vegetation of South Florida* (1914); *The Vegetation of the New Jersey Pine Barrens* (1916); *Pastoral Agricultural Botany* (1920).

HART, ALBERT BUSHNELL (1854-). An American historian (see VOL. X). Among his later works are: *Monroe Doctrine* (1915); *New American History* (1917); *School History of the United States* (1917); *America at War*

(1917); *Causes of the War* (1920). In addition, he edited *American Patriots and Statesmen* (1916). A discussion arose in 1923 as to the "Americanism" of his history textbook, *The Epoch of American History and National Ideals of History Traced*. The removal of his *School History of the United States* from New York City schools was recommended by an investigating committee.

HART, HASTINGS HORNE (1851-). An American social worker, born at Brookfield, Ohio, and educated at Oberlin College and Andover Theological Seminary. He was ordained to the Congregational ministry in 1880. From 1883, when he became secretary of the Minnesota State Board of Corrections and Charities, he was identified with social work in the Illinois Children's Home and Aid Society, the Russell Sage Foundation, and other organizations. Among his numerous works are: *Preventive Treatment of Neglected Children* (1910); *A Social Welfare Programme for the State of Florida* (1918); *How to Give Wisely \$25,000 to \$1,000,000* (1921); *The Third Degree: Methods of Obtaining Confessions and Information from Persons Accused of Crime* (1921); *Employment for Jail Prisoners in Wisconsin* (1922).

HART, WILLIAM S. (1870-). An American motion picture actor born in Newburgh, N. Y. He began his work in motion pictures in 1914 after having acted on the legitimate stage for many years. He has appeared chiefly in Western pictures, among his best being: *O'Malley of the Mounted and Travelin' On*. His most recent pictures are *Wild Bill Hickok*; *Singer Jim McKee*; *A Lighter of Flames*.

HARTFORD. The capital of Connecticut. The population increased approximately 40 per cent from 98,915 in 1910 to 138,036 in 1920. The number of persons engaged in manufacturing increased from 14,627 to 17,137 in 1917 and 26,264 in 1919; between 1909 and 1919, the value of the industrial products rose from \$40,500,000 to \$118,000,000. Bank clearings rose from \$261,494,106 in 1914 to \$567,980,369 in 1923, and deposits in discount banks from about \$46,000,000 to \$86,201,484; savings deposits increased from \$419.66 per capita in 1915 to \$612.85 per capita in 1924. The assets of the Hartford insurance companies increased from \$462,160,129 to \$1,084,057,101; \$1,088,071,199 was paid to policyholders and beneficiaries during the period. Several large office and commercial buildings were constructed.

HARTS, WILLIAM WRIGHT (1868-). An American army officer, born at Springfield, Ill., and graduated at the United States Military Academy. He had a long and varied career in the Engineers Corps of the United States Army, assisting or being in charge of construction work in nearly every part of the United States. President Wilson appointed him military aide in charge of public buildings and grounds, with rank of colonel, from 1913 to 1917. He built the Lincoln Memorial, the Arlington Memorial and the Red Cross Building. In 1917, he went to France with his regiment. He was chief of the American Mission at the British headquarters in 1918, and chief of staff, Army of Occupation in Germany, during 1919-20.

HARVARD UNIVERSITY. A nonsectarian, endowed, educational institution at Cambridge, Mass., founded in 1636. Many changes

were made in the methods of teaching and requirements for admission and graduation in the various departments at Harvard during the decade 1914-24. Important additions were made to the library and the several museums, and various schools were established or reorganized. A number of new buildings were completed and several private dormitories were purchased by the university. Partly through independent gifts and partly through the endowment fund campaign, begun in 1917 but postponed because of the War until 1919, the productive funds of the university were increased during the 10-year period, until the endowment in 1924 was in the neighborhood of \$55,000,000. The number of members of the teaching staff was increased during the period from about 800 in 1914 to 1057 in the year 1923-24, and the students in the university in the same period increased from about 4266 to 6733. Voting by alumni by postal ballots for overseers, who form one of the two governing boards of the university, was inaugurated in 1922.

Among the important changes in Harvard College was the additional method of admission, instituted as an experiment in 1923, whereby pupils having satisfactorily completed an approved school course, and ranking scholastically among the highest seventh of their graduating class, may, on the recommendation of their school, be admitted without examination. All seniors in the college, except those specializing in mathematics or the natural sciences, were required to pass general examinations in the field of their concentration, not only covering the courses taken by the individual, but requiring outside reading as well. This was an extension of the policy successfully practiced for a number of years in other divisions: it was first instituted in the division of history, government and economics in 1916, and gradually extended. The plan included the increasing use of the tutorial system, which was developed over a period of years, and in 1924 was to be extended to the division of modern languages.

The Engineering School as such, awarding the degree of S.B. after four years of undergraduate study, as well as higher degrees, was reorganized at Harvard in 1918, although the teaching of engineering at the university went back to 1847 and the founding of the Lawrence Scientific School. In 1920, it adopted new methods of instruction, training the students partly in the classrooms and partly in the neighboring industrial and engineering concerns, thus combining theoretical and practical experience. In the same year, it joined with the Graduate School of Business Administration in laying out a five-year programme of study in "business engineering."

Three other schools in the university were established during the decade. The Graduate School of Education for both men and women was founded in 1920, partly through the assistance of the General Education Board, and largely through money obtained by the endowment fund campaign. It was a school for the professional training of teachers, principals, and school superintendents, and for research in educational problems. In 1922, pursuant to an agreement between the Harvard Divinity School and the Andover Theological Seminary, the Harvard Theological School, nondenominational in policy, was organized, with Rev. Willard L. Sperry as dean. The School of Public Health,

closely allied with the Medical School, was also established in 1922 with the gift of \$2,000,000 from the Rockefeller Foundation, its dean being Dr. David L. Edsall, dean also of the Medical School. The Dental School raised its standard of admission in 1921 by establishing as a prerequisite of enrollment at least one year of college work. In 1914, the faculty of architecture, in charge of the School of Architecture and the School of Landscape Architecture, was instituted as a separate faculty. In the Graduate School of Business Administration, instruction by the case system, such as was used in the Law School, was extended greatly during the decade.

The exchange of professors with France and with western colleges was continued; and in 1923, the exchange of tutors with English universities, a new departure along the lines of the established practice of exchanging professors, was inaugurated as an experiment.

During the War, and for some months before the entrance into it of the United States, Harvard maintained a Reserve Officers' Training Corps unit trained by six disabled French army officers. In 1919, this was changed to an artillery unit with courses counting toward the college degree. The college also offered a course in 1917-18 preparing undergraduates for admission to the Naval Reserve as ensigns, and courses in military and naval science and tactics.

A number of physical changes were made in and about the university. The Harry Elkins Widener Memorial Library was dedicated in 1915, as was the Cruft Memorial Laboratory for high frequency electrical work. In 1915, the rebuilding of the Gray Herbarium was completed, and the Dudley Memorial Gate and Clock Tower was built. The three freshman halls, Standish, Gore, and Smith, were occupied in 1914 for the first time. Other buildings completed between the years 1914 and 1924 included the Germanic Museum, the music building, containing the John Knowles Paine Concert Hall, the Dunbar Laboratory for research in cryogenic engineering, the *Crimson* building, which housed the undergraduate daily paper and the alumni weekly, and two war buildings still in use, that on the Delta used as the bursar's office, and the McKay Engineering Laboratory.

The commencement exercises, formerly held in Sanders Theatre, were transferred to the Harvard Stadium in 1916 for one year, and to Sever Quadrangle in the Harvard Yard in 1923. President, A. Lawrence Lowell, LL.D.

HARVEY, GEORGE (BRINTON McCLELLAN) (1864-). An American editor and diplomat (see Vol. X). While at the Court of St. James (1921-23), he was very much criticized in the United States for his obvious pro-British sentiments. He strongly opposed the League of Nations on the basis that it would jeopardize national sovereignty. In 1918, he established a *War Weekly Supplement* to *The North American Review*, and later called it *Harvey's Weekly*. The latter was used as a means of denouncing President Wilson's administration. Though not a delegate at the Republican National Convention of 1920, he was present and contributed largely to Warren Harding's nomination for the Presidency. The latter appointed him ambassador to England in 1921.

HASKELL, WILLIAM NAFEW (1878-).

An American army officer, born at Albany, N. Y. He graduated from the United States Military Academy in 1901; from the Infantry and Cavalry School in 1904; and from the Army Staff College in 1905. He was made captain in 1916 and in 1917 was appointed major of field artillery in the National Army. He served throughout the War, becoming lieutenant-colonel in the regular army in 1920. In France, he served as assistant chief of staff with the 77th Division and participated in several important campaigns. Following the close of the war, he acted as head of the American Relief Commission to Rumania and was later director-general of all relief in the Caucasus. In 1921-22 he served as chief of the American Relief Commission to Russia.

HASKINS, CHARLES HOMER (1870-). An American educator, born at Meadville, Pa. He graduated from Johns Hopkins University in 1887 and was instructor from 1889 to 1890. He served as instructor, professor of history and professor of European history at the University of Wisconsin from 1892 to 1902. In that year he joined the faculty of Harvard University as lecturer on history, becoming successively professor of history and Gurney professor of history and political science (1912). From 1918, he served as dean of the Graduate School of Arts and Sciences. In 1918-19, he was a member of the American Commission to Negotiate Peace and was also on several other commissions in Europe. From 1920, he was chairman of the American Council of Learned Societies and was a member of many foreign and American learned societies. He was the author of *The Normans in European History* (1915), *Norman Institutions* (1918), and *Some Problems of the Peace Conference* (with R. H. Lord, 1920). He was also editor of the *American Historical Series*.

HASSALL, ARTHUR (1853-). English historian (see Vol. X). In 1918, he wrote *France, Mediæval and Modern*; in 1919, *A Handbook of British History*.

HASSAM, CHILDE (1859-). An American painter and etcher (see Vol. X). Especially interesting among his works during the decade were his flag pictures of Fifth Avenue, in which, with vitality and great effectiveness he caught the exultant spirit of flowing banners, as in "Allies Day." Within the decade he turned also to etching, his work in which was notable for its reticence and subtlety. Several important exhibitions of his drawings, etchings and water colors were held in New York. Among his awards during the period were the Altman prize, National Academy of Design, 1918; and the gold medal of honor, Pennsylvania Academy of Fine Arts, 1920. In 1919 he was made a member of the American Academy of Arts and Letters.

HASTINGS, JAMES (1860-). Scottish editor and Biblical scholar (see Vol. X). Besides continuing the series of dictionaries and encyclopædias begun some years ago, he started a series on *Great Christian Doctrines*, of which have appeared: Vol. I, *Prayer* (1915); Vol. II, *Faith* (1919); Vol. III, *Peace* (1921).

HASTINGS, THOMAS (1860-). An American architect (see Vol. X), member of the firm of Carrère and Hastings. He was a member of the National Academy and the American Academy of Arts and Letters, and was president of the Society of Beaux Arts Archi-

fects. In 1924, a design made by him for the war memorial for New York City was accepted.

HATCH, WILLIAM HENRY PAINE (1875-). An American theologian, born in Camden, N. J. He was graduated at Harvard in 1898, and received there his Ph.D. in 1904, after which he was graduated at the Episcopal Theological Seminary in Cambridge, Mass., and from the General Theological Seminary in New York City. After ordination to the Protestant Episcopal ministry in 1902, he held charges in Cambridge, Mass. (1902-03), Lake George, N. Y. (1904-05), and Lexington, Mass. (1905-08). In 1909, he went to the General Theological Seminary, becoming in 1913 professor of the language and literature of the New Testament. In 1917, he relinquished that place to accept a call to a similar chair in the Episcopal Theological Seminary in Cambridge. Dr. Hatch has published many articles and reviews and is the author of *The Pauline Idea of Faith* (1917), and with C. C. Edmunds, *The Gospel Manuscripts of the General Theological Seminary* (1918).

HAUK, MINNIE (1852-). An American soprano (see VOL. X). In the fall of 1912, a false report of her death was circulated in all the musical journals of the English-speaking world. The fact that this report was unfounded did not become known until in December, 1919, some friends issued a general appeal for assistance, as the artist had become destitute through the War and was almost totally blind. The appeal met with a generous response. In 1923, it was reported that a successful operation had brought about an improvement in her sight.

HAUPTMANN, GERHART (1862-). A German poet, dramatist, and novelist (see VOL. X). At the outbreak of the War he had a controversy with Romain Rolland, who had challenged him to protest against the crime of Louvain, which Hauptmann failed to do. Later he engaged in welfare work and was particularly active in caring for the wounded during the revolution in Berlin in 1919. His later writings comprise: *Der Bogen des Odysseus* (1914); *Parsival* (1915); *Der Ketzler von Soana* (1918); *Indipohdi* (1920); *Der weisse Heiland*, a dramatic phantasy (1920); *Anna*, a rural epic (1921); *Peter Brauer* (1921); *Phantom*, memoirs of a convict (1922); and *Kaiser Mæzens Brautfahrt* (1924). Many of the addresses and lectures delivered by him during the last years have also been published. English translations of his works appeared in London and New York.

HAUSER, HENRI (1866-). A French historian and economist. He was educated at the Ecole Normale Supérieure, and passed through the academic hierarchy until he became professor at the faculty of letters in the Sorbonne. For the year 1922-23, he was the French visiting professor at Harvard University, lecturing on the history of capitalism.

An authority on the economic history of the latter Middle Ages and the Renaissance, Professor Hauser wrote illuminatingly on social conditions both of the past and present. During the War he published a number of tracts exposing Germany's plans for economic domination of the world's markets.

His works include: *François de la Noue* (1893); *Ouvriers du Temps Passé; XV^e-XVI^e Siècles* (1899); *L'Or* (1901); *L'Impérialisme Américain* (1905); *Les Sources de l'Histoire*

de France au XVI^e Siècle (4 vols., 1906-15); *Etudes sur la Réforme Française* (1909); *La France et ses Colonies* (1912); *Le Traité de Madrid et la Cession de la Bourgogne* (1912); *La Guerre Européenne et le Problème Colonial* (1915); *Economic Germany* (Eng. trans. 1915); *Germany's Commercial Grip Upon the World* (Eng. trans., 1917); *Les Routes Fluviales de l'Europe Nouvelle* (1918); *Propos d'un Ignorant sur l'Economie Nationale* (1923); *La Nouvelle Orientation Economique* (1924).

HAUSER, OTTO (1876-). An Austrian writer. He was born at Dianesch, Croatia, and studied at the University of Vienna. He is the author of *Weltgeschichte der Literatur* (1910), *Rassebücher, Rasse und Rassefragen* (1913); *Geschichte des Judentums* (1921), and other works of a critical and historical character. He translated Verlaine, Rossetti, Swinburne, Wilde, Van Eeden and others, prefacing the translations by illuminating essays, and compiled anthologies of Chinese, Japanese and Scandinavian poetry with appropriate appreciations. He has published his own works of fiction which include: *Lehrer Johannes Johansen* (1902); *Ein abgesetzter Pfarrer* (1904); *Lucidor der Unglückliche* (1905); *Angelika und Malvine* (1906); *Spinoza* (1908); *Die Familie Gessner* (1909); *Alt Wien* (1910); *Faustulus* (1911); *Der liebe Augustin* (1913); *Das Deutsche Herz* (1921); *Atlantis* (1921).

HAUSMANN, ERICH (1886-). A German physicist, born in Solinger, Germany. He was graduated at the Brooklyn Polytechnic Institute in 1908, then studied at New York University. Returning to the Polytechnic Institute he taught physics and electrical engineering, becoming professor of physics in 1918. In addition, he was a member of the graduate faculty at New York University during 1911-16 and was in charge of the department of physics during the summer of 1912. He specialized on methods of electrical communication, transmission and traction, and on wave propagation along conductors. Dr. Hausmann has been very active in the Brooklyn Institute of Arts and Sciences, serving as vice president of its department of electricity (1909-21), and later as president. He is the author of *Electric Wave Propagation and Distribution along Conductors* (1911), *Telegraph Engineering* (1915), *Dynamo Electric Machinery* (1922), and, with others, of *Alternating Current Machines* (1908), *Direct Current Machines* (1909), *Electric Traction and Transmission Engineering* (1912), and *Physics Laboratory Experiments* (1917).

HAVERFORD COLLEGE. An institution under the control of the Society of Friends at Haverford, Pa., founded in 1833. Haverford grew steadily during the decade 1914-24 with the exception of the war years. At the beginning of that period, the enrollment was 176, the faculty numbered 22, the library contained 62,000 volumes and the productive funds amounted to \$1,100,000; and in the year 1923-24, the enrollment was 224, the faculty numbered 25, the library contained 93,000 volumes and the productive funds had trebled, totaling \$3,648,952. The Isaac Sharpless Science Hall for physics and biology was built in 1919, and the children of Gideon Scull gave \$146,000 in 1916 to establish a chair in English Constitutional History. William Wistar Comfort, Ph.D., LL.D., succeeded Isaac Sharpless, Sc., LL.D., as president in 1917.

HAWAIIAN ISLANDS, or **HAWAII**. A territory of the United States, consisting of a group of islands in the north central Pacific Ocean. Total area, 6449 square miles. The population of Hawaii increased from 191,909 in 1910 to 255,912 in 1920. The population on June 30, 1923, was estimated at 298,500. There is a great diversification of races among its population, and with the exception of the native Hawaiians, all are increasing. The Japanese form the largest proportion; they numbered 79,675 in 1910, and 109,274 in 1920. The Portuguese are second, with 22,301 in 1910 and 27,002 in 1920. The native Hawaiians decreased from 26,041 in 1910 to 23,723 in 1920. The other races forming the population, with their numbers, in 1910 and 1920, are as follows: Asiatic Hawaiian, 3734, 6955; Caucasian Hawaiian, 8722, 11,072; Porto Rican, 4890, 5602; Spanish, 1190, 2430; other Caucasian, 14,867, 19,708; Chinese, 21,674, 23,507; Filipino, 2361, 21,031; Korean, 4533, 4950; negro, 695, 348; all other, 310, 376.

Agriculture. The agriculture development of the Territory is under the Bureau of Agriculture and Forestry and the College of Hawaii. In addition to these, there are the Federal Experiment Station which is assisted financially by the Territory and the Hawaiian Sugar Planters' Association's Experiment Station, which meets the needs of the sugar industry. Up to July 1, 1915, the work of the Bureau was supported by a special income tax. Following that year, specific appropriations were made out of the general revenues. The United States census of 1910 showed a total area of 305,053 acres of cultivated agricultural lands in the Territory. The maximum of the possible cultivable land is about 400,000 acres. The number of farms in the Territory increased in the decade 1910-20 from 4320 to 5284. The land in farms increased from 2,590,600 acres in 1910 to 2,702,245 in 1920, while the improved land in farms increased from 305,053 acres in 1910 to 435,242 acres in 1920. The percentage of the total area in farms increased from 62.8 per cent in 1910 to 65.5 per cent in 1920. The value of farm property increased from \$96,363,229 in 1910 to \$151,129,085 in 1920, and the average value per farm increased from \$22,306 in 1910 to \$28,601 in 1920. The chief agricultural industry in the islands was the growing of sugar cane. The acreage under cultivation in 1909 was 186,230, and the sugar cane was harvested in 1919 from 123,165 acres. The production of sugar cane increased from 4,240,238 tons in 1909 to 4,862,707 tons in 1919, while the value increased from \$26,305,747 in 1909 to \$37,558,265 in 1919. The rice production was second in importance. Rice is the most important cereal grown. The acreage, however, decreased from 9425 in 1909 to 5801 in 1919. The production decreased from 41,827,900 pounds in 1909 to 29,571,845 pounds in 1919, while the value decreased from \$1,068,293 in 1909 to \$1,577,421 in 1919. The production of coffee showed remarkable development during the decade. The acreage increased from 3727 in 1909 to 5687 in 1919, while the production increased from 9,834,026 pounds in 1909 to 19,883,650 pounds in 1919. The value increased from \$213,085 in 1909 to \$741,315 in 1919. The production of fruits of all kinds was one of the chief industries of the island. The growing and canning of pineapples assumed great impor-

tance. This increased from 12,361,695 pounds in 1909 to 299,981,433 pounds in 1919, while the value increased from \$331,162 in 1909 to \$3,545,385 in 1919. Other fruits produced were avocados, bananas, figs, oranges and papayas. The number of farm owners increased from 963 in 1910 to 1419 in 1920. The managers decreased from 249 in 1910 to 126 in 1920, and the tenants increased from 3108 in 1910 to 3739 in 1920. The white farmers increased from 753 in 1910 to 892 in 1920; the colored farmers from 3567 in 1910 to 4392 in 1920. The Department of Agriculture and Forestry and the Agricultural Experiment Station did work with excellent results, especially in the decade 1914-24. Largely through the efforts of the Agricultural Experiment Station, agriculture became more diversified. Twenty years ago sugar was the only large agricultural industry. Through the experiments carried on, it was discovered that pineapples could be grown with great success, and the rapid growth of this industry is shown by the fact that the canned pineapples produced in 1903 were valued at \$7500, whereas the value in 1921 was \$29,841,000. The Experiment Station was particularly successful in discovering and destroying plant pests which were destroying sugar cane and fruits. An Extension Division was established in 1914 and during the decade developed numerous helpful points of contact with the various agricultural interests throughout the country.

Manufactures. The chief industries of Hawaii were based largely on the production of sugar. The number of establishments decreased from 500 in 1909 to 496 in 1919. The wage earners, however, increased during the same period from 5904 to 9969. The capital invested was \$23,875,000 in 1909 and \$48,851,000 in 1919. The value of products increased from \$47,404,000 in 1909 to \$133,096,000 in 1919. There were 43 establishments in 1919 connected with the manufacture of sugar, compared with 46 in 1909. The value of the products of these increased from \$35,959,822 in 1909 to \$80,236,244 in 1919. In 1909, there were 74 establishments engaged in the cleaning and polishing of rice, as compared with 69 in 1919. The value of the product increased from \$2,238,667 in 1909 to \$5,436,455 in 1919. Ten establishments in 1909 were engaged in canning and preserving, as compared with nine in 1919. The value of the product increased from \$1,591,073 in 1909 to \$18,997,975 in 1919. These industries practically comprised the most important part of the manufacturing done in the Territory. Printing and publishing, cleaning and polishing of coffee, the production of lumber, the making of confectionery and ice-cream were other manufacturing industries. Honolulu and Hilo are the chief manufacturing cities. In Honolulu, in 1909, there were 236 establishments and 241 in 1919. Hilo had no manufactures in 1909, but had 57 establishments in 1919. The value of the manufactures of Honolulu increased from \$10,704,744 in 1909 to \$43,611,175 in 1919. The industries of Hilo had a product valued at \$5,612,196 in 1919.

Education. The educational problems of Hawaii were unusually difficult from the mixture of populations, and the Territory's comparatively rapid increase. There were 161 schools in 1913, and 25,631 pupils. The cost of maintenance was \$677,799. In 1923, there

were 175 public and 60 private schools. In the public schools were 48,730 pupils and in the private schools 8470, or a total of 57,200. In 1914, there were, in the public schools, 10,329 Japanese. This number had increased in 1923 to 23,947. The Chinese increased from 2638 in 1914 to 4616 in 1923. The Hawaiians increased from 3288 in 1914 to 3565 in 1923. The Anglo-Saxons increased from 737 in 1914 to 1448 in 1923. During the decade 1913-23, great attention was given to the proper development of the educational system, especially with regard to agriculture and manual education. In the latter part of the period, widespread interest was manifest in a reorganization and re-direction of the public school curriculum for the purpose of giving adequate recognition to agricultural and manual training. One of the most significant educational developments over the period was the rapid rise of professional interest and self-improvement on the part of the teaching staff. The Hawaiian Educational Association, which embraces the whole Territory, held annual conventions. The junior high schools were established during the decade and these became very popular among the people and greatly increased the interest in educational work wherever established. In 1923, there were five of these schools. The University of Hawaii, established in 1907, formerly the College of Hawaii, afforded opportunity for higher education. The enrollment increased from 144 in 1914 to 701 in 1923. The relations of the university and the community at large became much closer through the work of the extension department. Two industrial schools, one for boys and one for girls, were also maintained.

Trade and Commerce. The development of trade and commerce in the decade 1913-23 is indicated by a comparison of several years during that period. In 1914, the total of imports and exports amounted to \$77,144,329, of which \$41,594,072 were exports and \$35,550,257 imports. In 1918, the total trade was \$132,347,810, of which \$80,546,606 were exports and \$51,801,204 imports. In 1920, the total trade amounted to \$168,063,451, of which \$104,779,804 were exports and \$63,283,647 imports. In 1923, the total trade amounted to \$147,645,131, of which \$72,768,317 were exports and \$64,876,814 imports. The exports to the United States in 1914 amounted to \$40,678,827 and the imports from the United States to \$29,267,699. In 1923, the exports to the United States amounted to \$81,495,984 and the imports from the United States to \$56,837,991. The total amount of raw sugar exported increased from 1,089,389,928 pounds, valued at \$32,108,518 in 1914, to 1,193,351,278 pounds valued at \$54,232,769 in 1923. Fruits and nuts exported in 1914 were valued at \$5,061,525 and in 1923 at \$24,122,234, constituting the two largest groups of export. Other important exports were coffee, rice, and hides. By far the largest trade was carried on with the United States, but there were important trade relations with Australia, British India, Canada, Japan and the United Kingdom.

Transportation. The mileage of steam railroads in Hawaii increased from 307.43 in 1914 to 335.72 in 1923. There were steam railroads on all the islands operating on regular schedules, most of them carrying passengers. In addition, plantations possessed their private railway

equipment for transporting cane and laborers. Passengers carried on all the railroads increased from 1,345,055 in 1914 to 1,958,548 in 1923. The only street railway existing in the Territory was in Honolulu, where an electric line was being operated. Traffic with the mainland was maintained by a number of steamship lines from New York and the west coast of the United States. In 1922, direct passenger and freight service was established between Los Angeles and Honolulu. Inter-island service was maintained by large and well-equipped steamboats.

Finance. The bonded debt of Hawaii at the beginning of the fiscal year 1914-15 was \$6,844,000. This was increased, until on June 30, 1920, it amounted to \$10,894,000. Further increases brought the bonded outstanding debt, on July 30, 1923, to \$14,649,000. A large part of this debt was incurred for public improvement and authorized by the Legislature during the decade 1913-23. The increase in receipts and disbursements during the decade will be noted by a comparison of the figures for several years of the period. In the fiscal year 1914-15, the total receipts amounted to \$4,905,149 and the disbursements to \$4,446,415. For the fiscal year 1920, the receipts amounted to \$10,925,406 and the disbursements to \$10,949,897. In 1923, the total receipts amounted to \$12,996,542 and the disbursements to \$11,533,819. The gross assessed value of real and personal property increased from \$161,187,226 in 1914 to \$293,104,297 in 1923. The taxes collected on real property increased from \$1,068,297 in 1914 to \$4,726,256 in 1923. On personal property the taxes increased from \$868,613 in 1914 to \$3,508,124 in 1923.

Banking. The number of banks in the Territory increased from 19 in 1914 to 29 in 1923, while the commercial deposits increased from \$10,371,874 in 1914 to \$31,616,007 in 1923. Deposits in the savings banks increased from \$6,275,790 in 1914 to \$21,755,731 in 1923. There were, in 1923, two national banks, a decrease from the five of 1914. One of these was at Honolulu and the other at Scofield.

Health and Sanitation. Nearly all the public health work in the Territory was done by the Territorial Department of Public Health, and during the decade 1913-23 much satisfactory work was accomplished. The death rate per thousand in population decreased from 15.03 in 1914 to 12.54 in 1923. Campaigns for the eradication of rats and mosquitoes were carried on during this period. For many years plague had been endemic in the Hamaquua district and the island of Hawaii, and the object of these campaigns was the destruction of rats which acted as carriers of the germs of the plague. In 1923, nearly 200,000 rats were destroyed. Several cases of plague occurred each year. Material progress was made in the decade in the campaign against tuberculosis. Education and publicity work was carried on in the public press and lectures and sanitarium were maintained for persons suffering from this disease. The Hawaiian race is especially susceptible to tuberculosis. Nearly one out of every 100 persons of this race have the disease or traces of it. Institutions were maintained on the island of Molokai and other localities in the islands for the treatment of leprosy. The number of persons suffering from this disease decreased from 638 in 1914 to 323 in 1923. The installa-

tion of sewage systems in Hawaii and other localities resulted in a great improvement in the sanitary conditions. The United States Public Health Service performed valuable services in the decade, having general charge of the examination of vessels entering the ports. It also aided the Territorial Board of Health in its rat campaigns and other functions of that department.

History. There was little of political interest in importance in the history of Hawaii in the decade 1914-24. During the entire period there was steady development in economic and other directions. A direct primary law, somewhat similar to the Berkeley system of double elections, was adopted by the Legislature of 1913 and elections were held under this law in 1915 and in the odd years thereafter. Sessions of the Legislature are also held biennially. The Legislature of 1915 passed much legislation of an advanced character. The laws relating to taxation were amended and ample provision was made for the encouragement of immigration in the Territory. In 1916, the government created the Hawaii National Park, which was the first national park lying outside the continent of the United States. In this park were included the three volcanoes, Kilauea, Mauna Loa, and Haleakala. With the entrance of the United States into the War, Hawaii took on added importance as a naval station, and it became the largest military outpost of the United States. The National Guard was brought in numbers and plan of organization to the maximum that could be obtained under voluntary service. Four regiments and other units were organized. This organization policed the islands, thus relieving the regular army of this duty. At the outbreak of the War, there were eight German merchant vessels and gunboats interned in the port of Honolulu and several merchantmen in the port of Hilo. These were seized by the United States government and placed at once in commission. The Legislature in 1917 created a commission to conserve and regulate the food supply, revised banking laws, and made provision for the citizens absent in the army and navy. On July 1, 1918, the first and second regiments of Hawaiian infantry were drafted into the national service. Owing to the greatest storm in the history of the Territory, a special session of the Legislature was held in this year and appropriations made to rebuild bridges and other public works destroyed by the storm. On Aug. 21, 1919, the Secretary of the Navy opened the new concrete drydock at Pearl Harbor on the island of Oahu. There was a serious strike on the sugar plantations in February, 1920, which lasted until June, when the laborers decided to return to work on the conditions that prevailed before the strike. At the legislative session of 1921 an act was passed raising the limit of outstanding bonded indebtedness to \$16,500,000. A court of domestic relations was created and hours of child labor were regulated. A measure was passed also creating an emergency labor commission. The Legislature of 1923 authorized the preparation of a statement defining and emphasizing the status of the Territory, which was entitled "Hawaii's Bill of Rights." This statement was designed to emphasize the unique position held by Hawaii among the Territorial possessions, in that it had always been a source of Federal revenue

while it had been uniformly deprived of the benefits of the Federal appropriations. The Legislature of 1923 amended the election laws, revised the Territorial tax law, increased the bonded indebtedness, amended the workmen's compensation act, and passed a uniform law on aeronautics. Conferences of Pacific leaders organized by the Pan-Pacific Union and held at Honolulu met in various years during the decade. A conference of scientists was held in 1920, a conference of educators in 1921, a conference of journalists in the same year, and a conference of commerce and finance in November, 1922. In addition, a conference on education was held in connection with the World Conference on Education which met in San Francisco in July, 1923.

HAWK, PHILIP BOVIER (1874-). An American physiological chemist, born at East Branch, N. Y. He was graduated in 1898 at Wesleyan and studied at Yale and Columbia Universities, taking his Ph.D. at the latter in 1903. During 1901-03 he was assistant in physiological chemistry at Columbia and then went as demonstrator of that subject to the University of Pennsylvania. He held a similar professorship at Illinois in 1907-12 and later accepted the chair of physiological chemistry and toxicology at Jefferson Medical College in Philadelphia. Dr. Hawk made a specialty of such subjects as metabolism, animal acids, food and nutrition, and the drinking of water, on all of which he has published papers. He was a member of the International Congress of Alimentary Hygiene held in Brussels in 1910 and of the Ninth Congress of Applied Chemistry held in New York in 1912. During the war with Spain he served on coast defenses with the Connecticut volunteers. Besides editing the *Journal of Metabolic Research*, he was an associate editor of *Chemical Abstracts*. He is the author of a series of articles on food in *The Ladies Home Journal*; of *Practical Physiological Chemistry* (1907), and of *What We Eat and What Happens to It* (1919).

HAWKES, HERBERT EDWIN (1872-). An American educator, born at Templeton, Mass. He graduated from Yale University in 1896 and was instructor of mathematics in that university in 1898. After postgraduate studies in Germany, he was appointed assistant professor of mathematics at Yale in 1903, serving until 1910, when he became professor of mathematics in Columbia University. In 1917-18, he was acting dean of Columbia College and from 1918, dean. He is the author of *Advanced Algebra* (1905), and *Higher Algebra* (1913), and the coauthor of several other books on mathematics. He has conducted important researches in hyper-complex numbers.

HAWKINS, ANTHONY HOPE (1863-). An English novelist known as "Anthony Hope" (see Vol. XI). He published: *A Young Man's Year* (1915); *Captain Dieppe* (1918); *Beaumaroy Home from the Wars* (1919); *Lucinda* (1920).

HAWLEY, RALPH CHIPMAN (1880-). An American forester, born at Atlanta, Ga. He graduated from Amherst College in 1901 and from the Yale School of Forestry in 1904. After serving with the United States Forest Service, he was assistant State forester of Massachusetts in 1906-07. From the latter date, he was professor of forestry at the Yale School of Forestry. Professor Hawley is the

author of *Forestry in New England* (1912), *A Manual of Forestry* (1918), and *The Practice of Silviculture* (1921).

HAWORTH, PAUL LELAND (1876-). An American author, born at West Newton, Ind. He graduated from Indiana University in 1899 and took postgraduate courses in history at Columbia University. He was a member of the faculty of several schools and colleges, including the Michigan Northern State Normal School, Columbia University and Bryn Mawr College, from 1906 to 1911. In 1916, he made explorations in the Canadian Rockies and revisited the same region in 1919, discovering new lakes and mountains. In 1918-19, he was acting professor of history at Indiana University and was a member of the Indiana House of Representatives in 1920-21. He was the author of: *The Path of Glory* (1911); *America in Ferment* (1915); *George Washington, Farmer* (1915); *The United States in Our Own Times, 1865-1920*; (revised, 1924); *Trail Makers in the Northwest* (1921).

HAWTHORNE, CHARLES WEBSTER (1872-). An American painter (see VOL. XI). Among his awards during the period were the Altman prize, National Academy of Design, 1915; the Temple medal, 1915, and the Lippincott prize, 1923, Pennsylvania Academy of Fine Arts. In his later paintings, among them, "Fisherman and Daughter," and "Adoration," there was still a spirit reminiscent of the Italian primitives.

HAY, WILLIAM HENRY (1860-). An American army officer, born in Jefferson County, Fla. He was graduated from the United States Military Academy in 1886, entered the United States Army as second lieutenant of the Third Cavalry, and continued in the service until his retirement in 1923, in which year he was also made a major-general. As colonel, he commanded the 15th Cavalry in the Philippines in 1917 and in the recent War he had the 28th Division, participating in the campaigns of the St. Die sector, the Vosges, the Pont à Mousson sector, the Thiancourt sector, the Meuse-Argonne offensive, and the offensive of the 2d Army Corps. Later he served in the Inspector-General's office (1920) and then with the General Staff (1921). For his services he received the United States Distinguished Service Medal, the Croix de Guerre with two palms, and the French decorations of the Legion of Honor and the Black Star.

HAYAKAWA, SESSUE KINTARO (1889-). A Japanese actor and playwright, born in Tokyo. He studied at the University of Chicago and starred in moving-pictures with various companies, including his own. Among his productions, of which he is also author, are *His Birthright*; *Hearts in Pawn*, and *Even unto Eternity*.

HAYES, CARLTON JOSEPH HUNTLEY (1882-). An American educator and historian, born at Afton, N. Y. He graduated from Columbia University in 1904, and after postgraduate courses at that university became lecturer in history in 1907, assistant professor in 1910, associate professor in 1915, and full professor in 1919. In the War he served as captain of the United States Military Intelligence Division of the General Staff in 1918-19. He is a member of many historical and other learned societies and is the author of *Sources Relating to Germanic Invasions* (1909); *British Social Politics* (1913); *Political and*

Social History of Modern Europe (1916); *Brief History of the Great War* (1920). He is also coauthor of *The League of Nations, Principle and Practice* (1919).

HAYES, DOREMUS ALMY (1863-). An American theologian (see VOL. XI). He published *Paul and His Epistles* (1915); *John and His Writings* (1917); *The Synoptic Gospels and the Book of Acts* (1919); *Great Characters of the New Testament* (1920); *New Testament Epistles* (1921).

HAYES, PATRICK JOSEPH (1867-). An American Cardinal, born in New York, and educated at Manhattan College, New York City, and the Catholic University of America. He was ordained priest in 1892, was president of Cathedral College from 1903 to 1914, and became rector of St. Stephen's Church in 1915. He was made Archbishop of New York in 1919. During the War he was appointed Catholic chaplain bishop for the United States Army and Navy. In 1924, he was nominated as Cardinal, and went to Rome to be formally inducted into the office.

HAYES, SAMUEL PERKINS (1874-). An American psychologist, born at Baldwinsville, N. Y. Educated at Amherst College, Union Theological Seminary, Columbia and Cornell Universities, he became professor of psychology at Mount Holyoke in 1906. He was also director of psychological research of the Pennsylvania Institution for the Blind, the Perkins Institution and the Massachusetts School for the Blind. He specialized in the psychology of the blind and published an important monograph on the *Mental Measurement of the Blind* (1915).

HAY FEVER. This affection tends to merge itself in the larger group of foreign protein sensitizations, and to range itself more and more with the asthmas and food intoxications. The former plan of inoculation in the spring with mixed pollens seems to be giving way more and more to a policy of identifying the specific exciter of the disease and immunizing against it. Within the decade 1914-24 Dr. Schleppegrell of New Orleans did much service in describing all plants that can set up hay fever and in giving them something of a rating as to their individual importance. In 1922, Dr. Vaughan of Richmond published the result of his experiments in isolating the offending plant in the individual case. Only when immunization with mixed pollens has failed will it become necessary to take these pains. In intractable cases, this author found that the patients were especially sensitive to the short ragweed pollen, although this does not mean that the individual is insensitive to all others. However, the patients in question recovered under injections of the pollen of this plant although, instead of the usual weekly injection, he employed daily injection, and it therefore is suggested that the latter plan be adopted in the obstinate case. In regard to the possibility that the patient in such cases has benefited by previous treatment, the author states that untreated subjects furnished the same result. In order to determine sensitiveness to individual pollens, the skin reaction is employed. The author usually preferred to make successive routine tests with short ragweed, giant ragweed, timothy, daisy, sunflower, corn, orchard grass, goldenrod, etc., although with most of these plants reaction will be neg-

ative. This is evidently preferable to attempts at selection.

HAYS, WILLIAM CHARLES (1883-). An American architect, born in Philadelphia, Pa. He graduated from the University of Pennsylvania and studied in Paris, beginning the practice of his profession in 1895. In 1904, he removed to California. He became assistant professor of architecture at the University of California in 1906 and in 1917 was made acting director. He was consulting architect of that university and designed many of its buildings.

HAYS, WILLIAM HARRISON (1879-). An American lawyer, born at Sullivan, Ind. He was graduated at Wabash College in 1900, later studying law. In 1904, he was chosen a member of the Republican State Advisory Committee of Indiana and in 1910 he was elected city attorney of Sullivan, Ind. He became chairman of the Republican Central Committee of Indiana in 1910 and in 1918 was chosen chairman of the Republican National Committee, continuing in that office until 1921, when President Harding appointed him to his cabinet, as postmaster-general. This place he held for one year and then resigned to become president of the Motion Picture Producers and Distributors of America. During the War he was chairman of the Indiana State Council of Defense. He is a member of the Indiana State Bar Association and of the honor legal fraternity Phi Delta Theta, of which he was State president for Indiana and in 1920 was elected national president.

HAYWARD, WILLIAM (1877-). An American lawyer, born at Nebraska City, Neb. He was educated in Munich, Germany, and studied law at the University of Nebraska, beginning practice in Nebraska City in 1897. During the Spanish-American War he served as colonel of the 2d Infantry of Nebraska. He removed to New York in 1911 and became a member of the law firm of Wing and Russell. He was assistant district attorney for 1913-14, and was appointed member of the Public Service Commission in 1915. He resigned to improve and organize the 15th Infantry (colored) which later became the 369th United States Infantry. He commanded this organization in France and with it participated in many battles. He was awarded the Croix de Guerre, also decorations from the United States and foreign governments. In 1921, he was appointed United States Attorney for the Southern District of New York.

HAYWOOD, WILLIAM D. (?-). An American labor agitator (see Vol. XI). He became conspicuous early in 1917, when, as secretary of the Industrial Workers of the World (q.v.) with headquarters in Chicago, he was arrested on a charge of seditious conspiracy. He was sentenced to 20 years' imprisonment and to pay a fine of \$10,000, but was released on bail, and, in April, 1921, fled to Russia. In March, 1922, he headed a group of American members of his organization who were granted a concession to operate the Nadejdinsky Iron Works in Russia, and in August of the same year it was reported that some of these American I. W. W.'s had mutinied and were without sufficient food and shelter. Some went to deserted coal mines in the Kuznetsk Basin, Siberia, while others started for the iron mines in the Urala.

HAZARD, CAROLINE (1856-). An American educator (see Vol. XI). During the War she was prominent in the work of the

Woman's Council of National Defense (1916), the first Liberty Loan (1916), the War Savings Campaign (1917), and the United War Work Campaign (1918).

HAZEN, CHARLES DOWNER (1868-). An American historian (see Vol. XI). He was professor of history at Columbia University after 1916. His later works include: *Modern European History* (1917); *The French Revolution and Napoleon* (1917); *Alsace-Lorraine Under German Rule* (1917); *The Government of Germany* (1917); *Fifty Years of Europe* (1919); *Modern Europe* (1920). He also edited *Historical Essays by Lord Macaulay* (1921), and *The Kaiser vs. Bismarck* (1921).

HAZEN, SIR JOHN DOUGLAS (1860-). A Canadian lawyer and statesman (see Vol. XI). He represented Canada at the Imperial War Cabinet in 1917, and in 1917-19 was chairman of the Canadian Section of the International Fisheries Commission. He also became Chief Justice of New Brunswick in 1917, and in the following year was knighted.

HEADLAM, ARTHUR CAYLEY (1862-). An English theologian (see Vol. XI). His later works include: *The Miracles of the New Testament* (1914); *The Revenues of the Church of England* (1917); *The Study of Theology* (inaugural lecture, 1918); *The Doctrine of the Church and Christian Reunion* (Bampton Lectures, 1920).

HEALY, TIMOTHY (1855-). Irish Nationalist leader (see Vol. XI). In 1917, he published *The Great Fraud of Ulster*. On Dec. 4, 1922, he accepted from the British government the post of Governor-General of the Irish Free State, and two days later the new Irish orange, white and green flag took the place of the Union Jack over the public buildings in Dublin. He refused all the unnecessary honors to which his office of governor-general entitled him.

HEARING. See PSYCHOLOGY, EXPERIMENTAL; AUDITION.

HEARST, WILLIAM RANDOLPH (1863-). An American newspaper publisher (see Vol. XI). Although he took no active part as a candidate in politics in the decade 1914-24, he continued to exercise influence through his ever-increasing list of newspapers. After the purchase of the *San Antonio Light* in May, 1924, he had 24 papers in all parts of the country. He also was the owner of many magazines of wide circulation, including *Good Housekeeping*, *Cosmopolitan*, and *Hearst's International Magazine*.

HEART DISEASE. The enormous death rate and the increasing incidence of chronic heart disease strike the eye of the reader of mortality records and excite wonder as to the final outcome. This mode of decease is doubtless a result in part of the greater average duration of life, a greater proportion of citizens reaching the age at which degenerative diseases of the vital organs naturally occur. The exact causal factors cannot be visualized and it is customary to set these affections down as due to civilization, since the savage and primitive man show no such predisposition. Organic heart disease, hardening of the arteries and one form of chronic disease of the kidneys are so closely associated that they may be visualized as a single disease group, although not necessarily due to a single cause; for implication of one organ can readily bring about diseases in the others. Disease of the arteries leads to involvement of the heart,

as does also disease of the kidneys. Some idea of the prevalence of these affections may be obtained from a glance at one of the *Weekly Bulletins* of the New York City Health Department. Thus for the week ending Apr. 5, 1924, the total number of deaths lacked but one of 1700, and of this number 500, in round numbers, died of disease of the heart, arteries and kidneys.

Within the decade 1914-24, two casual factors received increasing emphasis. These were syphilis and so-called focal infection or medical sepsis, as it is sometimes called. Other factors vaguely evident may be summed up under defective personal hygiene, which includes improper eating and drinking, the stress of modern living, and in general the drawbacks of civilized existence. Since 1918, cardiac therapeutics seems to have been greatly enriched by the introduction of the drug quinidin, which already vies with digitalis in making it possible for a man to live and labor with advanced heart disease. Quinidin is even superior in some ways to the older remedy because it seems equal to an actual cure of cases of permanent loss of rhythm, indicating deep-seated disease. See ADRENALIN.

HEBER, CARL AUGUSTUS (1874-). A sculptor who was born in Stuttgart, Germany. He studied with Taft, in Chicago, and became a member of the National Sculpture Society in 1904. He was also a member of the New York Architectural League and well known for his designing of memorials. His work includes the "Champlain Memorial" at Crown Point, N. Y., the "Champlain Statue" at Plattsburg, N. Y., the "Schiller Monument" at Rochester, N. Y., the "Benjamin Franklin" at Princeton University and "Pastoral" exhibited at the Art Institute in Chicago. Among his awards were a bronze medal from the St. Louis Exposition in 1904 and a bronze medal from the Panama-Pacific International Exposition in 1915.

HECHT, BEN (1893-). An American author, born in New York City. He was educated in Racine, Wis., and began his journalistic career with the *Chicago Journal* in 1910. He joined the staff of the *Daily News* in 1914. From December, 1918, to December, 1919, he was correspondent in charge of the Berlin Office of News. He is the author of *Erik Dorn* (1921); *Gargoyles* (1922); *Fantazius Mallare* (1922); *The Egoistic* (drama) (1917); *The Florentine Dagger*; *1001 Afternoons* (1923); and short stories in the magazines.

HEDIN, SVEN ANDERS (1865-). A Swedish explorer and author (see VOL. XI). His works have been translated into many languages. After 1914 he published: *Andra varnunger* (1914); *Fyra tal* (1914); *Ett ord till Norges folk* (1914); *Tal till ungdomskräfter, borgare och bönder* (1914); *Fran fronten i väster* (1915); *Kriget mot Russland* (1915); *Till Jerusalem* (1917); *Bagdad, Babylon, Niniveh* (1917); *En levnads teckning* (1920); *Resare Bengt* (1921); and other works.

HEDJAZ. See ARABIA.

HEDRICK, EARLE RAYMOND (1876-). An American mathematician, born at Union City, Ind. He was graduated at the University of Michigan in 1896, then held fellowships at Harvard, and finally took his Ph.D. at Göttingen in 1901. During 1901-03 he was instructor of mathematics at the Sheffield Scientific School at Yale University, but in the latter year became professor of mathematics at the University of Missouri. During the War he served on the Di-

vision of Physical Sciences of the National Research Council. He became editor-in-chief in 1921 of the *Journal of the American Mathematical Association*, of which organization he was president in 1916. Dr. Hedrick edited *A Series of Mathematical Texts* and (with D. C. Jackson) the *Engineering Science Series*. He wrote *A Course in Mathematical Analysis* (1904); an *Algebra for Secondary Schools* (1908); and *Application of the Calculus to Mechanics* (1909).

HEGELER, WILHELM (1870-). A German novelist. He was born at Varel and studied at the universities of Berlin, Munich, Vienna and Geneva. He is the author of: *Sonnige Tage* (1898); *Nellys Millionen* (1899); *Pastor Klinghammer* (1903); *Flammen* (1905); *Ingenieur Horstmann* (1906); *Das Aergerniss* (1907); *Die Leidenschaft des Hofrat Horn* (1914); *Die goldene Kette* (1915); *Zwei Freunde* (1921), and other works. He also wrote a monograph on *Heinrich von Kleist*.

HEGNER, ROBERT WILLIAM (1880-). An American zoölogist born at Decorah, Iowa. He was educated at the University of Chicago and at the University of Wisconsin (Ph.D., 1908). He was assistant at the University of Chicago (1905-07), professor of biology, State Normal School, River Falls, Wis. (1907), assistant in zoölogy at the University of Wisconsin (1907-08) and instructor at the University of Michigan (1908-10). In 1910, he went to Johns Hopkins University, where he was successively assistant professor (1910-18), associate (1918-19), and associate professor in charge of department of medical zoölogy (1920-). He published: *College Text Book of Zoölogy* (1912); *Introduction to Zoölogy* (1910); *The Germ Cell Cycle in Animals* (1914); and numerous papers in journals.

HEIBERG, GUNNAR EDVARD RODE (1857-). A Norwegian dramatist and writer on drama (see VOL. XI). He published *Set og hort* (1917), *Ibsen og Björnson paa scenen* (1918), *Franske visitter* (1919), and *Norsk teater* (1920).

HEIDENSTAM (KARL GUSTAF) WERNER VON (1859-). A Swedish poet and litterateur (see VOL. XI), who in 1916 received the Nobel prize. His recent works include *Om Svenskarnas lynne* (1914), *Vad vilja vi?* (1914), and a volume of verse, *Nya dikter* (1914).

HEIFETZ, JASCHA (1899-). A Russian violinist, born at Vilna. His is one of the most remarkable cases of precocity on record, for at the age of three he began to receive regular instruction on the violin from his father. After a little more than a year he was admitted to the Imperial Music School at Vilna. At the age of six he played Mendelssohn's concerto in public at Kovno, scoring a sensational success. Nevertheless, he continued his studies at the Music School until 1907, when he became a pupil of Auer at the Petrograd Conservatory. Even before he graduated, he made frequent public appearances which spread his fame through Russia. His international fame dates from the phenomenal success of his Berlin début (1912), which he repeated the next year in Vienna, and the following year in all the principal cities of Germany. After an equally successful tour of Scandinavia, he made his American début in New York (Oct. 27, 1917). His American tours were an uninterrupted series of triumphs. In 1921, he made a tour of Australia. Even before he was out of his teens he was universally

recognized as the equal of the greatest living violinists. Auer is said to regard him as his greatest pupil.

HEIJERMANS, HERMAN (1864-). A Dutch dramatist and novelist. Among his recent works are *Robert Bertram et Cie.* (1914), *Eva Bonheur* (1919), *Feest*, in the English translation *Jubilee* (1923), and *Salimbanks*, also in English (1923).

HEINZE, RICHARD (1867-). A German scholar and rector of the University of Leipzig (1921-22). He was born at Naumburg and studied at Bonn, Leipzig and Berlin. He was lecturer at the University of Strasbourg (1893-99), then professor at the universities of Berlin, Königsberg and Leipzig. He is the author of: *De Horatio Bionis Imitatore* (1889); *Xenokrates* (1893); an interpretation of the third book of *Lucretius* (1897); *Virgils epische Technik* (1915), *Ciceros politische Anfänge* (1909); *Tertullii Apologeticum* (1911); *Die lyrischen Werke des Horaz* (1919); *Ovids elegante Erzählungen* (1920).

HELFERRICH, KARL (1872-1924). A German economist and politician. He was born at Neustadt, and was educated at the universities of Munich, Berlin and Strasbourg. He taught at the University of Berlin and later at the government school for colonial politics and oriental languages. In 1902, he entered upon a diplomatic career. He soon became a leader in the German government's policy of economic imperialism, and in 1906 he was appointed director of the Anatolian Railway. In 1908, he was made director of the powerful Deutsche Bank in Berlin. At the close of the Balkan War he was the German financial delegate to the international conference (1913). He was Minister of Finance from 1915 to 1917, and was said to be responsible for the policy of financing the War through loans instead of taxes. After the Treaty of Brest-Litovsk, he was sent to Moscow as the German Ambassador to Russia, succeeding Von Mirbach, who was assassinated. Elected to the Reichstag of 1920, Helferrich threw in his influence with the extreme nationalists and would have nothing to do with the economic fulfillment of the Versailles Treaty. He was killed in a railway wreck on Apr. 23, 1924. His works comprise chiefly economic and political studies. A partial list follows: *Die Reform des deutschen Geldwesens nach der Gründung des Reiches* (1898); *Handelspolitik* (1901), *Geld und Bank* (1903), *Die Weltkrieg* (1919).

HELICOPTER. See AERONAUTICS.

HELIOTROPISM. See ZOOLOGY, *Tropisms*.

HELIUM. See AERONAUTICS; CHEMISTRY, ORGANIC; CHEMISTRY; PHYSICS.

HELLER, EDMUND (1875-). An American naturalist, born at Freeport, Ill. He graduated from Leland Stanford, Jr., University in 1901. From that year to 1907, he was naturalist for the Field Museum in Chicago and was engaged in explorations in California, Mexico, Guatemala and East Africa. In 1907-08, he was curator of mammals at the University of California Museum of Natural History, and in 1909-10, naturalist for the Smithsonian African Expedition in East Africa under the direction of Theodore Roosevelt. He was a member of expeditions in Africa, Peru and China (1909-17). During the War he served on the photographic staff of the Czecho-Slovak Army, and in 1919-20 was a member of the Expedition of the Smithsonian Institution in Africa. He was a member

of many societies and was the joint author (with Theodore Roosevelt) of *Life Histories of African Game Animals*. He wrote, also, numerous papers on fishes, reptiles and birds.

HELLMAN, GEORGE SIDNEY (1878-). An American author, born in New York City, and educated at Columbia University. In 1918-19 he served as director of the Department of Fine and Applied Arts for the Army Educational Commission of the Y. M. C. A. and in 1919 was director of instruction in Fine and Applied Arts of the American Expeditionary Forces. He was director of the American Expeditionary Forces Art Training Centre at the Bellevue in Paris. He served on several commissions relating to war memorials and in 1920 was treasurer and director of the Hugo Ballin Productions. His writings include *The Hudson and Other Poems* (1909); *Applied Arts and Education* (1919); *Art and the Citizen* (1919), and *The Way It Ended* (1920). He also edited the works of other authors and contributed poems and stories to magazines.

HELMICK, ELI ALVA (1863-). An American military officer, born at Quaker Point, Ind. He was graduated at the United States Military Academy in 1888. He was promoted to second lieutenant in the 11th Infantry and continued in the army until Nov. 7, 1921, when he was made Inspector-General with the rank of major-general. His services have included duty in Idaho during the Cœur d'Alene riots (1892), participation in the expedition to Santiago de Cuba (1898), campaign against the Moros (1902), duty on the Mexican border (1910 and 1916), and service in the Inspector-General's office (1916-18). During the War he commanded the 8th Division with the provisional rank of major-general, and later was in command of the service of supplies at Brest. The United States Distinguished Service Medal was conferred on him.

HEMING, ARTHUR (1870-). An illustrator and writer, born in Canada at Paris, Ont., who came to the United States as a student and was a pupil of Frank Brangwyn and Frank V. DuMond. He is a member of the Society of Illustrators and of the Arts and Letters Club of Toronto. Mr. Heming knows his natural scenery and puts it on canvas with a peculiar gift. Among the books which he has written and illustrated are *Spirit Lake* and the *Drama of the Forests*. In the Royal Ontario Museum there are 10 of his pictures on exhibition and he is also represented in the Canadian National Gallery.

HENCKELL, KARL FRIEDRICH (1864-). A German poet (see Vol. XI) identified with the Young Germany of the '80s. After 1914, he published the following works: *Lyrik und Kultur* (1914); *Weltmusik* (1918); *Gedichte* (1921); *Buch des Kampfes* (1921); *Buch der Saat* (1923); *An die neue Jugend* (1924).

HENDERSON, ARCHIBALD (1877-). An American mathematician and author (see Vol. XI). His later books include *O. Henry* (1914); *Star of the Empire* (1919); *Conquest of the Old Southwest* (1920).

HENDERSON, ARTHUR (1863-). A British public official, born in Glasgow. He worked for several years in a foundry. Becoming interested in the labor movement, he speedily became a leading figure in trade unionism and held numerous official positions in connection with that movement. For several years he was

a member of the Newcastle City Council. He was elected to Parliament in 1903 and was successively reelected until 1918. From 1908 to 1910 he was secretary of the Labor party, and again from 1914 to 1917. In 1914 he was chief whip of that party and became its chairman at the outbreak of the War. Joining the first coalition cabinet as president of the Board of Education, he served in 1915-16 and in the latter year was paymaster general and labor advisor to the government. He joined the second coalition cabinet as a member without portfolio. In May, 1917, he went on a government mission to Russia and in August of that year resigned from the cabinet. He was defeated for Parliament in the general election of 1918 but was elected in the following year. In the election of 1922 he was elected by the Labor party and became one of its prominent leaders in Parliament. In the general election of 1923 he was defeated but was afterward elected and became a member of the Labor cabinet.

HENDERSON, LAWRENCE JOSEPH (1878-). An American biological chemist born at Lynn, Mass. He was educated at Harvard (M.D., 1902) and at the University of Strasbourg. He was lecturer in biological chemistry (1902-03), instructor (1903-10), assistant professor (1910-19), and professor (1919-) at Harvard. Professor Henderson published *Fitness of the Environment* (1913), *The Order of Nature* (1917), and numerous papers dealing with applications of physical chemistry to biology.

HENDRICK, BURTON JESSE (1871-). An American writer, born in New Haven, Conn., and educated at Yale. For several years he was on the staff of newspapers in New Haven and New York. He became associate editor of *The World's Work* in 1913. He has written *The Age of Big Business and Life and Letters of Walter Hines Page* and was coauthor, with Admiral W. S. Sims, of *The Victory At Sea*. This book won the Pulitzer Prize for the best book published in 1920 on the history of the United States. He was a frequent contributor to magazines.

HENDRICK, ELLWOOD (1861-). An American chemist, born at Albany, N. Y. He studied chemistry at Zurich under Victor Meyer, and on his return to the United States was superintendent of the Albany Aniline and Chemical Works (1881-84), then, turning his attention to insurance and stock brokerage, continued in that business until 1915, when he retired. In 1917, he became a member of the staff of the research corporation of Arthur D. Little and Company of Cambridge, Mass. Besides being consulting editor of *Chemical and Metallurgical Engineering*, he is the author of many articles on science in popular magazines and published *Everyman's Chemistry* (1917), *Opportunities in Chemistry* (1919), and *Percolator Papers* (1919).

HENEY, FRANCIS JOSEPH (1859-). An American lawyer (see VOL. XI). In 1917-18, he served as special attorney for the Federal Trade Commission in charge of investigation of the high cost of living, with special reference to the packing industry. In 1918, he was Democratic candidate for Governor of California.

HENNING, H. See PSYCHOLOGY, EXPERIMENTAL.

HENRI, ROBERT (1865-). An American painter and portraitist (see VOL. XI). With the same sincerity of purpose and simplic-

ity of method which he had in former years devoted to unsophisticated European types, he turned in 1914 toward the people of California and the Southwest, continuing to look at each individual "with the eager hope of finding there something of the dignity of life, the humor, the humanity, the kindness, something of the order . . . of the universe." Among these later works were "Tam Gan," "Ramon—a Mexican," "Jim Lee," and "A Girl of the Southwest." He was awarded the portrait prize, Wilmington Society of Fine Arts, 1920. His influence as a teacher, pre-eminently as a personality, continued to be of much importance. *The Art Spirit* (1923) is a compilation by Margery Ryerson of fragments of his letters and of his talks to students on the spirit, technique, and appreciation of picture-making.

HENRY, PRINCE OF PRUSSIA (HEINRICH ALBERT WILHELM) (1862-). A German admiral and brother of the ex-Kaiser of Germany (see VOL. XI). He was commander-in-chief of the Baltic fleet from 1914 to 1918.

HENRY, ROBERT L., JR. (1882-). An American professor of law, born at Chicago, educated at the University of Chicago, and as Rhodes scholar at Oxford, England; also at Heidelberg, Germany, and Grenoble, France. He held the position of professor of law at several State universities, also holding the post of dean of the College of Law at the University of North Dakota from 1912 to 1914. He was commissioned captain of infantry in the Officers' Reserve Corps in 1916, and promoted to major in 1919. He was instructor in several officers' training camps from 1917 to 1919, and was a member of the War Department Board of Contract Adjustment in Washington during 1919-20. He lectured at Oxford, England, during 1920-22. His writings include: *Liens and Pledges* (1913); *Consideration in Contracts 601 A.D. to 1520 A.D.* (1917); *Anglo-Saxon Contracts* (1917).

HENSON, HERBERT HENSLEY (1863-). An English clergyman and author (see VOL. XI). He was appointed Bishop of Durham in 1920. His later publications include: *War-Time Sermons* (1915); *Robertson of Brighton, 1816-1853* (1916); *Christian Liberty* (1918). He edited *The Naked Truth*, by Bishop Croft (1919); *Sir William Anson: a Memoir* (1920); *Anglicanism* (1921).

HEPBURN, A (LONZO) BARTON (1846-1922). An American banker, philanthropist and author (see VOL. XI). He was a member of the Federal Advisory Council of the Federal Reserve Board in 1918, and was a prominent member or officer of important associations concerned with economics and political science. In 1915, he wrote *A History of Currency in the United States*. He died in New York City.

HERBERT, VICTOR (1859-1924). An Irish-American conductor and composer (see VOL. XI). Among the numerous productions of his last decade the following achieved conspicuous success: *Princess Pat* (1915), *Eileen* (1917), *Angel Face* (1919), *Orange Blossoms* (1921), *The Dream Girl* (1924). In the field of light opera Herbert not only towers far above all his American colleagues because of his inexhaustible melodious invention, splendid orchestration and solid technical attainments, but has securely established his place by the side of such masters as Johann Strauss, Offenbach, Millöcker, Suppé and Sullivan.

HEREDITY. An observational and experimental study of the laws governing the transmission of physical or mental characteristics through successive generations of animals, or of physical characteristics in plants, the laws being in general the same in the two great groups of living beings. A complete theory of heredity must offer an explanation of two sets of phenomena—first, the fact that, on the whole, offspring resemble their parents more than they resemble other members of the race; and second, that this resemblance is never absolute but the offspring always show some differences from the parents, i.e. they show variability.

An important date in the history of this subject is 1809, when Lamarck formulated his theory of the effects of use and disuse of organs and of the effect of environment on the structure of plants and animals. According to Lamarck, the increased size of an organ through use or its decreased size following disuse was passed on to the offspring so that in the course of generations descendants of the original animals, through accumulation of these structural changes, would be quite unlike their ancestors. Similarly, plant structures would be modified in response to climatic conditions, or to changes in the environment such as moisture or chemical composition of the soil, so as to lead in the end to considerable structural modifications.

Lamarck was arguing in favor of the evolution of species and developed this theory as an explanation of this evolution, but running as it did, contrary to the generally held belief in the fixity of species, the theory met with nothing but opposition, and it was only after 1859, when Darwin's formulation of a theory of evolution was widely accepted, that it received recognition. In the evolutionary writings from 1859 to 1890, there was general acceptance of the doctrine of use-inheritance. This was, indeed, carried to much greater extremes than it was by Lamarck himself, in that there was a general belief that scars resulting from injuries, or the effects of mutilations such as the loss of an organ through accident, would appear as a birthmark in the offspring. Thus the child of a German student had a birthmark reproducing the scar her father carried as the result of a student duel, and a cat whose tail was cut off by an accident henceforth gave birth to tailless kittens. Cases of this sort which had wide acceptance as popular legends were repeatedly cited as illustrating the method of evolution.

It was clearly recognized that the assumption of the inheritance of acquired characters carries with it the necessity of explaining the mechanism of the process. How, for example, is it possible for the removal of a cat's tail to so affect the sex cell of the cat, situated at a considerable distance from the tail, as to cause her to give birth to tailless kittens? Darwin proposed as an explanation the "provisional" theory of pangenesis, which assumed that each cell of the body is constantly throwing off gemmules or ultra-microscopic particles which collect in the sex cells. When these sex cells develop the gemmules are distributed throughout the body of the new individual, and each going to its appropriate group of cells determines the character of their development. These gemmules multiply by fission and may remain dormant for several generations. If through use or disuse or through accident, the structure of a group of cells is changed, the gemmules arising from

these cells will be correspondingly modified and when they in turn take part in the construction of a new individual that individual may exhibit the changed character. Herbert Spencer had earlier attempted to explain heredity and the inheritance of acquired characters on the assumption of "physiological units" or ultra-microscopic particles having a definite polarity which are located in the body cells and by the form of their polarity determine the appearance of the cells in which they are. Use or disuse may modify the form of this polarity and thus affect the character of the race. Neither of the above explanations has any experimental basis and both are purely formal.

Later theories are based on more exact knowledge of the actual phenomena of development, knowledge not available at the time that Darwin and Spencer were writing, and a brief summary of these phenomena will be essential here. The starting-point for each new individual in biparental inheritance is the fertilized egg, a single cell formed by the union of two cells, the *ovum* from the mother and the *spermatozoön* from the father. This fertilized egg divides into two cells, each of these divides again, and the process is repeated until eventually the many-celled adult appears. Coincident with these divisions a process of differentiation goes on, by which different portions of the complex of cells assume different structures adapted to different functions. Examination of any one of these cells under favorable conditions would show that in its central portion or nucleus is a substance called *chromatin* which just before the cell divides breaks up into rods called *chromosomes*, which are arranged in pairs and are constant in number in any one species. When the cell divides, each chromosome of a pair divides, half going to each daughter cell. Thus the number is kept constant and each cell gets a representative of each chromosome present in the cell from which it arose.

A study of the immature sex cells shows that they also have paired chromosomes but as they approach maturity, the members of each pair unite more or less closely with one another in a very complex fashion, later separate and divide with the cells containing them so that the mature sex cell contains only half the normal number of chromosomes. This process is known as *maturation*. When these cells unite in the fertilization process the number is brought back to normal and it is quite certain that one member of each pair is derived from each parent. In fertilization only the head of the *spermatozoön*, which is practically nothing but chromatin, enters the egg. Since observation shows that inheritance from the father is as strong as that from the mother, it seems evident that whatever material is the carrier of hereditary qualities must be located in the chromatin. It has also been shown in the case of a few animals that the cells which give rise to the sex organs of the new generation seem to be set aside early in the development and to be quite distinct from the other organs of the body.

In the light of this further information, Weismann attacked the problem and worked out an elaborate theory of heredity. He was the first to seriously question the validity of the Lamarckian principle, and began by investigating supposed cases of inheritance of mutilations. For these he decided there is no evidence whatever. In this connection he developed the con-

cept of the germ plasma. This may be defined as a material contained in the nucleus of the fertilized egg, whose function is to determine the character of the individual resulting from that egg. For this purpose, during development portions of the germ plasma are distributed to the appropriate regions of the developing organism, each controlling the differentiation of its own particular area. Some of this germ plasma, however, is not distributed in this fashion but remains as residual material which goes by the shortest route to the cells which are to form the sex organs of the new individual and there locates itself in the nuclei of the embryonic sex cells. Here it remains until at the time of sexual maturity the cell containing it begins to develop, unites in fertilization with the cell from the opposite sex, and the process is repeated. While in this position this residual material necessarily must receive its nutrition from the surrounding body, but Weismann supposed that it is so effectually insulated from the latter as not to be affected in any qualitative fashion by any activities of the body itself or by any influence of the environment.

If this germ plasma is thus isolated and unchangeable and determines the character of the individuals of successive generations, why are not all individuals alike? Weismann refers the origin of variations to the maturation process of the sex cells in which each cell apparently shuffles its chromatin and discards a portion of it, before fertilization takes place. Since by the law of chances this discarding is different in any two cells it follows that no two mature sex cells are exactly alike. Further variability is produced by the union of the chromatin of the two sex cells in fertilization. While much that is new has been discovered concerning the phenomena of maturation and fertilization since Weismann wrote, nothing has appeared that seriously affects this much of his theory. His further development of hypotheses concerning the structure of the germ plasma and its behavior are not of so much importance at the present time (see bibliography at end of article).

The net results of Weismann's work are two. In the first place, there is agreement among all students of heredity that mutilations or their effects are not inherited, nor is there any reason to accept the validity of reported cases of maternal impressions and prenatal influences. In the second place, there is agreement that without necessarily accepting Weismann's ideas as to the composition of the germ plasma it is necessary to assume the existence of such a substance as the determiner of hereditary qualities. The question as it now stands is this: Is it possible for this germ plasma, lying in the sex cells, to be affected by any activity of the body or by any influence of the environment so as to produce precise and permanently heritable changes in the structure of subsequent generations?

Weismann at first claimed for germ plasma a complete insulation from external influences, but later modified this position. He found that certain insects when subjected to lowered temperature became darker in color and this modification was transmitted to subsequent generations. To explain cases of this sort where animals certainly responded to external changes, Weismann developed the theory of Parallel Induction, which holds that some environmental influences are strong enough to penetrate through the body

and act directly on the germ plasma and the results of such influences may be inherited. Only those agencies that are strong enough to thus penetrate may affect the germ plasma.

The Neo-Lamarckians on the other hand, who believe in the transmission of acquired characters, hold that lesser influences, acting repeatedly on the body, may gradually penetrate it and affect the germ plasma. Admitting that the mechanisms by which such an effect could operate are not clearly to be seen, they believe that some observations can be explained only on the assumption that this has taken place. Botanists are rather more apt to take this position than are zoölogists, for in the animal body are found much fewer protoplasmic connections between the organs, and the sex cells are more definitely isolated than is the case in plants. In fact, it is sometimes difficult to imagine any very complete separation in plants because of the elaborate arrangement of intercommunicating protoplasmic connections. Among zoölogists the paleontologists are most apt to be Neo-Lamarckians because the history of many structures seems to show a precise parallelism between the changes that these organs show in successive ages and the changes that would have been set up in them in each generation by the uses to which they must have been put.

It is evident that an apparent case of use inheritance might be explained equally well by either of the above hypotheses, and thus a condition of deadlock results.

Most of the earlier writers on this subject devoted their time mainly to arguing on what might be considered reasonable explanations of observed phenomena, and conclusive experimental evidence is lacking. Brown-Sequard, whose results were quoted by Darwin and by later writers, thought that certain injuries to the nervous system of guinea pigs would be followed by a condition of epilepsy and this was transmitted to descendants. This for a long time stood for a valid case of the inheritance of acquired characters, but the most recent work along this line indicates that the so-called "epileptic" condition of the guinea pig appears under favorable conditions in the perfectly normal pig, and it seems certain that this case may be ruled out. Practically all of the supposed cases to demonstrate this point are either of doubtful accuracy, or are capable of two interpretations (see above) and clean-cut, precise evidence is lacking in favor of Neo-Lamarckism.

What seem at this time of writing (1924) the most promising lines of investigation are through the study of hormones and antibodies. If we inject, for example, human blood into the blood vessels of an unrelated animal, say a rabbit, the body of the rabbit will react in a definite and precise fashion, developing what is known as an antibody which has specific relations to human blood. If the blood containing the antibody is mixed with human blood a precipitate will form, but if mixed with blood from any other animal (except a few of the higher apes) no reaction occurs. A similar formation of antibodies having a specific relation to whatever material was injected would follow from the injection of any other body tissue, or on the entrance of bacteria into the blood.

Guyer and Smith injected the material from a crushed lens from the eye of a rabbit into the blood of a fowl and in that way developed an

anti-lens body in this blood. Some of this blood was injected into a pregnant rabbit at a time when the lenses of the embryos were forming, and a number of them were born with defective lenses. This defect persisted through several generations, being transmitted through the male as well as through the female and in a Mendelian fashion (see below). This would indicate that the defect was truly hereditary and not a case of infection from the mother in each generation, and leads to the conclusion that the germ plasm of the rabbit had been modified by the antibody, and since antibodies are set up in response to the entrance of foreign matter into the body it seems probable that modifications of the body might alter the character of the germ plasm.

The hormones are chemical compounds found in the blood of animals and have important functions as regulatory mechanisms. (See ZOOLOGY.) It seems possible that aside from the easily recognizable hormones others may be produced by any functioning tissue, and if this is true, it might be that the use of any organ sets free hormones which react on the germ plasm. Experiments along this line are still too few to be conclusive, but it seems probable that they indicate a procedure most likely to settle this problem which has puzzled biologists for over a century.

Biometry. An important technique for the study of heredity was developed by Galton and later by Pearson in the study of Biometry. This is an application of mathematics to the study of variation in plants and animals. First, accurate measurements are made of the structures under consideration in as large a number of related individuals as possible. These results are then plotted in the form of a curve which is available for treatment by mathematical technique. In such a curve the spread indicates the amount of variability, its mean the average measurement for the group, and its highest point or mode, the largest class within the group. The "probable error" and the "standard deviation" of such a curve are mathematical terms indicating the amount of variability from the mean, within the group. An example of the use of this method in the study of heredity would be to compare such a curve derived from measurements of one group with those obtained from a related group, e.g. parents and offspring, brothers and sisters, etc. The degree to which one group varies from the average of the race and toward the other group is taken as a measure of the strength of heredity in each case. This degree of resemblance or correlation may be expressed mathematically in the form of the "coefficient of correlation." For further details concerning the technique consult the works referred to in the bibliography.

It is obvious that this method deals exclusively with averages and not at all with individual inheritance, thus differing fundamentally from the Mendelian method described below, and there has been much disagreement as to the relative value of the two methods. Pearson and his associates consider Biometry the only method that can give accurate results, while Bateson, writing as a Mendelian, says that "To those who hereafter may study this episode (Biometry) in the history of biological science, it will appear inexplicable that work so unsound in construction should have been respectfully received by the scientific world." A reasonably conserva-

tive position would seem to be that for cases where the experimental method is possible the Mendelian is the better method, while in cases such as human heredity where experimentation is out of the question, the biometric method is the one to be employed, but that in many cases it is desirable to use both. Biometry will often detect significant differences which are not possible to demonstrate in any other way.

Mendelism. In 1866, Gregor Mendel, an Austrian monk, working on the ordinary garden pea, discovered the laws which bear his name. These results were published in an obscure journal and were overlooked by biologists until 1900, when results similar to Mendel's were independently and simultaneously discovered by de Vries in Holland, von Tschermak in Austria and Correns in Germany. Later, Bateson and Punnett in England, Davenport, Castle and Morgan in the United States, have been leaders in the further development of the subject.

Mendelism regards the individual as containing a series of hereditary determiners of *genes* which singly or in combination determine the character of the body. By means of properly devised experiments it is possible under favorable conditions to analyze the individual so as to determine the number and character of the genes responsible for the production of any character or characters and, having made this analysis, to synthesize them into new combinations in very much the same way that an organic chemist follows analysis with synthesis in the production of new chemical compounds.

In its simplest form Mendel's law may be illustrated by crossing a black and a white guinea pig. The offspring of the first generation (known technically as the first filial generation or F_1) will all be black. If these are inbred the offspring of the second filial generation (F_2) will, if the number is large enough to give smooth results, be in the proportion of three black to one white. If the whites be inbred nothing but white will ever appear among their descendants, i.e. the black has entirely disappeared from their composition. If, however, the blacks are inbred it will appear that only one-third of them will give rise to only black offspring while the other two-thirds will have both black and white descendants just as did the F_1 generation. The F_2 generation, therefore, are 25 per cent pure black, 25 per cent pure white and 50 per cent hybrid like F_1 .

Mendel's interpretation of these results was by the assumption of the "purity of the gametes," "gamete" being a generalized term meaning either of the sex cells, ovum or spermatozoon. If we assume that the sex cells of the black animal carry genes for black and those of the white ones carry genes for white, and we represent the black by B and the white by w , then in the hybrid there would be a union of the two though only one is visible. This could be represented as Bw . The theory of the purity of the gametes assumes that when this hybrid forms sex-cells, the genes segregate so that each sex cell of the hybrid (ovum in the female and spermatozoon in the male) contains one or the other of the genes but never both. The further assumption is made that in each individual the number of these two kinds of sex cells is equal. If now they unite at random in the fertilization process, the results could be expressed by the table that follows on page 615.

Of the four classes possible under such condi-

Ova

*B**w*

Spermatozoa

*B**w**BB**Bw**Bw**ww*

tions, 25 per cent of the whole contain only *B* and are pure black, 25 per cent contain only *w* and are pure white, while 50 per cent contain both black and white like the original F_1 hybrid.

This theoretical explanation agrees with observed results and the statement that in any sex cell the gene for only one of any pair of opposed characters is present is a fundamental proposition in Mendelism.

In this case where black and white guinea pigs are crossed the offspring are black. This condition is expressed by saying that black is "dominant" to white, meaning that when genes for both black and white are present in the same individual only the effects of one are visible, the white being "recessive." This relation of dominance and recessiveness is common but not universal in Mendelian heredity and by no means essential. The F_1 generation may be quite unlike either of the parents, but in all cases the segregation of the genes takes place whether there is dominance or not and both grandparental types appear in the F_2 generation.

If instead of black and white opposed characters or "allelomorphs" we take into consideration the results of crossing a short-haired guinea pig with a long-haired one, the F_1 will be short haired and results exactly similar to those described above would follow inbreeding of this generation. If instead of limiting our attention to only one pair of allelomorphs we consider simultaneously two pairs, and mate a short-haired black guinea pig with a long-haired white one, we would get in the first generation short-haired black animals. If these are inbred we get in F_2 offspring in the proportion of nine short black: three short white: three long black: one long white. Returning to the original assumption concerning the genes in the sex cells of the parents, we would assume that each sex cell of one parent contained genes for black and short and in the other parent genes for white and long. In the F_1 these would all be in the same individual, but only the effects of the dominant genes are evident. When these genes segregate in the inbreeding of the F_1 individuals, four combinations are possible, *BS*, *Bl*, *wS*, *wl*; *B* and *w* standing for black and white genes

respectively and *S* and *l* for the short and long ones. The assumption is that there are equal numbers of ova and spermatozoa carrying these genes, the four classes in each sex being equal to one another in size. The results of random union of these sex cells would be indicated by the diagram in preceding column.

The letters in each square indicate, as in the earlier diagram, the character of the individual represented in it. Remembering that *B* and *S* stand for dominant genes, it is obvious that in any square where these are both present the individual will appear to be black with short hair and there are nine such squares in the diagram.

In any square containing *S* and *w* without *B* the animal would be short haired and white and there are three such squares: in any containing *B* and *l* without *S* the animal would be black with long hair and there are three of such squares, while only one square contains neither dominant and the animal would be white with long hair. Here again, these theoretical results agree with those obtained by experiment and again the evidence is in favor of the hypothesis of the purity of the gametes.

In Mendelian terminology individuals corresponding in composition to any one of the four squares lying on the diagonal from upper left to lower right-hand corners are "homozygous" because in none of them is a recessive character hidden by a dominant and they really are what they appear to be, while in each of the other squares one or two recessive genes are present but not evident because obscured by the dominant allelomorphic gene. These individuals having this composition are called "heterozygous."

It is evident that recessive characters are visible only in cases where their genes are homozygous. Breeding from homozygous individuals gives only homozygous offspring, while among the descendants of heterozygous individuals a certain proportion will continue this heterozygous condition, some will become homozygous for the dominant characters and others homozygous for the recessive. In any one of the heterozygous squares the real character of the animal could only be determined by further breeding. Mendel in a generation of peas corresponding to the above groups analyzed them further in this way and found that they conformed in character to expectation, giving further demonstration of the truth of his "purity" hypothesis.

This work on Mendelian heredity has developed further proof that the carriers of heredity are located in the chromatin. The determination of sex seems in some way connected with the activity of a certain *X* chromosome. (See ZOOLOGY.) The distribution of this *X* chromosome from one generation to another as determined microscopically follows so closely the inheritance of certain peculiar characters as to lead to the conclusion that the gene for each of these characters is located in the *X* chromosome. If, for example, a color-blind man marries a normal woman, none of their children will be color-blind and none of the children of the sons will have this defect, but one-half of the sons of the daughters will show it. If we assume (see ZOOLOGY) that the female has two *X* chromosomes while the male has but one, and that the gene for color-blindness is located in the *X* chromosome (indicating this condition by under-

		Ova.			
		<i>BS</i>	<i>Sw</i>	<i>Bl</i>	<i>wl</i>
Spermatozoa	<i>BS</i>	<i>BS</i> <i>BS</i>	<i>Sw</i> <i>BS</i>	<i>Bl</i> <i>BS</i>	<i>wl</i> <i>BS</i>
	<i>Sw</i>	<i>BS</i> <i>Sw</i>	<i>Sw</i> <i>Sw</i>	<i>Bl</i> <i>Sw</i>	<i>wl</i> <i>Sw</i>
	<i>Bl</i>	<i>BS</i> <i>Bl</i>	<i>Sw</i> <i>Bl</i>	<i>Bl</i> <i>Bl</i>	<i>wl</i> <i>Bl</i>
	<i>wl</i>	<i>BS</i> <i>wl</i>	<i>Sw</i> <i>wl</i>	<i>Bl</i> <i>wl</i>	<i>wl</i> <i>wl</i>

scoring the X in the male) then the union of the two would be as in the diagram:

		Ova	
		X	X
Spermatozoa	X	XX	XX
	y	Xy	Xy

Squares containing two X 's would be female and if one X is normal the individual would appear normal because normal is dominant to the color-blind condition. It is evident that the color-blind gene is only in the daughters and is entirely eliminated from the sons. If one of these daughters marries a normal man the condition would be as in the next diagram.

		Ova	
		X	X
Spermatozoa	X	XX	XX
	y	Xy	Xy

The son in the lower right-hand corner would be color-blind, while the other son would not, and neither daughter shows the defect though one of them could transmit it. This theoretical result agrees perfectly with results of observation on the mode of inheritance of this disease and there is no doubt of the correctness of the interpretation. Genes which are carried in this fashion in the X chromosomes are known as "sex linked" genes and a considerable list of such genes have been identified.

Important practical suggestions arise from the study of sex linked characters. It is evident from a study of the last two diagrams that it would be possible to determine which individuals would transmit the sex linked character and which would not. If, as is true in some cases, the character is an undesirable one, it would be possible, by controlling matings, to eliminate the character from the race. On the other hand, if the sex linked character is desirable it would be possible so to control matings as to make it more common. It is evident from the diagram that, assuming absolute power to control matings, either color-blindness could be entirely eliminated or a race could be developed all of whom would be color-blind, according to which was considered the desirable condition.

Atavism or Reversion. These terms should be considered as synonymous and refer to the appearance in one generation of characters not represented in the immediate parents but present in some more remote ancestors. In the case just mentioned, color-blindness skips a generation and might even seem to skip more than one, if in the intermediate generations the individual who would otherwise show it did not happen to appear. Another familiar case is where the child of brown-eyed parents has blue eyes inherited from a blue-eyed grandparent or earlier ancestor. In eye color, the pigmented (brown or black) eye is dominant to the non-pigmented (blue or albino). If, therefore, the brown-eyed parents happen to be heterozygous for brown, having the blue as a recessive character,

one-quarter of their children would be homozygous for blue and be blue-eyed (see diagram above, referring to the guinea pig which, making the necessary changes in the symbols, would apply as well to this case). Since the number of individuals is so small in any human family, it might happen that several generations would elapse before the homozygous individual appears and thus the child seem to inherit something not possessed by its parents. This emergence of a previously hidden recessive character explains one type of atavism.

Another type has a different explanation. Bateson described a case where two white sweet peas when crossed gave a purple F_1 and this when inbred gave in F_2 nine purple to seven white. This purple color was present in the ancestral Sicilian sweet pea, so that this was an undoubted case of atavism. This can be explained on the assumption that for the production of the purple color the coöperation of two genes is necessary. If either gene is present alone no color appears; when they are both present they produce the purple color. In the history of these two varieties of sweet peas it happened that these two genes became separated and thus two lines of white-flowered plants arose, one carrying one of the genes, the other carrying the other. When they were crossed color returned. Assuming that one of these genes is represented by C with an allelomorph c and the other by R with r as allelomorph, the composition of one plant would be Cr and the other cR . When crossed this becomes $CRcr$ and color appears. Assuming that this is the case the hybrid would form gametes CR , Cr , cR , cr . Representing the result of crossing by a diagram, as before, we have:

		Ova			
		CR	Cr	cR	cr
Spermatozoa	CR	CR CR	Cr CR	cR CR	cr CR
	Cr	CR Cr	Cr Cr	cR Cr	cr Cr
	cR	CR cR	Cr cR	cR cR	cr cR
	cr	CR cr	Cr cr	cR cr	cr cr

Nine of these squares contain both C and R while none of the other seven has both of them. Accordingly nine are colored and seven white, as actual observation showed. Again theoretical expectation and observations are in agreement and demonstrate the accuracy of the theory.

Inbreeding. This is regarded, and with some experimental evidence in favor of the belief, as undesirable in that it tends to produce weakened or degenerate descendants. Many plants, however, as wheat, rice, barley, oats, tobacco, and beans are normally self-fertilizing and experiments on white rats have shown that no injurious effects follow on the closest inbreeding. It now seems certain that inbreeding in itself is not injurious, but that if there are in a race undesirable recessive traits these traits are more apt to become homozygous and thus

visible if two members of this race mate than if either mates with a more distantly related individual. If a race is free from these undesirable recessives no harmful effects follow inbreeding. On the other hand, "outbreeding" or mating of unrelated individuals is sometimes followed by an increase in vigor, apparently because it results in a combination of several desirable dominant characters.

The most elaborate experiments ever made in heredity were made by Morgan and his associates on the fruit-fly *Drosophila*, which is ideal for this purpose as it breeds rapidly and is easily kept under observation. As a result of these experiments they have not only identified a large number of genes but have demonstrated the exact location of each of these genes on the chromosome (consult bibliography).

Of much interest is the question as to the number and character of these genes. To assume that there is in the sex cell a gene for each different character of the adult would be to assume an inconceivable complexity in the germ plasm. Moreover, it is known that sometimes one gene may affect more than one body character or, on the other hand, several genes may cooperate to determine one character. It would be possible, therefore, to explain their action by the assumption of a comparatively few genes which, reacting on the original material of the fertilized egg, start the process of differentiation, then by a second reaction on this primary differentiated material set up a further differentiation, and this series of actions and reactions continue to the end, the process being more or less modified by the reactions of one set of genes upon the others. That the genes are complex chemical compounds, possibly of the nature of enzymes, acting upon the protoplasm of the body seems a reasonable assumption from what we know of their mode of working.

It seems, however, certain that the cytoplasm of the egg plays some part in heredity and is not merely an inert mass, molded by the genes in the chromosomes. Apparently the general characteristics, e.g. whether an egg shall develop into a dog or a horse, are determined by the cytoplasm while the individual characteristics are controlled by the genes.

If genes are chemical compounds of the nature of enzymes it should be possible to modify their structure by chemical or other means and there is experimental evidence that this can be done. If the cases mentioned earlier, where external forces have permanently modified the race, are valid, the genes must have been modified. Mutations also (see ZOOLOGY) must owe their origin to changes in the composition of the genes.

This work in heredity has decidedly modified opinion on one point which had seemed so obvious as to be axiomatic. This was the principle which underlay all of Darwin's work on selection, that of the supposed efficiency of the selection of individual variations. Among the members of any generation are always found variations in the degree of development of any one character. Darwin supposed, and this has generally been believed until quite recently, that if extreme variates be isolated from the remainder and allowed to breed, some of their offspring would vary still more widely in this direction and if this process is continued almost any amount of variability could be obtained.

If this is true it would mean that the character of genes could be changed by the act of selection and the evidence indicates that it is probably not true.

In any species the range of variability is fixed, and selection of the greatest or the smallest variate from the mean of the species would not in any way affect the range of variability of the next generation. Where the selective process seems to be efficient it may mean either that the original group was not homogeneous and selection has isolated different races from one another, each having its own range of variability, or that there were genes modifying or interfering with the action of the genes under consideration and the selective process has removed these, thus allowing the original gene free expression. The gene is apparently not modified through selection.

As a result of his study of biometry, Galton decided that inheritance is blending, i.e. that the offspring of two parents unlike in any particular character would be, with respect to that character, intermediate between the parents. If this were true, it would mean that the genes from the two parents had modified one another. The Mendelian interpretation is that in such a case the apparent blending is due to the peculiar action of two or more genes. For example, a brown-chaffed and a white-chaffed wheat were crossed and F_1 was brown. F_2 , however, did not have brown and white in the proportions of three to one as might have been expected but there were fifteen brown to one white and the browns were not all of the same shade. This can be explained on the assumption that there are two genes for brown, B and B^1 , each capable of producing the color, but BB^1 gives a more intense shade than either B or B^1 alone. Worked out on the checker-board diagram such as has been given, this theoretical expectation agrees closely with actual observations and there is no evidence for a true blending due to modifications in the character of the original genes.

By offering precise information concerning the results to be expected from any given mating, Mendelism has been of service to practical plant and animal breeders, and these services will undoubtedly be extended with advancing information. In human heredity, because of the obvious impossibility of experimental matings and because of the small size of human families, accurate information is more difficult to obtain, but enough is known to offer to eugenics much valuable assistance in its efforts to improve human qualities. This is especially true in the cases of a number of diseases which are sex linked in inheritance and which, by applying the rules mentioned above, might easily be eliminated from the race. See EUGENICS.

Bibliography. The following books summarize the more important works in this field though several of them of course are the work of pioneers in this branch of biology: Darwin, *Animals and Plants under Domestication* (New York, 1876); Spencer, *Principles of Biology*; Galton, *Natural Inheritance* (New York, 1889); Bateson, *Mendel's Principles of Heredity*; Thomson, *Heredity*; Cunningham, *Hormones and Heredity*; Pearl, *Modes of Research in Genetics*; Castle, *Genetics and Eugenics*; East and Jones, *Inbreeding and Outbreeding*; Morgan, Sturtevant, Muller and Bridges, *The Mechanism of*

Mendelian Heredity; Weismann, *The Germ Plasm*.

HERELLE, F. d' (?) —). A Canadian-French pathologist distinguished for a remarkable discovery of a principle or organism which attacks and destroys bacteria. Born in Canada, he removed to France while young, and having taken a degree in medicine he joined the research force of the Pasteur Institute at Paris and made his discovery of the so-called "bacteriophage." His labors in this field were summed up in a monograph originally published in French but issued in a more advanced form in English with the title *The Bacteriophage* (1922).

HERFORD, CHARLES HAROLD (1853—). An English scholar (see Vol. XI). His later publications include: *Is There a Poetic View of the World?* (1916); *Treatment of Love and Marriage, and Other Essays* (1921).

HERGESHEIMER, JOSEPH (1880—). An American author, born at Philadelphia, Pa. He studied painting for a time, but soon turned to literature, receiving his initial encouragement from George Horace Lorimer, editor of the *Saturday Evening Post*. His writings continued from time to time to appear in that periodical. His first novel, *The Lay Anthony*, which was not published until 1914, was at once acclaimed as a work of the first importance. There followed in rapid succession a series of notable books, including: *Mountain Blood* (1915); *The Three Black Pennys* (1917); *Java Head* (1919); *Linda Condon* (1919); *Cytherea* (1921); *The Bright Shawl* (1922); and the collected short stories *Gold and Iron* (1918) and *The Happy End* (1919). Possessed of a luxurious style that is peculiarly effective for his subjects, with a feeling for exotic backgrounds that he has, nevertheless, been able to render subordinate to the essential work of character delineation, Mr. Hergesheimer, in the *Lay Anthony*, in *Linda Condon*, in the first parts of *The Three Black Pennys* and *Java Head*, has written fiction little surpassed or even equaled in the period. Always intelligent and the man of the world, always sure of his powers, a little too ostentatious in his devotion to the details of the luxurious life, but saved by the brilliance with which he has been able to manipulate those details to build up a convincing word-picture, he has produced romances notable for character, atmosphere, and circumstances. It is interesting to note that he has been least successful with modern themes, that his *Cytherea* fails where his *Three Black Pennys* succeeds. But he is not concerned with problems so much as he is with life, and nothing gives him more pleasure or tests his powers better than the depiction of attempts at violent and perhaps maladroit readjustments. His young *Anthony*, the Chinese figures in *Java Head*, and *The Bright Shawl* are cases in point.

HERMANN, GEORGE (pseudonym for GEORG HERMANN BORCHARDT (1871—). A German novelist. He made old Berlin the background of most of his stories, some of which were dramatized: *Spielkinder* (1897); *Die Zukunfts-frohen* (1898); *Aus dem letzten Hause* (1899); *Jettchen Gebert* (1906); *Henriette Jacoby* (1907); *Aus guter alter Zeit* (1913); *Heinrich Mchön. Jr.* (1915); *Von genickerten und ungesicherten Leben* (1915); *Einen Sommer lang* (1917). His plays include: *Jettchen Gebert*; *Henriette Jacoby*; and *Mein Nachbar Ameise*

(1920). He is also the author of two volumes of sketches *Randbemerkungen* and *Kleine Erlebnisse* (1920).

HERMANSSON, HALLDOR (1878—). An Icelandic philologist. He entered the university of Reykjavik in 1898 and three years later that of Copenhagen. In 1905, he was appointed curator of the Fiske Icelandic Collection at Cornell University Library and became connected with the university as instructor in Scandinavian languages, professor and lecturer. He is the author of *Bibliography of the Icelandic Sagas* (1908); *The Northmen in America* (1909); *Bibliography of the Sagas of the Kings of Norway* (1911); *The Ancient Laws of Norway and Iceland* (1911); *Bibliography of Mythic-Heroic Sagas* (1912); *Icelandic Authors of To-day* (1913); *Icelandic Books of the 16th Century* (1916); *The Periodical Literature of Iceland* (1918); *Modern Icelandic* (1919); *Bibliography of the Eddas* (1920); etc. He has compiled a *Catalogue of the Fiske Icelandic Collection* (1914) and *Runic Literature* (1918) and has edited *The Story of Griseildis in Icelandic* (1914) and *An Icelandic Satire: Lof Lyginne* (1915).

HERMANT, ABEL (1862—). A French man of letters, born in Paris, and educated at the Lycées Bonaparte and Condorcet. He devoted himself to journalism and to literature, writing critical essays, novels, and theatrical comedies. In all his works he displayed a keen sense for satire and social caricature. One of his novels, *La Carrière*, dealt ironically with the diplomatic "career," and it is this that is supposed to have prevented Hermant's election to the official French Academy. He did, however, receive the badge of Commander of the Legion of Honor. His works include: *Les Mépris* (1883); *Monsieur Rabosson* (1884); *La Mission de Cruchod* (1885); *Le Cavalier Miserey* (1887); *Nathalie Madoré* (1888); *La Surintendant; Amour de Tête; Serge; Ermeline; Le Frisson de Paris; Cœurs à Part, Cœurs Privilegiés; Les Confidences d'une Aïeulle* (1893); *La Carrière* (1894); *Eddy et Paddy* (1894); *Le Disciple Aimé* (1895); *Le Sceptre; La Meute; Les Transatlantiques* (1897); *Le Char de l'Etat* (1899); *Le Faubourg; L'Empreinte; Sylvie ou la Curieuse d'Amour; Souvenirs du Vicomte de Courpière* (1901); *La Confession d'un Homme d'Aujourd'hui* (1904); *L'Esbrouffe* (1904); *M. de Courpière Marié* (1905); *La Belle Madame Héber* (1905); *Les Grands Bourgeois; Chaîne Anglaise; L'Autre Aventure du Joyeux Garçon; Chronique Française; Le Cadet de Coutras; Les Renards; Le Second Testament; Trains de Luxe; Affranchis; Le Caravansérail; L'Aube Ardente; La Vie à Paris; Le Rival Inconnu; La Journée Brève* (1920); *Philé; La Petite Femme* (1921); *Entretiens sur la Grammaire Française* (1923).

HERRE, PAUL (1876—). A German historian, who in 1920 became director of the political-historical archives at Potsdam. He was born at Magdeburg, studied at the universities of Berlin, Jena and Leipzig, and in pursuit of a commercial enterprise traveled in Germany, Austria, Italy, and Spain. He was lecturer at the University of Leipzig (1906-20). He is the author of: *Preussens Befreiungs- und Verfassungskampf* (1914); *Spanien und der Weltkrieg* (1915); *Weltpolitik, Weltkatastrophe* (1916); *Geschichtliche Schlaglichter auf den Weltkrieg* (1916); *Aufruf an die Neutralen zur*

Geduld (1918); *Bismarcks Staatskunst* (1916); *Völkergemeinschaftsidee und Internationale Politik* (1920).

HERRICK, MYRON T. (1854-). An American diplomat (see VOL. XI). He was in charge of the American Embassy in Paris at the outbreak of the War and did efficient service in the protection and assistance of Americans in Europe. He was reappointed ambassador by President Harding in April, 1921. For these services in France, he received the Grand Cross of the Legion of Honor. After the war he was chairman of the American Commission for Devastated France.

HERRICK, ROBERT (1868-). An American writer and educator (see VOL. XI). His later books include *His Great Adventure* (1913), *Clark's Field* (1914), *The World Decision* (1916), *The Conscript Mother* (1916), *Homely Lilla* (1923), and *Waste* (1924). He was a member of the National Institute of Arts and Letters.

HERRIN, ILL. See STRIKES.

HERRIN MASSACRE. See COAL.

HERRIOT, EDOUARD (1872-). A French politician and man of letters. He was educated at the Ecole Normale Supérieure, and at the conclusion of his studies became a professor of rhetoric and literature at the University of Lyons. He entered politics and was successively counsellor-general of the Rhone, Mayor of Lyons, Senator, and minister in a radical government. Before the War he became one of the leaders of the *Parti Radical Socialiste*. This party was temporarily disorganized by the War and by the trial of Caillaux, but it came back strongly in the 1924 elections with Herriot as its leader. After the Armistice, Herriot opposed the reparation policies of the nationalist groups in France and favored a rapprochement with Germany and Russia. He made a visit to Russia in 1922 and described what he saw in the land of the Soviets in a book entitled *La Russie Nouvelle*. In June, 1924, he became premier of France, with a government drawn from the parties of the left bloc. As a man of letters, Herriot was best known by a work on Philo Judæus and the Jewish-Alexandrian school of philosophy which was crowned by the Academy of Moral and Political Science in 1897. His other works include: *Un Ouvrage Inédit de Mme. de Staël*; *Fragments d'Ecrits Politiques* (1904); *Précis d'Histoire des Lettres Françaises* (1905); *Agir* (1915-16); *Créer* (1919).

HERRMANN, CONRAD EDMUND GUSTAV (1871-). A German writer. He was born at Leipzig and attended the university. He engaged in an export business and traveled in America (1893-95). During the War he was instructor of oratory at the Volks-Akademie in Leipzig. He is the author of the plays: *Savonarola* (1886); *Sensation* (1906); *Der Triumph des Mannes* (1906); *Der grosse Baal* (1907). Other works include: *Vineta*, a volume of verse (1908); *Und doch* (1915); *Sakuska*, a Russian story (1919); *Lebensfahrt* (1919); *Wilhelm Busch an der Himmelstür* (1920); *Gesichte und Grimassen* (1920); *Der lachende Olymp* (1921); *Maulwürfe* (1921).

HERSHEY, AMOS SHARTLE (1867-). An American educator (see VOL. XI). Among his later writings were *Modern Japan*, with Frank M. Anderson (1919), and *Handbook for the Diplomatic Relations of Europe, Asia and*

Africa, 1870-1914 (1918). He was a member of the staff of the American Commission to Negotiate Peace, 1918-19. He was a frequent contributor to magazines on political science and law.

HERSHEY INDUSTRIAL SCHOOL. See EDUCATION IN THE UNITED STATES.

HERTER, ALBERT (1871-). An American painter and craftsman (see VOL. XI). Among his later mural works were a series for the Supreme Court room of the Wisconsin Capitol, and an allegorical pageant in the St. Francis Hotel, San Francisco. At his Herter looms he designed and produced artistic tapestries.

HERTLING, GEORG, BARON VON (1843-1919). A German administrator and Catholic philosopher (see VOL. XI). On Nov. 1, 1917, he was appointed Chancellor by the Kaiser, and by his skill brought some measure of stability into the affairs of the German government. His task was made easier by the fact that at that time Russia collapsed and the invasion of Italy was succeeding. Later, when Bulgaria capitulated at the end of September, he was driven from office. In his last speech he declared that Germany's discontent was due entirely to military reverses, but said that the German people would stand firm and not beg for mercy; that the iron wall on the western front would not be broken; that the U-boat war was slowly tending to success, and gradually would restrict the reinforcements from the United States; and that the hour would come when the enemy would see reason and be ready to make an end of war. See GERMANY, *History*.

HERTY, CHARLES HOLMES (1867-). An American chemist, born at Milledgeville, Ga. He was graduated at the University of Georgia in 1886, and received his Ph.D. at Johns Hopkins in 1900, after which he took courses at Berlin and Zurich. In 1890-1901, he was assistant chemist of the Georgia Experiment Station and then taught at his alma mater, attaining the rank of adjunct professor of chemistry in 1894. From 1901 to 1904, he was with the Bureau of Forestry in the United States Department of Agriculture, and then for a year with the Chattanooga Pottery Company. In 1905, he was called to the chair of chemistry at the University of North Carolina, where he remained until 1916, when he became the editor of the *Journal of Industrial and Engineering Chemistry*. His principal researches have been in organic chemistry and include the determination of the constitution of inorganic compounds by physico methods; also he invented a new method of turpentine orcharding and a rapid method for the determination of oil in cottonseed products.

HERTZ, ALFRED (1872-). A distinguished German conductor (see VOL. XI). In 1915, he resigned his position at the Metropolitan Opera House and accepted the conductorship of the San Francisco Symphony Orchestra, which under him soon developed into one of the great orchestras of the country. He was largely instrumental in winning recognition for the native composer. While at the Metropolitan he conducted all the operas by American composers produced there.

HERTZOG, J. M. B. (?-). A South African statesman and soldier (see VOL. XI). At the outbreak of the South African rebellion in 1914, although he did not take an active

part in opposition to the British government, he declined also to oppose the rebellion. In the years following the War, he headed the opposition to the government of General Smuts and continued in aggressive opposition to the governmental policies of that statesman. On defeat of the Smuts ministry, early in 1924, he became Prime Minister.

HERTZSPRUNG, EJNAR (1873-). A Danish astronomer. He was born in Copenhagen, studied at Leipzig, and was connected with the observatory of Potsdam, until called to Leyden, Holland, where he was first director of the observatory, and since 1920, professor at the university. He has written much on astrophysics for scientific periodicals.

HERZOG, RUDOLF (1869-). A popular German novelist (see Vol. XI). In the first two years of the War he abandoned fiction and wrote the following volumes of verse: *Ritter, Tod und Teufel* (1915); *Von Stürmen, Sterben, Auferstehen* (1916); and the dramatic poem *Stromübergang* (1916). He later wrote: *Die Stollenkämpfe und ihre Frauen*, a novel (1917); *Jungbrunnen*, a volume of stories (1918); *Germaniens Götter*, a book of German myths (1919); *Die Buben der Frau Opterberg*, a novel (1921).

HESS, ALFRED FABIAN (1875-). An American pediatricist distinguished for his original researches into certain affections of childhood, notably rickets, scurvy, tuberculosis, blood states and affections of the stomach and intestines. Born in New York City, he was educated at Harvard and at Columbia, receiving his medical degree from the College of Physicians and Surgeons in 1901. After studying pediatrics in Europe, he was made a professor of that chair in the University-Bellevue Medical College. The record of his work in pediatrics and experimental pathology is contained in 70 or more papers published in periodical literature.

HESS, MYRA (1890-). An English pianist, born in London. At the age of five she began to study the piano and two years later entered the Guildhall School of Music, where she graduated as winner of the gold medal. After further study under Tobias Matthay, she made her debut in London, in January, 1908, winning immediate success. She then made tours of Holland and France. Upon her American debut (New York, Jan. 24, 1922) she became a prime favorite in the United States, not only as soloist, but also as a fine ensemble player.

HESS, VICTOR (1883-). An Austrian professor of physics and contributor on radioactivity, atmosphere electricity, and kindred subjects to the publications of the Academy of Science in Vienna.

HESSE, HERMANN (1877-). A German novelist and poet (see Vol. XI). He took up his residence in Switzerland before the War. His recent works include: *Rosshalde* (1914); *In der alten Sonne* (1914); *Musik des Einsamen* (1915); *Knulp* (1915); *Am Weg* (1916); *Briefe ins Feld* (1916); *Schön ist die Jugend* (1916); *Märchen* (1919); *Kleiner Garten* (1919); *Klingsors letzter Sommer* (1920); *Zarathustras Wiederkehr* (1920); *Blick ins Chaos* (1920); *Wanderung* (1921).

HETERODYNE. See RADIO TELEGRAPHY.

HEWLETT, MAURICE HENRY (1861-1923). An English novelist (see Vol. XI). His later books include: *A Lover's Tale* (1915); *The Little Iliad* (1915); *The Song of the Plow*

(1916); *Thorgils of Treadholt* (1917); *Peridore and Paravail* (1917); *The Village Wife's Lament* (1918); *Flowers in the Grass*, poems (1920); *In a Green Shade* (1920); *Wiltshire Essays* (1922).

HEYCK, EDUARD (1862-). A German historian. He was born at Doberan and studied at Leipzig, Jena and Heidelberg. He was professor at the universities of Freiburg and Heidelberg, and librarian at Donaueschingen. Included among his later works are: *Die Kreuzzüge und das Heilige Land* (1900); *Frauenschönheit im Wandel von Geschmack und Kunst* (1903); *Wilhelm von Oranien* (1908); *Florenz und die Medici* (1909); *Das Deutschland von Morgen* (1917); *Parlament und Volksvertretung* (1918); *Höhenfeuer* (1920).

HEYMANN, LILA GUSTAVA (1868-). A native of Hamburg, active from her youth in welfare work and municipal reform. She was instrumental in securing public baths, commercial courses for girls, and establishing club and lunch rooms for women workers. She engaged in propaganda for the abolition of the *Sittenpolizei*, worked for child protection and was active in municipal and communal reforms in Munich. She also wrote works about the sex problem and hygiene for young people.

HIBBARD, BENJAMIN HORACE (1870-). An American agricultural economist, born in Bremer County, Ia. He graduated from the Iowa State College of Agriculture and Mechanic Arts in 1898, and took postgraduate courses at the University of Wisconsin and in Germany. In 1910, he was special agent in the agricultural division of the Bureau of the Census, and in 1913, was appointed professor of agricultural economics at the University of Wisconsin. In 1918 Professor Hibbard became head of this department. He was a member of several societies and wrote *Effect of the Great War on Agriculture* (1919), and *Marketing Agricultural Products* (1921).

HIBBEN, PAXTON (1880-). An American war correspondent and publicist, born at Indianapolis, Ind. He graduated from Princeton University in 1903 and studied law at Harvard. In 1906, he was admitted to the bar. Entering the diplomatic service, he served as Secretary of Legation at Russia, Mexico, Colombia, Holland and Chile, retiring from the service in 1912. He acted as war correspondent in Europe for several papers and magazines from 1915 to 1917, and in 1921 was secretary of the Russian Commission of Near East Relief. During the War he served as first lieutenant of field artillery and also with the Finance Bureau, and in the office of the Inspector-General. In 1919, he was on duty with the military mission of Armenia and was staff correspondent for the *Chicago Tribune* from 1919 to 1920. He wrote *Constantine I and the Greek People* (1920), and contributed many articles on subjects relating to the Near East to magazines.

HICHENS, ROBERT SMYTHE (1864-). An English novelist (see Vol. XI). Among his later books are: *In the Wilderness* (1917); *Snake-Bite* (1919); *Mrs. Marden* (1919); *The Spirit of the Time* (1921).

HICKS, FREDERICK CHARLES (1875-). An American librarian and educator, born at Auburn, N. Y. He graduated from Colgate University in 1898 and from the Georgetown Law School in 1901. After several years spent in

practice of law, he was appointed librarian at the United States Naval War College at Newport, serving from 1905 to 1908. In 1908-09, he was assistant librarian of the Brooklyn Public Library and from 1911 to 1915 was law librarian and from the latter date associate professor of legal bibliography at Columbia University. He was the author of *New World Order* (1920), *Men and Books Famous in the Law* (1921), and edited several historical series.

HICKS, FREDERICK CHARLES (1863-). An American economist, born at Capac, Mich. He was graduated from the University of Michigan in 1886, where in 1890 he also received his Ph.D. During 1891-92 he was instructor in economics at the University of Michigan, and then for eight years was professor of history and political economy at the University of Missouri, but in 1900, accepted a call to the chair of economy and commerce at the University of Cincinnati. He became president of the latter institution in 1920. During 1888-90, he served on the United States Census and later was supervisor of the 13th United States Census in the First District of Ohio. In addition to many technical papers, reports and monographs contributed variously, he is the author of *Lectures on the Theory of Economics* (1901) and *Competitive and Monopoly Prices* (1911).

HIDES. See LEATHER; LIVE STOCK.

HIGGINS, WILLIAM VICTOR (1884-). A painter and teacher, born at Shelbyville, Ind. He studied at the Art Institute in Chicago and at the Academy of Fine Arts there. In Paris, he was a pupil of René Menard and Lucien Simon, and when he was in Munich he studied with Hans von Hyeck. He is an Associate of the National Academy. Among his pictures in permanent exhibitions are his "Moorland Gorse and Bracken," in the Municipal Gallery, Chicago; "Moorland Piper," Terra Haute Art Association; "Juanito, the Suspicious Cat," in the Union League Club, Chicago; "Women of Taos," Santa Fé Railroad; "A Shrine to St. Anthony," in the collection of the Des Moines Association of Fine Arts; "Fiesta Day," at the Butler Art Institute, Youngstown, Ohio; "Pueblo of Taos" and "Indian at Stream" in the Los Angeles Museum. Examples of his murals are found in the decorations of the Englewood Theatre, Chicago.

HIGGS, HENRY (1864-). An English economist and administrator (see VOL. XI). His later writings include: *Financial System of The United Kingdom* (1914); *National Economy* (1917); *A Primer of National Finance* (1919).

HIGH PRESSURE BOILERS. See BOILERS.

HIGHWAYS. See ROADS AND PAVEMENTS.

HILDEBRAND, ADOLF E. R. (1847-1921). A German sculptor of prominence (see VOL. XI). His most important recent work has been the "Hubertus" Fountain at the National Museum in Munich (1921). At the time of his death he had finished the model for a monumental fountain for Cologne, with "Father Rhine" as the central figure.

HILDEBRAND, JOEL HENRY (1881-). An American chemist, born at Camden, N. J. He was graduated at the University of Pennsylvania in 1903, took his Ph.D. there in 1906, then studied for a year in Berlin. During

1904-05 he was assistant and during 1907-13 an instructor in chemistry at the University of Pennsylvania, after which he accepted a call to the University of California, where, in 1918, he became professor of chemistry. Physical chemistry, and such topics as electro-analysis, hydrogen electrodes, vapor pressures of metals and amalgams, dissociation of alcohol, and theories of solubility, are among those on which he has published the results of his studies. During the War he served as director of the laboratory of the Chemical Warfare Service in France with the rank of major and later commanded the gas defense school as lieutenant-colonel. He is the author of *Principles of Chemistry* (1917).

HILL, ALBERT ROSS (1869-). An American educator (see VOL. XI). From 1908, he was president of the University of Missouri. During the War, he was on a leave of absence until 1922 as director of foreign operations of the American Red Cross. In 1917, he was a member of the board of the United States Naval Academy.

HILL, ARCHIBALD V. (1886-). A British physiologist, educated at Cambridge and a fellow of Trinity College from 1910. He lectured on physical chemistry at the university from 1914 to 1919 and was then appointed professor of physiology at Manchester University, resigning in 1923 to become Jodrell professor of physiology in the University of London. During the War he was director of the Anti-Aircraft Station. With O. Meyerhoff, he shared the Nobel prize for medicine and physiology for 1921. Since 1910, he had been investigating the production of lactic acid by exercising muscle. His cosharer, Otto Meyerhoff, professor of physiology at the University of Kiel, was a personal friend of Hill and engaged in the same field of research.

HILL, DAVID JAYNE (1850-). An American diplomat and writer (see VOL. XI). In 1917 he was chairman of the War Finance Committee of the American Library Association. This committee raised over \$1,700,000 to erect library buildings at army camps and to provide reading matter for soldiers and sailors. His later writings include: *The People's Government* (1915); *Americanism—What It Is* (1916); *The Rebuilding of Europe* (1917); *Impressions of the Kaiser* (1918); *Present Problems in Foreign Policy* (1919); *American World Policies* (1920). He is president of the National Association of Constitutional Government.

HILL, EDWARD BURLINGAME (1872-). An American composer, born at Cambridge, Mass. After completing, with highest honors, all the courses in music under J. K. Paine at Harvard University, he continued his studies in Boston with B. J. Lang (piano) and F. F. Bullard (composition), and in New York with A. Whiting (piano) and H. E. Parkhurst (theory). In 1908, he was appointed instructor in music at Harvard and in 1918 was made assistant professor. He lectured extensively on modern French music, both in the United States and in France, and was also a frequent contributor to various periodicals. As a composer, his leaning is decidedly toward impressionism. His works include: two pantomimes, *Jack Frost in Midsummer*, and *Pan and the Star*; two symphonic poems, *The Parting of Lancelot and Guinevere*, and *The Fall of the House of Usher*; two orchestral suites, *Stevensoniana*

No. 1 and No. 2; *Nine Waltzes* for orchestra; *Poem* for violin and orchestra; *Prelude* to Euripides's *The Trojan Women*; and choruses, songs and pieces for piano.

HILL, FRANK PIERCE (1855-). An American librarian (see VOL. XI). In 1917, he was chairman of the American Library Association war finance committee which raised over \$1,700,000 for the purpose of erecting library buildings at army camps and providing books, newspapers and magazines for soldiers and sailors. He was also chairman of the Association's committee on enlarged programme in 1919.

HILL, JOSEPH ADNA (1860-). An American statistician (see VOL. XI). After service as chief statistician of the United States Census he was appointed Assistant Director of the Census in 1921. He was the author of many census reports on child labor, the insane, divorce and kindred subjects.

HILL, LEONARD ERSKINE (1866-). See VOL. XI. He published in two parts (1919-20) as a report to the Medical Research Commission *The Science of Ventilation and Open Air Treatment*; and in collaboration (Flack and Hill) *Textbook of Physiology* (1919). During the War, he was a member of the Medical Research Commission.

HILLER, KURT (1885-). A German writer. He was born in Berlin and studied at the universities of Berlin, Freiburg and Heidelberg, graduating as doctor of law. He is the author of: *Das Recht über sich selbst* (1908); *Die Weisheit der Langeweile* (1913); *Ein deutsches Herrenhaus* (1918); *Unnennbares Brudertum* (1918); *Geist werde Herr* (1920); *Logokratie* (1921); *Schmach des Jahrhunderts* (1922); and *Der Aufbruch zum Paradies* (1922). He also compiled the anthology *Der Kondor* and edited the posthumous works of Max Steiner.

HILLIS, NEWELL DWIGHT (1858-). An American clergyman and writer (see VOL. XI). Among his later books are: *German Atrocities* (1918); *The Blot on the Kaiser's 'Scutcheon'* (1918); *Rebuilding the Ruined Lands of Europe* (1919); *The Better America Lectures* (1921).

HILLQUIT, MORRIS (1869-). An American Socialist (see VOL. XI). He was the Socialist candidate for Mayor of New York City in 1917. In 1921, he published *From Marx to Lenin*.

HINDEMITH, PAUL (1895-). A German composer, born at Hanau, Hessen. He was a pupil of Hoch's Konservatorium, in Frankfurt, and in 1915 became concertmaster at the Frankfurt Opera. His first works, showing influences of Brahms, Reger and Mahler, attracted little attention, but when he had developed into an uncompromising futurist, he was hailed as a new Messiah throughout Germany. As for ugly and grotesque effects, his music appears as a caricature of the style of Stravinsky or Schönberg. His productivity has been enormous, especially in the field of chamber music (sonatas, string quartets, etc.). His three one-act operas, *Nusch-Nuschi* and *Hoffnung, Mörder der Frauen* (Stuttgart, 1921) and *Sankta Susanna* (Frankfurt, 1922) were immediately suppressed by the police because of the alleged revolting immorality of the text.

HINDENBURG, PAUL VON BENECKENDORF UND VON (1847-). A German soldier born

in Posen. He entered the army in 1866, serving in the war against Austria, and in 1870-71 in the Franco-Prussian War. He was placed on the retired list in 1911, but when the World War broke out, and East Prussia was overrun by the Russians, he was recalled and given command of the VIII Army with General Ludendorff as his chief of staff. For his victories at Tannenberg, the Masurian Lakes, etc., he was made colonel-general and, later, field marshal. In November, 1914, he was given command of the armies of the East, later of the Austrian front, and in 1916 he succeeded Falkenhayn as chief of the general staff. By that time he was the national idol of the German people, and they erected an immense wooden statue of him in the Königsplatz in Berlin. Money was raised for war charities by charging a fee for the privilege of driving nails into the statue. After the War he was of great assistance in disbanding the armies. He published his recollections under the title *Aus meinem Leben* (1920).

HINDENBURG LINE. See WAR IN EUROPE, *Western Front*.

HINDHEDE, MIKKEL (?-). A Danish physician, an eminent authority on dietetics, who during the War was responsible for the nutrition of the Danish people. Known especially as a low protein advocate, he goes further in this direction than any other dietetic expert. Up to the outbreak of the War he was best known for two of his publications, *Protein and Nutrition* (1913) and *What to Eat and Why* (1914). These works are known through translations into English and German. His experiences in feeding the populace during the War were given out in 1920 in an official report of the Danish Minister of the Interior.

HINDS, ERNEST (1864-). An American military officer, born in Marshall County, Ala. He was graduated at the United States Military Academy in 1887, entered the army as second lieutenant in the 3d Artillery, and by successive promotions attained the rank of major-general on Dec. 6, 1922. He participated in the war with Spain in Cuba and later saw duty in the Philippine Islands. During the War in Europe he was chief of artillery of the 1st Army Corps and then of the 1st Army in France, with the provisional rank of major-general. In 1919 he took command of the Field Artillery School of Fire at Fort Sill. For his "exceptionally meritorious and distinguished services" he received the United States Distinguished Service Medal and the decorations of the Legion of Honor from France, the Order of Leopold from Belgium, and the order of St. Maurice and St. Lazarus from Italy.

HINDUS. See BRITISH COLUMBIA.

HINES, FRANK THOMAS (1879-). An American soldier, born in Salt Lake City, and educated at the Agricultural College of Utah. He enlisted for the Spanish-American War. In 1919 he was commissioned second lieutenant in the Utah Light Artillery. He then joined the Regular Army, and rising through the various grades, became captain of the Coast Artillery Corps in 1908. He was made colonel of the National Army in 1918 and brigadier-general in the same year. In 1917 he was assigned to the office of the Chief of Staff as assistant in the Embarkation Service, which he headed in 1918. In 1919 he was appointed Chief of the Transportation Service of the United States

Army. He served at several important international conferences following the War. In 1923 he was appointed director of the Veterans' Bureau.

HINES, JOHN LEONARD (1868-). An American army officer, born in White Sulphur Springs, W. Va., and educated at the United States Military Academy. He was commissioned second lieutenant in 1868. He served during the Spanish-American War and in the Philippines and in the punitive expedition into Mexico in 1916-17. In the latter year he was appointed assistant adjutant-general in the American Expeditionary Forces and accompanied the first detachment of American troops to France. He was appointed colonel of the 16th Infantry in November, 1917, and in May, 1918, commanded the 1st Brigade Infantry, 1st Division. In October, 1918, he was appointed commander of the 3rd Army Corps, and in November, 1919, commander of the 4th Division. He commanded the 5th Division in 1920 and the 8th Corps Area in 1921. General Hines succeeded General Pershing as Chief of Staff of the United States Army in September, 1924.

HINES, WALKER DOWNER (1870-). An American lawyer and public official, born at Russellville, Ky., and educated at Ogden College and the University of Virginia. In 1893 he began the practice of law in Louisville and was general counsel of the Atchison, Topeka, and Santa Fé Railroad from 1906 to 1918 and was chairman of the Board of Directors of this road from 1916 to 1918. In 1906-16 he engaged in general law practice in New York. In the latter year he was appointed director general of railroads and served until 1920. In that year he was in Europe as arbitrator under the Peace Treaties of questions of river shipping. On his return to the United States in 1921 he resumed the practice of law. He is the author of numerous pamphlets and articles on railroad and governmental problems.

HINKSON, MRS. KATHARINE (maiden name TYNAN) (1861-). An Irish novelist and poet (see VOL. XI). Her later writings include: *The Story of Margery Dawe* (1915); *John-a-Dreams* (1916); *Miss Mary* (1917); *Herb o' Grace* (1918); *The Man from Australia* (1919); *Love of Brothers* (1919); *The Second Wife* (1920); *The Wandering Years* (1922); and *Mary Beaudesert, V.S.* (1922).

HINSHAW, WILLIAM WADE (1867-). An American operatic baritone and impresario, born at Union, Iowa. While pursuing the general academic course at Valparaiso University (Ind.), he studied singing and theory with R. A. Heritage and later continued with L. G. Gottschalk and L. A. Phelps in Chicago. He made his debut on the concert stage in Chicago during the World's Fair (1893). From 1895 to 1899 he was dean of the Conservatory of Music at Valparaiso University. After coaching with A. Mareschalchi he was engaged for the Savage Grand Opera Company, and made his operatic debut as Mephistopheles in St. Louis (Nov. 6, 1899) with marked success. In 1903 he opened his own school of opera, which soon became merged with the Chicago Conservatory, and until 1907 he was president of the combined institutions. In 1909 he organized the International Grand Opera Company of Chicago, of which he was general manager, stage-manager, and principal baritone. From 1910 to 1913 he was a member of the Metropolitan Opera Com-

pany and then made guest appearances in various German opera houses. In 1918 he became president of the Society of American Singers, an organization devoted to the production of intimate operas, especially Mozart's, in English. Since 1920 he has been directing his own chamber productions of opéra comique. He offered, in 1916, a prize of \$1000 for a one-act opera by an American composer. It was awarded to Hadley's *Bianca*, produced by the Society of American Singers, New York, 1917.

HINTON, EDWARD WILCOX (1868-). An American lawyer and educator, born at Rocheport, Mo., and educated at Christian College in Columbia, Mo., and at the University of Missouri, where he studied law. He began the practice of law at Columbia, Mo. He was professor of pleading and practice at the University of Missouri from 1903 to 1913 and from the latter year was professor of law at the University of Chicago. In 1918-19 he was acting dean of the law school of this University. He edited *Hinton's Cases of Trial Practice* (1915) and *Hinton's Cases on Evidence* (1919).

HINTZE, PAUL VON (1864-). A German admiral and diplomat, born at Schweltdon-Oder. He served for several years as military attaché at several embassies and was military plenipotentiary to Russia in 1908. In 1914 he was in service in the German embassy in Mexico and in the same year was sent to China, where he carried on extensive propaganda in favor of Germany. He was transferred to Norway later in the same year. In 1918 he was appointed Secretary of State for Foreign Affairs and continued in this post until the fall of the empire.

HIROHITO, PRINCE (1901-). Prince Regent of Japan, proclaimed heir apparent in 1912 when his father became Emperor. He was educated under private tutors at the Imperial Education Institute in Tokyo, and when he reached the age of 18 he was given a seat in the House of Peers in the Imperial Diet. His father's ill health caused some of the imperial duties to devolve on the Prince in 1920, and early in 1921 there was a movement to have him declared Prince Regent. Instead, however, in the spring of that year he was sent on a visit to England, France, Belgium, and Italy and was thus the first Japanese prince to leave his native land. He was royally entertained wherever he went. All hope of the Emperor's ability to continue his duties as ruler being abandoned, Prince Hirohito was designated Regent of Japan on Nov. 25, 1921. In December, 1923, a young student, inflamed by radical teachings, attempted to assassinate the young ruler. The whole nation was aroused, and the cabinet resigned in a body as an expression of their horror, for the Prince was very popular because of his democratic ways. On Jan. 26, 1924, he was married to Princess Nagako, eldest daughter of Prince Kuni, with ancient Shinto rites.

HIRSCHFELD, GEORG (1873-). A German author, at first chiefly a dramatist, now a prolific novelist (see VOL. XI). Among his recent works are *Nachwelt* (1915), *Die Geborgte Sonne* (1916), *Die Deutsche Prinzessin* (1920), and *Das Haus mit der Pergola* (1923).

HIRSCHFELD, LUDWIG (1882-). An Austrian writer, born at Vienna, and educated at technical schools. After drifting from one occupation to another, he settled down as a journalist. He was associate editor of the

Wiener Neue Freie Presse and editor of the illustrated magazine, *Die Moderne Welt*. Hirschfeld is mainly a humorist but has written several comedies and texts for operettas, which include: *Der Wetterhahn* (1911); *Der Berühmte Gabriel* (1916); *Die Steinerne Maske* (1918); *Die Grosse Dummheit* (1919); *Der Liebling der Frauen* (1920); *Die Silberne Jugend* (1921), and he has also published *Die Klingende Stadt*, a volume of Viennese sketches (1912); *Wo Sind die Zeiten?* and *Ten Years of Viennese Life* (1920).

HIRSCHFELD, MAGNUS (1868-). A German psychiatrist, famous for his exhaustive studies in sex confusion and allied subjects. Born at Kolberg, he settled in Berlin to practice neurology and psychiatry in 1910, and within a few years he had published the following exhaustive works: *Die Transvestiten*, 2 vols. (1910-12); *Die Homosexualität* (1914); *Sexual Pathologie*, 2 vols. (1917); and *Sexual Zwischenstufen* (1922).

HIRT, HERMANN (1865-). A German philologist (see VOL. XI). Among his recent works are *Geschichte der Deutschen Sprache*; *Fragen des Vokalismus und der Deutschen Stammbildung im Indogermanischen* (1914), and *Etymologie der Neuhochdeutschen Sprache* (1920).

HIRTH, FRIEDRICH (1845-). A German-American sinologue (see VOL. XI). He was professor of Chinese and head of the Chinese department of Columbia University, 1902-17. In 1917 he wrote *The Story of Chang K'ie'n, China's Pioneer in Western Asia*.

HISTOLOGY. See ZOOLOGY.

HISTORICAL ASSOCIATION, AMERICAN. A national organization founded in 1884 for the promotion of historical writing and studies in the United States. Throughout the decade 1914-24 it had its annual report published by the Smithsonian Institution, and brought out quarterly *The American Historical Review*. In 1915, after a controversy in which the *Review* was criticized, the Association gave the editors a vote of confidence and took the *Review* more closely under control. Woodrow Wilson was elected president for 1924 and after he died the first vice-president, Charles M. Andrews, became acting president.

HITCHCOCK, GILBERT MONELL (1859-). An American lawyer and public official. During the administration of President Wilson he was chairman of the Foreign Relations Committee of the Senate and led in the movement for the ratification of the League of Nations in that body, 1919-20. He was defeated for reelection in the Senate in 1922.

HITCHCOCK, HELEN SANBORN SARGENT (Mrs. RIPLEY HITCHCOCK) (1870-). An American social worker, born at Elizabeth, N. J. She studied at the Art Students' League and in 1898 founded the Art Workers' Club for Women, of which she was president for 11 years. In 1914 she founded and was first vice-president of the Art Alliance of American Women. In 1917 she founded and was chairman of the Art War Relief and was vice-chairman of the American Jugo-Slav League. She took a prominent part also in other war activities. In 1914 she married Ripley Hitchcock of New York City.

HITLER, ADOLF (?-). Bavarian reactionary leader, born in Austria, but a naturalized Bavarian. In November, 1920, he organized

a movement in Bavaria similar to the Fascist movement in Italy. His followers wore gray shirts and brassards with an anti-Semitic Swastika cross in a white circular field on red. They were armed with blackjacks and, it was reported, with revolvers. Hitler had great gifts as an orator and organizer and stood for a strong united Germany. On Nov. 8, 1923, he and General von Ludendorff seized the government at Munich, but their power lasted only a few hours. Ludendorff was captured first; Hitler was taken on November 12. They were tried for treason in April, 1924, and Hitler was sentenced to a short term in the fortress at Landsberg, Bavaria.

HJARNE, HARALD GABRIEL (1848-1922). A Swedish historian. His last works were *Fran Förvarstridden* (1914), *Osteuropas Kriser och Sverges Försvär* (1914), *Mironsredistensismen* (1915), and *Var Ofverhängande Fara* (1917).

HOBAN, EDWARD FRANCIS (1878-). An American bishop, born at Chicago, and educated at St. Ignatius College, St. Mary's Seminary in Baltimore, and the Gregorian University at Rome. He was ordained priest in 1903. In 1908 he was appointed chancellor of the archdiocese of Chicago and was consecrated bishop of that diocese in November, 1921.

HOBART COLLEGE. An institution founded at Geneva, N. Y., under Episcopal auspices, in 1822. The number of students increased from 102 in 1914 to 209 in 1924, the number of teachers in the faculty from 21 to 32, and the library from 55,000 to 75,000 volumes. The productive funds rose from \$400,000 to \$800,000, of which \$200,000 was in scholarship foundations, and the endowment from \$600,000 to \$1,000,000, which was being added to in 1924 by payment on the endowment fund campaign pledges. Murray Bartlett succeeded Lyman Pierson Powell as president.

HOBHOUSE, LEONARD TRELAWNEY (1864-). A British sociologist and philosopher (see VOL. XI). He published in 1918 *A Philosophical Theory of the State*, a work in which he attacked the metaphysical absolutistic notions set up by the Hegelian school. He held that the habit of conceiving the state as a being led to political conservatism. *The Rational Good* (1921) is an attempt to treat ethics on a realistic and somewhat sociological basis. In addition to these works he was joint author, with G. C. Wheeler and Morris Ginsberg, of a survey of *The Material Culture and Social Institutions of the Simpler Peoples* (1915).

HOBHOM, MARTIN (1883-). A lecturer on history at the University of Berlin. He was born at Friesdorf and studied in Heidelberg, Munich, Freiburg, Berlin, and Göttingen. He was lecturer at the University of Kiel in 1913 and in Berlin in 1914. In 1916 he founded a bureau for the repression of chauvinism. He became very active in political life. His principal works include: *Macchiavellis Renaissance- und Kriegskunst* (1912); *Torstensson als Vorgänger Friedrichs des Grossen* (1913); *Die Alldeutsche Bewegung; eine Politische Schuld und Gefahr* (1915); *Vaterlandspolitik* (1917); *Wir Brauchen Kolonien* (1918); *Chauvinismus und Weltkrieg* (1919); and *Delbrück, Clausewitz, Kritik des Weltkriegs* (1920).

HOBSON, JOHN ATKINSON (1858-). An English economist (see VOL. XI). His later writings include: *Towards International Gov-*

ernment (1915); *The New Protectionism* (1916); *Democracy after the War* (1917); *Richard Cobden: the International Man* (1918); *Taxation in the New State* (1919); *Problems of a New World* (1921); *Incentives in the New Industrial Order*; and *Economics of Unemployment* (1922).

HOBSON, RICHMOND PEARSON (1870-). An American naval constructor, lecturer, and author (see Vol. XI). Among his later books are: *Destroying the Great Destroyer* (1915); *America and the World War* (1917); *The Great Reform* (1918); *Alcohol and the Human Race for Truth Inoculation of Society* (1919). In 1921 he organized the American Alcohol Educational Association.

HOCHENEGG, JULIUS VON (1859-). An Austrian surgeon, known as the world's leading operator for cancer of the rectum. Having obtained his medical degree from the University of Vienna in 1885, he became an assistant to Professor Albert and in 1889 a private docent in surgery. From 1891 to 1904 he had a class in surgery in the Poliklinik of the University, after which he was made full professor of surgery with charge of the University Surgical Clinic. He has published but few books; in 1906 he edited *Lehrbuch der Spezielle Chirurgie* (2 vols.), which was reissued in 1918. His military experiences were summed up in his *Kriegschirurgische Mitteilungen* in 1919. From time to time he has reported his experiences with rectal cancer in the Vienna medical journals.

HOCHSTETTER, GUSTAV (1873-). A German writer. He was born at Mannheim and studied in Heidelberg and Berlin. A humorist, he edited the popular humorous magazine, *Die Lustigen Blätter*. He is the author of *Das Starre System* (1908); *Diskretion Ehrensache* (1909); *Der Tausendste* (1909); *Das Füsschen der Gnädigen Frau* (1912); *Die Heiratsjagd* (1912); *Hundert Frauen* (1913); *Wir Sind Wir* (1914); *Bismarcks Historische Karikaturen* (1914); *Das Morse Alphabet* (1915); *Debberitzer Briefe* (1916); *Lachende Geschichten* (1917); *Das Buch der Liebe* (1917); *Venus in Seide* (1920); and *Das Lustige Hundebuch* (1920).

HOCK, STEFAN (1877-). An Austrian writer, born at Vienna, and educated in Vienna and Berlin. He was connected with the famous Burgtheater and was lecturer at the State Academy for music and drama. He is the author of *Die Vampyrage* (1901); *Der Traum: ein Leben* (1904); a history of German literature for grammar schools (1913); an introduction to the study of Grillparzer (1909); a monograph on *Paul Schlenker* (1909); *Die Romantische Schule in Deutschland* (1910); *Karl May* (1912); *Friedrich Hebbel* (1913); *Gervhart Hauptmanns Odysseus* (1914); and *Prinz Eugen, der Edle Ritter* (1918). He compiled an anthology of Austrian verse, wrote a treatise entitled *Giebt es eine Oesterreichische Literaturgeschichte?* and edited the correspondence of Betty Paoli and Leopold Kompert.

HOCKER, PAUL OSKAR (1865-). A popular German novelist, publisher of the magazine *Velhagen und Klasings Monatshefte*. He was born at Meiningen, had a university education and studied at the Royal Academy of Music in Berlin. Included among his numerous works are: *Fräulein Doktor* (1897); *Die Frau Rat* (1898); *Weisse Seele* (1901); *Letzter Flirt* (1902); *Frühlingsstürme* (1904); *Don Juans*

Frau (1906); *Die Verbotene Frucht* (1908); *Die Sonne von St. Moritz* (1910); *Die Lachende Maske* (1911); *Die Meisterin von Europa* (1913); *Ein Liller Roman* (1916); *Die Stadt in Ketten* (1917); and other fiction. He also wrote a volume of war sketches, recollections of his youth, and two plays, *Die Wappenhäuse* (1904) and *Das Volk in Waffen* (1913).

HOCKEY. See SPORTS.

HOCKING, JOSEPH (1860-). An English clergyman and novelist (see Vol. XI). His later writings include: *The Day of Judgment* (1915); *The Path of Glory and Tommy and the Maid of Athens* (1917); *The Pomp of Yesterday and The Price of a Throne* (1918); and *In the Sweat of Thy Brow* (1920).

HOCKING, SILAS KITTO (1850-). An English novelist (see Vol. XI). His later writings include: *The Beautiful Alien* (1916); *His Own Accuser* (1917); *Nancy* (1919); *Watchers in the Dawn* (1920); *The Greater Good* (1922); and *My Book of Memory* (1923).

HOCKING, WILLIAM ERNEST (1873-). An American philosopher, born at Cleveland, Ohio, and educated at Harvard University. He was instructor in the history and philosophy of religions at Andover Theological Seminary (1904-06). After 1906 he taught philosophy successively at California, Yale, and Harvard Universities. He was appointed to the Alford professorship at Harvard in 1920. He is the author of two important works on religion and ethics, *The Meaning of God in Human Experience* (1912) and *Human Nature and Its Remaking* (1918; rev. ed., 1924). During the War he gave a series of lectures on *Morale and Its Enemies* (1918).

HODGE, JOHN (1855-). A British labor leader, born in Scotland. He founded and was president of the Iron and Steel Trades Confederation and took an active part in the political, municipal, and industrial movements of Glasgow and western Scotland. He removed to Manchester and was for several terms a member of the City Council. In 1906 he was elected to Parliament and was acting chairman of the Labor party in the House of Commons in 1915. He served on several important commissions and was Minister for Labor in 1916-17 and Minister for Pensions in 1917-19. He took an active part in the temperance movement.

HODGES, HARRY FOOTE (1860-). An American army officer, born at Boston, Mass. He graduated from the United States Military Academy in 1881, when he was made second lieutenant in the engineers. He continued in the army until December, 1921, when he was retired with the rank of major-general. His services have been chiefly with engineering work, at first on river and harbor duty, and then at the Military Academy as assistant professor of engineering. In 1907 he became assistant chief engineer and a member of the Isthmian Canal Commission. Continuing in this position until 1915, he had much to do with the designing of the locks and dams and other regulating work on the Panama Canal, for which he received the thanks of Congress. During the War he had command of Camps Devens (Mass.), Sevier (S. C.), and Travis (Tex.). He was also in France in command of the 20th Division. Later he was in command of the North Pacific and 3d Coast Artillery districts until his retirement. He received the United States Distinguished Service Medal.

HOEBER, KARL (1867-). A German pedagogue and editor of the *Kölnische Volkszeitung*, born at Dietz and educated at the universities of Freiburg, Heidelberg, and Strassburg. He taught in various colleges and was director of the teachers' seminary in Metz. He is the author of *F. W. Weber, Leben und Dichtung* (1903); *Edmund Hardy, ein Lebensbild* (1905); *Sprachgebrauch im Volkslied des Vierzehnten und Funfzehnten Jahrhunderts* (1908); *Das Deutsche Universitäts- und Hochschulwesen* (1912); *Die Religiösen Pflichten des Gebildeten* (1913); *Religion, Wissenschaft, Freundschaft* (1921); and *Pro Deo et Patria* (1921).

HOENSBRÖCH, PAUL, COUNT (1852-1923). A German theologian and writer on history and allied subjects (see Vol. XI). His later works include: *Zwei Welten: Dramatische Bilder* (1918); *Graf Hertling, Reichskanzler* (1918); *Ein Stück Jesuitenmoral* (1918); *Wilhelm II, Abdankung und Flucht* (1918); and *Zurück zur Monarchie* (1918). He died Sept. 9, 1923.

HOFFDING, HARALD (1843-). A Danish philosopher (see Vol. XI). Despite advancing age, he published several philosophic works after 1914. In 1921 he helped organize the *Societas Spinozana*, an international body for the study and interpretation of the works of the great Dutch philosopher. Professor Hoffding's writings include: *Modern Philosophers* (1915); *The Great Humor* (1916); *The Concept of Totality* (1917, 1918); *Spinoza's Ethics* (1918); *Life and Interpretation* (1918); *Leading Conceptions of the Nineteenth Century* (1920); and *The Concept of Relation* (1921, 1922).

HOFFMAN, FREDERICK LUDWIG (1865-). An American statistician (see Vol. XI). Among his later books are: *Industrial Accident Statistics* (1915); *Mortality from Cancer throughout the World* (1915); *A Plea and a Plan for the Eradication of Malaria throughout the Western Hemisphere* (1916); *National Health Insurance in Great Britain* (1920); *Race Amalgamation in Hawaii* (1921); *Health Conservation and Vital Statistics of South American Republics* (1921).

HÖFFNER, W. F. JOHANNES (1886-). A German clergyman and writer, born at Dramburg. He studied theology at Halle and Berlin. After some years as a pastor, he became editor of the popular magazine *Daheim*, a position which he filled until 1921. He is the author of *Pastorentheologie in Beispielen* (1906); *Der Sinn des Lebens*, a volume of stories (1909); *Frau Rat* (1910); *Der Scharfe Weingesang* (1909); *Elisabeth Goethe, geb. Textor* (1910); *Der Verschlussene Garten*, a novel (1910); *Misericordia* (1911); *Gideon der Arzt* (1911); *Die Treue von Pommern* (1912); *Aus Biedermeiertagen* (1912); *Schiller* (1913); *O du Heimatstür* (1916); and a biography of Goethe (1920).

HOFFMANN, JOSEF (1877-). A celebrated Polish pianist (see Vol. XI). In 1916 he featured on his recital programmes works by an entirely unknown composer, Michel Dvorsky, which attracted favorable comment. He also played two concertos for piano and orchestra by Dvorsky, *Chromaticon* and a concerto in Ab, and the Philadelphia Orchestra produced the same composer's symphonic poem, *Le Château Hanté*. A rumor began to circulate that Dvorsky was really Hoffmann. No one

could get into communication with the supposed Dvorsky. Hoffmann himself declared that the composer had studied in Paris and was living in strict seclusion at San Sebastian, Spain. The mystery was cleared up on Dec. 28, 1923, when Stokowski gave an all-Hoffmann programme, with Hoffmann as soloist, which included all the compositions mentioned. This programme was repeated in New York a few days later. Hoffmann's explanation was that he wished to secure an impartial opinion regarding the public's valuation of his works, an object which could not have been realized had the works been introduced under the composer's real name.

HOFFMANNSTHAL, HUGO VON (1874-). An Austrian author whose dramas make him an outstanding figure in contemporary German literature (see Vol. XI). He published after 1914: *Prinz Eugen, der Edle Ritter* (1915); *Alkestis* (1916); *Rodauner Nachklänge* (1920); *Der Tod des Tizian* (1920); *Der Schwierige* (1921); *Die Frau ohne Schatten* (1921), and other works. The last named and others of his plays served Richard Strauss as librettos for his operas.

HOG CHOLERA. See VETERINARY MEDICINE.

HOG FEEDING. See GARBAGE AND REFUSE DISPOSAL.

HOGS. See LIVE STOCK.

HOLBROOK, ELMER ALLEN (1880-). An American mining engineer and public official, born at Fitchburg, Mass., and educated at the Massachusetts Institute of Technology. He served as engineer and superintendent of several mines. In 1911-12 he was professor of mining at the Nova Scotia Technical College and after 1917 was associated with the United States Bureau of Mines in various capacities. He is the author of many articles on mining and engineering.

HOLBROOK, WILLARD AMES (1860-). An American army officer, born in Arkansaw, Wis. He graduated from the United States Military Academy in 1885 and became second lieutenant in the First Cavalry. Continuing in the army, he became in 1920, after successive promotions, chief of cavalry, with the rank of major-general. General Holbrook was also an honor graduate of the Infantry and Cavalry School in 1891 and of the Army War College in 1912. His services have included duty in Cuba during the war with Spain, in the campaigns in the Philippines, at the Pennsylvania Military Academy, and on the Mexican border. During the War in Europe he was overseas, where he held the provisional rank of major-general in the National Army. On his return to the United States he was made chief of staff of the Southern Department; he later became chief of cavalry. His services won him the United States Distinguished Service Medal.

HOLDEN, CHARLES ARTHUR (1872-). An American educator, born at Hudson, Mass., and educated at the Thayer School of Civil Engineering of Dartmouth College and at Harvard. During 1895-98 he was engaged in construction work on the Boston and Albany Railroad, after which for two years he was an instructor at the Worcester Polytechnic. In 1901 he returned to the Thayer School where, in 1908, he became professor of civil engineering, and in 1919, director. During 1901 he also lectured on civil engineering at the University of Wisconsin. Professor Holden has been able to

give attention professionally to important engineering enterprises, notably as engineer for New Hampshire in the New Hampshire and Vermont boundary litigation; he has been frequently called into court as an expert. During the War he was executive secretary of the emergency help and equipment commission of New Hampshire and supervisor of military training at Dartmouth.

HOLDEN, HALE. See RAILWAYS, *Consolidations*.

HOLDICH, SIR THOMAS HUNGERFORD (1843-). An English explorer (see VOL. XI). He was president of the Royal Geographical Society from 1916 to 1918. His later publications include *Political Frontiers and Political Boundary Making* (1916) and *Boundaries in Europe and the Near East* (1918).

HOLITSCHER, ARTHUR (1869-). An Austrian writer, born at Budapest. He engaged in the banking business in Fiume, traveled in Europe and America, and took up his residence in Berlin. He is the author of novels and short stories, among them: *Leidende Menschen* (1893); *Weisse Liebe* (1896); *Das Sentimentale Abenteuer* (1905); *Der Vergiftete Brunnen* (1900); *Der Golem* (1909); *Worauf Warst Du?* (1910); *Bruder Wurm* (1910); *Schlafwandler* (1919); and *Adele Bourkes Begegnung* (1920). He also wrote a play, *Das Andere Ufer* (1901); some essays, *Ideale des Alltags* (1920); and books of travel, *Amerika Heut und Morgen* (1912), *Geschichten Zweier Welten* (1920), *Ost Südwest* (1915), *Das Amerikanische Gesicht* (1918), and *Drei Monate in Soviet Russland* (1921). He translated Oscar Wilde's *Ballad of Reading Gaol*.

HOLL, KARL (1866-). A German Protestant theologian, and professor at the university of Berlin (see VOL. XI). Like many other German writers, after the War he turned to Luther for spiritual guidance. He published *Die Bedeutung des Grossen Krieges für das Religiöse und Kirchliche Leben der Protestanten* (1917); *Was Verstand Luther unter Religion?* (1917); *Luther und Calvin* (1919).

HOLLAND. See NETHERLANDS.

HOLLAND, CLIFFORD MILBURN (1883-). An American civil engineer, born at Somerset, Mass. He studied at Harvard. His professional work has been chiefly under the New York State Public Service Commission. In 1906-09 he was assistant engineer in the building of the Joralemon Street tunnel under the East River, and in 1906-12, with the Fourth Avenue subway. Subsequent to 1916 he continued this service as division engineer in charge of all tunnels built under the East River. He later became chief engineer of the New York State Bridge and Tunnel Commission and of the New Jersey Interstate Bridge and Tunnel Commission, directing construction of the bridge and tunnel connecting New York and New Jersey.

HOLLAND, RUPERT SARGENT (1878-). An American lawyer and writer, born at Louisville, Ky. He graduated from Harvard in 1900 and from the Law Department of the University of Pennsylvania in 1903. In the same year he was admitted to the bar. He was chief attorney for the Legal Aid Society of Philadelphia from 1904 to 1910 and lectured also for the American Society for the Extension of University Teaching. He was well known as a writer of historical works and fiction. Among his works are

Builders of United Italy (1908); *Historical Inventions* (1911); *Historical Events of Colonial Days* (1916); *The Blue Heron's Feather* (1917); and *The Paneled Room* (1921).

HOLLANDER, JACOB HARRY (1871-). An American economist (see VOL. XI). His later writings include *The Abolition of Poverty* (1914) and *War Borrowing* (1919).

HOLLINGWORTH, HARRY LEVI (1880-). An American experimental psychologist, born at DeWitt, Neb., and educated at Columbia University. In 1909 he was appointed instructor of psychology at that institution, and in 1916 he became associate professor. He was one of the leaders in the movement for industrial application of scientific psychology. His principal works are *Studies in Judgment* (1913); *Outline for Experimental Psychology* (1914); *Outlines for Applied and Abnormal Psychology* (1914); *Advertising, Its Principles and Practice* (1915); *Vocational Psychology* (1916); *Science of Taste* (1917); *Applied Psychology* (1917); and *Psychology of Functional Neuroses* (1920).

HOLLIS, HENRY FRENCH (1869-). An American public official (see VOL. IX). He served in the United States Senate from 1913 to 1919 and during the War did relief work in Poland and Siberia. He was decorated by these governments for his services.

HOLLIS, WILLIAM STANLEY (1866-). An American public official, born in Chelsea, Mass. He studied at the United States Naval Academy in 1883-84 and left on account of a gun accident. He served in several capacities in the consular service from 1889 to 1911, when he was appointed consul general of Beirut, Syria. On the entrance of Turkey in the War, he had charge of the interests of the Allies in Syria. He was also head of the American Red Cross in Beirut and was prominent in relief work in Syria and elsewhere. He served as consul general in London in 1919 and during other periods and was a representative in London of the United States War Trade Board and other important bodies. In 1920 he was appointed consul general at Lisbon, Portugal.

HOLLISTER, NED (1876-). An American zoölogist, born at Delaware, Wis. He collected extensively in field zoölogy throughout the western part of the United States (1902-09) and was then assistant curator of mammals at the United States National Museum (1910-16) and superintendent of the National Zoölogical Park (1916-). He published *Birds of Wisconsin* (1903); *Systematic Synopses of Muskrats* (1911); *Mammals of the Philippine Islands* (1912); *Mammals of Alpine Club Expedition to Mt. Robson* (1913); *Philippine Land Mammals in the United States National Museum* (1913); *A Systematic Account of the Grasshopper Mice* (1914); and *East African Mammals in the United States National Museum* (1918, 1919).

HOLM, FRITZ (VILHELM) (1881-). A Danish explorer, born at Copenhagen, and educated at Copenhagen University and in the Danish Royal Navy. After serving in the navy from the time he was fourteen years of age until he was 19, he went to the Far East, acting as journalist and in other positions until 1904, when he visited the United States. In 1905 he was engaged in journalistic work in London, and in 1906 he commanded a scientific mission

into the interior of China, the result of which was the bringing to the western world of the only existing monolithic replica of the famous Nestorian Monument of A.D. 781, which was lent to the Metropolitan Museum of Art in New York, 1908-16. This replica is now in the Lateran Palace in Rome, Italy. He was very active in the War as correspondent and as Red Cross Commissioner and received many decorations for his work.

HOLM, GUSTAV FREDERICK (1849-). A Danish explorer, who published a number of works on Greenland (see VOL. XI). An English translation of *Legends and Tales from Augmasalik* appeared in 1914.

HOLMES, HARRY NICHOLLS (1879-). An American chemist, born at Fay, Pa., and educated at Westminster College and Johns Hopkins University. During 1906-07 he was an assistant in chemistry at Johns Hopkins and then became professor of chemistry at Earlham College until 1914, when he was called to a similar chair at Oberlin College and was made head of the department. Dr. Holmes is a specialist in the chemistry of soaps and in colloid chemistry, in consequence of which he became the chairman of the subcommittee on colloid chemistry of the National Research Council in 1919-22. The results of his studies on the specialties which he has made his own have been published in papers contributed to the American Chemical Society of which he is a member and of whose division of physical and inorganic chemistry he was chairman in 1920. He is the author of an *Outline of Qualitative Analysis* (1908), *Laboratory Manual of General Chemistry* (1909), *General Chemistry* (1921), and *Laboratory Manual of Colloid Chemistry* (1921).

HOLMES, JOHN HAYNES (1879-). An American clergyman (see VOL. XI). He was chairman of the General Unitarian Conference from 1915 to 1917, was president of the Free Religious Association from 1914 to 1919, and was made director of the Civil Liberties Bureau in 1917. He broke from Unitarianism and became an independent in 1919. His later writings include: *Is Death the End?* (1915); *New Wars for Old* (1916); *Religion for To-day* (1917); *The Life and Letters of Robert Collyer* (1917); *Readings from Great Authors* (1918); *The Grail of Life* (1919); and *Is Violence the Way Out?* (1920).

HOLMES, SAMUEL JACKSON (1868-). An American zoölogist, born at Henry, Ill. He was educated at the University of California and the University of Chicago (Ph.D., 1897). He was instructor in zoölogy at the University of Michigan (1899-1905), associate professor there (1905-11), and associate professor (1911-16) and professor (1916-) at the University of California. He published *Biology of the Frog* (1906); *Evolution of Animal Intelligence* (1911); *Studies in Animal Behavior* (1916); *Elements of Animal Biology* (1918); *The Trend of the Race* (1921); and *A Bibliography of Eugenics* (1924).

HOLMES, WILLIAM HENRY (1846-). An American anthropologist (see VOL. XI). He was curator of the department of anthropology at the Field Museum in Chicago, of the department of aboriginal pottery at the National Museum in Washington, and of the National Art Gallery of Washington (1910-20). He has published many works on archaeological and anthropological subjects. His most recent publica-

tion is *Handbook of Aboriginal American Antiquities* (1918).

HOLSCHER, GUSTAV (1877-). A German theologian and authority on the Old Testament. He was born at Norden and studied at the universities of Berlin, Munich, and Leipzig. In 1893 he made a journey to Palestine and Phoenicia under the auspices of the German Orient Society. He lectured at the universities of Halle, Göttingen, and Giessen (1904-20) and in 1921 became professor of Old Testament science at Marburg. He is the author of *Palästina in Persischen und Hellenischen Zeiten* (1903); *Quellen des Josephus* (1904); *Sadduzäismus* (1906); *Landes- und Volkskunde Palästinas* (1908); *Two Greek Inscriptions from Khurbet Harravi* (1909); *Geschichte der Juden in Palästina von Siebzig nach Christus* (1910); *Propheten* (1915); *Entstehungszeit der Himmelfahrt Moses* (1919); *Entstehungszeit des Buches Daniel* (1920); and a work on the meter of Arab, Summerian, and Hebrew poetry.

HOLST, GUSTAV (1874-). An English composer, born at Cheltenham. He studied at the Royal Academy of Music under Stanford and Parry, then played for some seasons in various orchestras, and finally settled in London as a teacher. In 1907 he became director of music at Morley College and also at St. Paul's Girls' School. In May, 1923, he conducted several of his works at the Ann Arbor (Mich.) Festival. His works include four operas, *The Revoke* and *The Youth's Choice* (neither of them produced), *Savitri* (London, 1916), and *The Perfect Fool* (ib., 1923); a masque, *The Vision of Dame Christian*; a symphony, *Cotswolds*; an overture, *Walt Whitman*; the orchestral suites, *Beni Mora*, *Phantastes*, *The Planets*, and *Japanese*; a symphonic poem, *Indra*; a *Fugal Concerto* for flute and oboe with string orchestra; *The Mystic Trumpeter* for soprano and orchestra; *Ornult's Drapa* for baritone and orchestra; the choral works with orchestra, *Clear and Cool*, *King Estmere*, *Choral Hymns from the Rig Veda*, *The Cloud Messenger*, *Christmas Day*, *Hecuba's Lament*, *Hymn to Dionysus*, *The Hymn of Jesus*, *Ode to Death*; and chamber music, songs and part songs.

HOLT, EDWIN BISSEL (1873-). An American psychologist and philosopher, born at Winchester, Mass., and educated at Harvard and Columbia Universities. He was instructor in psychology at Harvard University, 1901-05; assistant professor, 1905-18. His two important works, *The Concept of Consciousness* (1914) and *The Freudian Wish* (1915), combine the approach of behavioristic psychology with a realistic metaphysics. Professor Holt was one of the group of six who published a joint profession of neo-realistic doctrine (1912). His own contribution to that philosophy included the notion of neutral entities; that is, entities neither mental nor physical, which he presumed to be the ultimate elements of the universe.

HOLT, HAMILTON (1872-). An American editor (see VOL. XI). In 1917 he was special lecturer for the World Peace Foundation, and the Isaac Bromley lecturer on journalism at Yale University. In the spring of 1918 he visited the Allied battle fronts as guest of the British, French, American, Belgian, and Italian governments and represented the League to Enforce Peace at the Peace Conference at Versailles in 1919.

HOLT, HENRY (1840-). An American

author and publisher (see VOL. XI). In 1915 he became a member of the Harvard Overseas Visiting Committee on philosophy and psychology. From 1914 to 1921 he edited *The Unpartisan Review* (formerly *The Unpopular Review*) and in 1919 he published *The Cosmic Relations and Immortality*.

HOLT, LUCIUS HUDSON (1881-). An American author, born in Atchison, Kan., and educated at Yale. He was instructor in English there from 1905 to 1908 and assistant editor of *Webster's International Dictionary* from 1908 to 1910. From 1910 he was professor of English and history at the United States Military Academy. He was a member of several societies and wrote *Introduction to the Study of Government* (1914); *Leading English Poets* (1915); *History of Europe, 1862-1914*, with A. W. Chilton (1917); *Brief History of Europe 1789-1915*, with A. W. Chilton (1918); and *Military Correspondence, Reports and Orders* (1918).

HOLT, L (UTHER) EMMET (1855-1924). An American physician (see VOL. XI). Dr. Holt's death occurred suddenly in China, where he had gone to deliver a course of lectures on pediatrics in the new medical college established at Peking by the Rockefeller Foundation. The only considerable recent work published by him is *Food, Health, and Growth* (1922). The Holt treatise on pediatrics was reissued in 1922 under the joint authorship of Holt and Howland of Johns Hopkins University. Dr. Holt was recognized as one of the great medical figures of his day, notably in the field of pediatrics. His popular booklet on the feeding and care of infants was translated into many languages.

HOLT, WINIFRED (?-). An American sculptor and philanthropist, born in New York City. She was educated privately and studied anatomy, drawing, and sculpture in Florence. Her works, exhibited in New York and in several cities of Europe, included portraits, busts, and bas-reliefs. She founded and was secretary of the Association for the Blind, and through her efforts several homes for the blind were founded. She also organized so-called light-houses for the blind in France and other parts of Europe. In 1921 she visited Poland as a guest of the Polish Government for the relief of the Polish blind. During the War she did much relief work among those blinded in battle. She was awarded medals by France and other governments and was the author of *A Short Life of Henry Fawcett* (1911); *The Beacon for the Blind* (1914), and numerous papers.

HOLY PLACES. See ARABIA.

HOLZKNECHT, GUIDO (1872-). An Austrian physician, pioneer in röntgenology, who has recently attracted much attention through his attempts to "rejuvenate" elderly women by raying the genital glands. Holz-knecht is indirectly responsible for Gertrude Atherton's novel, *Black Oxen*. Having received his medical degree from the University of Vienna, just as the Röntgen rays were coming into use in medicine, he began to devote himself to this subject and was eventually appointed professor of radiology in the university. He published the results of X-ray diagnosis in tuberculosis and diseases of the chest in 1901 in a volume entitled *Die Röntgenologische Diagnostik der Erkrankungen der Brusteingeweide*. In collaboration (Holzknecht and Jonas) he wrote *Die Radiologische Diagnostik der Intra- und Extraventriculären Tumoren* (1908), and

in 1921 he edited the large two-volume work, *Röntgenologie*.

HOME RULE, MUNICIPAL. See MUNICIPAL GOVERNMENT.

HONDURAS. A Central American republic with an area of about 44,275 square miles, and a population, on Jan. 1, 1922, of 662,422 (a gain of 17 per cent over the last decennial census). The capital, Tegucigalpa, had 38,950 in 1920. Other important towns are: La Esperanza (11,453), Santa Rosa (10,574), Nacaome (8152), Choluteca (8065), Amapala (2800), La Ceiba (8000), Puerto Cortés (4000). The percentage of illiteracy among children was 56 per cent and school attendance increased only slightly over 1911. By the school census of 1919 only 35,912 children out of the 87,207, were receiving instruction.

Industry. The cultivation of bananas and coconuts continued as the leading activity. For the year ending Dec. 31, 1922, 12,520,495 bunches of bananas were exported, and 10,056,977 coconuts. Exports of both bananas and coconuts declined for 1923, banana shipments to the United States (over 99 per cent) being 10,725,004 bunches, and coconuts 7,485,519. The coffee production remained stationary while that of rubber decreased. Cattle and horse raising was on the decrease, there being 500,000 heads in 1920, compared with 800,000 in 1922. After 1912 the country's trade consistently made gains, the imports being \$14,342,237 in 1922-23 as compared with \$5,132,679 in 1912-13; and the exports in 1922-23, \$10,016,270 as compared with \$3,180,968 in 1912-13. The United States supplied 85 per cent of the goods imported into the country in 1922-23, and took 90 per cent of its exports. The balance of trade was overwhelmingly against Honduras.

Finance. For the year 1922-23, the budget estimates balanced at 7,949,032 pesos. (In 1913-14, this was 4,824,000.) The national budget appropriations steadily increased after 1913-14, while both revenues and expenses were always larger than the budgeted amounts. The 1921-22 budget called for revenues and expenses of 6,674,895 pesos, but revenues were actually 7,386,979 pesos and expenses 7,196,161 pesos, showing a surplus of 190,818 pesos. The interest arrears on the foreign debt were not being paid with the result that the foreign debt totaled \$125,000,000 in 1923. The internal debt in 1921 amounted to over \$6,000,000, United States currency. In 1922, the Banco de Honduras became the national bank of issue. In 1918, the peso was legally fixed at one-half the value of the American dollar. In 1920, an ambitious programme of fiscal reform was launched under the direction of an American expert, but it was not carried out because of lack of funds, while the years 1922, 1923, and part of 1924, were years of political disturbances, which made expenditures for war out of all proportion to other expenses, and created huge deficits. In 1920 the national railway of 95 kilometers was turned over to Compañía Agrícola de Sula to secure a credit of \$1,000,000 to be used in the complete reconstruction of the road. This Compañía Agrícola, a subsidiary of the American Fruit Company, was changed in 1924 to the Cortes Development Company, and retained control over the national railroad. Slightly over 500 miles of railways, in addition to the national line, were the property of American fruit companies operat-

ing on the north coast. There were no railways on the Pacific coast. There were about 200 miles of highways open the year around to wheeled traffic. A national coast-to-coast highway, which was to have been opened in 1924 (385 kilometers in length), was damaged during the revolutions.

History. Internal affairs were stormy during the period 1914-24. In 1919, President Bertrand's well prepared plans for his own reelection were upset by a revolt led by General Gutierrez. Bertrand fled the country; Gutierrez had himself declared dictator; and, in October, 1919, was elected president. In 1920, disturbances were again reported with the result that United States battleships had to proceed to the scene to protect American property. In 1923, on the eve of the forthcoming election, civil war again threatened and many prominent Hondurans sought safety in flight. After a contest, in which bloodshed and violence were not wanting, and which was marked by the continuous interference of the president, General Carias, Conservative candidate, received a plurality vote. The election was now thrown into the Congress which, in 1924, declared it could find for no one candidate. The usual round was now repeated. American marines were rushed to the scene but could effect nothing; the president, Gutierrez, proclaimed himself dictator, Feb. 1, 1924; the disappointed presidential aspirants took up arms in rebellion and waged war intermittently on each other throughout February. In March, Gutierrez was put to flight, and, after a chaotic interregnum, Dr. Fausto Davilla, Conservative, was proclaimed provisional president by a group of revolutionary "generals"; but the forces defending Tegucigalpa set up a rival in the person of Zuñiga Hueta. In the hope of restoring order, President Coolidge sent Mr. Sumner Welles as his special representative, in April, to mediate, and the four neighboring republics were invited to join in a conference with the warring Honduran factions. This somewhat unusual procedure met with success early in May, when one of the revolutionary chieftains, Gen. Vicente Tosca, was elected president and the civil war was ended.

The government applied itself toward furthering the union of Central American States, and with Guatemala and Salvador signed a pact in 1921 for common action in matters of trade, communications, and coinage. In 1919, Guatemala and Honduras submitted their long outstanding boundary dispute to the United States Secretary of State and a scientific survey under the administration of the American Geographical Society was provided for. A further advance toward realizing peace in Central America was made in 1922 at a conference of the presidents of Nicaragua, Salvador, and Honduras on board the U.S.S. *Tacoma* in Fonseca Bay (Aug. 20, 1922), at which the three countries reaffirmed in part the Treaty of Peace and Friendship of Dec. 20, 1907 (see CENTRAL AMERICAN UNION). On July 19, 1918, Honduras declared war on Germany and thus became an Associate Power and original member of the League of Nations. On Nov. 15, 1922, however, Honduras notified the League of its intention to withdraw because of the onerous annual dues.

HONEGGER, ARTHUR (1892-). A French composer, born at Havre. He studied

in Zurich, 1907-09, and then with R. Martins in Havre and L. Capet in Paris, where he lived after 1913. He began as an extreme futurist and was soon recognized as the leader of the notorious group, "Les Six" (Auric, Durey, Milhaud, Poulenc, and Taillefer). His works comprise an opera, *La Mort de Ste.-Alm  ne*; incidental music to Morax' *Le Roi David* and M  ral's *Dieu des Jeux du Monde*; a ballet, *V  rit  ? Mensonge?*; a symphonic poem, *Pastorale d'Et  *; a mimic symphony, *Horace Victorieux*; *Rhapsodie* for piano, flutes, and clarinet; chamber music; and songs.

HOOVER, BRIAN (WILLIAM BRIAN) (1880-). An American author (see VOL. XI). In 1915 he was awarded the prize in an America Opera Association competition for the opera *Fairyland*, with music by Horatio Parker. In the same year he published another opera, *Morven and the Grail*, and a commemorative poem, *A.D. 1919*, also with music by Horatio Parker, and a volume of *Poems*, 1915. He became literary editor of the New York *Sun* in 1917.

HOOVER, CHARLES R. (UGLAS) (1885-). An American chemist, born in Oskaloosa, Iowa, and educated at Haverford College and Harvard University, where he held a Carnegie fellowship, 1912-13. He was professor of chemistry at Penn College in Iowa (1909-10) and associate professor at Syracuse University (1913-15). In 1918 he became professor of chemistry at Wesleyan University. He has made determinations of atomic weights of elements, investigated tobacco smoke, and studied the analyses of gases. During the War he served with the Chemical Warfare Service and invented a gas absorbent and a gas detector, both of which were of value.

HOOVER, HERBERT CLARK (1874-). An American public official. He was born in Iowa, where his father, a Quaker, cultivated a farm. Left an orphan at 10 years of age, he was sent to his uncle's farm in Oregon to live. He ran away when he was 14 and went to Portland, Ore., where he worked for a while in a real estate office. In 1891 he entered the newly established Leland Stanford Junior University, working his way through by establishing a laundry of which he made a success. Specializing in geology and engineering, he was in the first class graduated by the university. To perfect himself as a mining engineer he went to California and became a common workman in mining, passed through the several grades, and acquired familiarity with every part of the work. In 1897 he went to Australia as a mining engineer for an English syndicate and was successful in developing some mines there. In 1899 he was appointed director general of mines by the Chinese government. His work in China was interrupted by the Boxer troubles; he was in Tientsin when the foreigners were besieged there. He defended not only his European coworkers but his Chinese workmen too, rescuing them in some cases from the firing squad. Later he was engaged in mining operations in various parts of the world. He made and lost two fortunes and eventually won lasting success. He was living in England at the outbreak of the War, and his services were at once required in aid of Americans stranded there with their funds cut off. Soon afterward he was put in charge of the Belgian relief work and attracted wide attention by his great abil-

ity and enthusiasm. During three years he traveled throughout Belgium and visited Brussels, London, Rotterdam, Lille, and Berlin, in order to confer with the heads of governments. Although \$1,000,000,000 was expended on food and transportation, about one-half of 1 per cent was required for overhead expenses. He was appointed United States Food Administrator in 1917. He announced that the people of the United States could diminish their expenses in the necessities of life by 50 per cent. He instituted "wheatless days," and "meatless days," and urged avoidance of all waste. After the War, Mr. Hoover devised a chain of food depôts throughout central Europe on which relatives and friends in the United States could draw for relief of the starving people in the countries desolated by the conflict. In March, 1921, he entered President Harding's cabinet as Secretary of Commerce, with the understanding that he was to continue his relief work. In 1921, he assumed general supervision of the relief work in Russia, on condition that all American prisoners held by the Soviet authorities should be released.

He wrote *Principles of Mining* (1909), and in collaboration with his wife, who was Lou Henry of Monterey, Cal., a fellow-student at Stanford University, he translated into English Agricola's *De Re Metallica*.

HOPE, ANTHONY. See **HAWKINS, ANTHONY HOPE.**

HOPE, JOHN (1868-). An American educator, born at Augusta, Ga., and educated at Brown and Chicago Universities. After graduation from college he devoted all his time to teaching colored youth. He served on the faculties of several colleges and universities in the South and was appointed president and professor of ethics at Morehouse College (then Atlanta Baptist College) in Atlanta, Ga., in 1906. In 1918-19 he did war work among the colored troops in France. He was a director and trustee of many institutions for colored people.

HOPKINS, ARTHUR MELANCTHON (1878-). A dramatic producer, born in Cleveland, Ohio, who began his work in New York City in 1912. His best recent productions include *The Poor Little Rich Girl*; *On Trial*; *The Deluge*; *Good Gracious, Annabelle*; *The Rescuing Angel*; *Be Calm, Camilla*; *The Jest*; *Night's Lodging*; *Daddy's Gone a-Hunting*; *The Claw*; *Anna Christie*; *The Hairy Ape*; *The Old Soak*; *Rose Bernd*; *The Laughing Lady*; *Launzi*; *A Royal Fandango*, and plays by Tolstoy, Ibsen, and Shakespeare.

HOPKINS, EDWARD WASHBURN (1857-). An American philologist (see Vol. XI). He has been professor of Sanskrit language and literature and comparative philology at Yale since 1915 and has published *Epic Mythology* (1915) and *History of Religions* (1918).

HOPKINS, ERNEST MARTIN (1877-). An American educator, born at Dunbarton, N. H. He graduated from Dartmouth in 1901 and from that year to 1905 was secretary to the president there. He was secretary of the college from 1905 to 1910 and until 1916 was engaged in original research for various industrial concerns in Chicago, Boston, and other cities. He became president of Dartmouth on July 1, 1916. During 1918 he was in charge of the Industrial Relations of the Quartermaster Department, United States Army, and assistant to the Secretary of War in charge of industrial

relations. He represented the War Department on the War Labor Policies Board in 1918.

HOPKINS, WILLIAM JOHN (1863-). An American author (see Vol. XI). His later works include *Those Gillespies* (1916); *The Clammer and the Submarine* (1917); and *She Blows! and Spurn at That* (1921).

HOPPE, WILLIAM H. (1887-). World's champion at 182 and 18.1 balkline billiards. He was born at Cornwall-on-the-Hudson, N. Y. From 1910 he reigned supreme as a wielder of the cue despite the many times he has been called upon to defend his laurels. Beaten in match play at rare intervals by such stars of the game as Jacob Schaefer, he has always succeeded in defending his championship honors.

HOPWOOD, AVERY (1884-). An American playwright, born in Cleveland, Ohio. He came to New York City as a correspondent for the *Cleveland Leader* and there sold his first play, *Clothes*, written with Channing Pollock. His plays have been produced in the United States, Canada, Europe, and the Orient. The best known include *Fair and Warmer*; *The Gold Diggers*; *The Bat*; *Spanish Love*, in collaboration with Mary Roberts Rinehart; *Ladies' Night*; *The Demi-virgin*; *Little Miss Bluebeard*; *Why Men Leave Home*; *The Alarm Clock*, and *The Best People*, with David Gray.

HORMONES. See **SECRETIONS, INTERNAL**; **ZOOLOGY, Physiology**; **HEREDITY.**

HORNBY, LESTER GEORGE (1882-). An American illustrator, engraver and painter, born at Lowell, Mass., and educated at the Rhode Island School of Design at Providence, the Pape School in Boston, and the Art Students' League of New York. In Paris he studied with Laurens and others. Representative pictures of his are in the Victoria and Albert Museum (London), the Library of Congress (Washington), the New York Public Library, the Art Institute of Chicago, Detroit Institute, Carnegie Institute (Pittsburgh), etc. He has illustrated sketch books of London, Edinburgh, Paris, and Boston. His war etchings are well known.

HORNE, HENRY SINCLAIR, first BARON (1861-). A British soldier. He was educated for the army at Woolwich and served in the South African War. In 1914 he was made commander of the artillery of the 1st Corps, and in the following year commanded the 2d Division. He was sent to Egypt to defend the Suez Canal in 1916 and in the same year commanded the 15th Army Corps. Later in that year he was given command of the 1st Army in France. He served with great distinction. In 1909 he was created Baron of Stirkeke and was given the eastern command. Until 1920 he was general to the King.

HORNE, SIR ROBERT STEVENSON (1871-). A British statesman, born in Glasgow. He was educated at the University of Glasgow. He lectured on philosophy at the University College of North Wales in 1895. In the following year he was admitted to the Scottish bar and was elected to Parliament in 1910. In 1917 he was appointed assistant inspector general of transportation and in the same year became director of materials and priority in the Admiralty. In 1918 he was director of the Admiralty Labor Department. He was appointed, also in 1918, Third Civil Lord of the Admiralty. He was Minister of Labor in 1919; president of the Board of Trade in 1920-21; and Chancellor of

the Exchequer in 1921-22. He was knighted in 1920. In 1921 he was elected Lord Rector of Aberdeen University.

HORSLEY, SIR VICTOR ALEXANDER HADEN (1857-1916). An English surgeon and neurologist (see VOL. XI). On the outbreak of the War Sir Victor was put at the head of a hospital which saw service in Egypt. At a later period he was made a colonel in the Mesopotamia Expeditionary Force and in the course of his duties succumbed at Amara to heat stroke. A biography of him by Stephen Paget appeared in 1919.

HORTHY DE NAGYBANYA, NIKOLAUS (1868-). Regent of Hungary. Early in life he entered the navy. During the War he gave efficient service as captain of the battleship *Novara*. He was promoted to be admiral of the fleet and in this capacity surrendered the Austrian fleet to the Allies in 1918. In 1919 he organized a counter-revolution against the Soviet government in Hungary, under Bela Kun, and on the fall of that government, came into supreme control. He was elected regent in 1920 on the theory that the monarchy in Hungary was only temporarily suspended. By provision of the laws, he holds this office for an indefinite period. See HUNGARY, *History*.

HORTICULTURE. Activities in this field showed both the destructive and stimulant effects of the War during the period dominated by it. Increased demands for fruits and vegetable products of all kinds resulted in an unprecedented speeding-up of production, followed by a corresponding decline on the close of hostilities. At the same time labor costs rose excessively, and failing to recede with the drop in prices, they made the period of readjustment particularly difficult for the growers of all forms of perishable products. The long continued and bitterly contested railroad strike of 1922 was a bitter blow to fruit and vegetable producers, sorely needing an opportunity to recover from the disastrous conditions following the War. The period showed a gradual movement from amateur to commercial production. The ravages of insect and fungus pests, making expensive spraying machinery an absolute necessity, eliminated many poorly kept orchards and plantations. The haphazard methods of the past yielded to scientific practices. This trend in commercial horticulture is clearly outlined in statistics furnished in the 1920 census, which shows that the number of bearing, deciduous fruit trees dropped from 301,117,277 in 1910 to 230,781,135 in 1920. In the Pacific Coast States, always the stronghold of commercial orcharding, there was at the same time a noticeable increase in the number of trees. The greatest decline occurred in the Mississippi Valley region, where small farm orchards were the general rule. The greatest loss in bearing trees occurred in the apple and peach; the pear, plum, and cherry nearly held their own, and the apricot showed slight gains. Despite the decline in the number of trees the total production of orchard fruits increased slightly during the period, and the value of fruits trebled. The number of grapevines in the United States gained slightly during this census period, and citrus fruits of all species showed consistent increases. Bearing orange trees increased from 9,737,927 in 1910 to 14,397,836 in 1920; lemons from 959,920 to 2,921,908; grapefruit from 710,040 to 1,938,453; and tangerines from 27,-

271 to 41,310. The total production of citrus fruits increased from 23,502,128 boxes in 1909 to 38,107,060 in 1919.

One of the striking changes in the fruit industry of the country during the same census period was the serious setback to the pineapple industry, as indicated in figures showing that the number of bearing plants declined from 37,948,309 in 1910 to 2,897,141 in 1920. Bearing nut trees, pecans, Persian walnuts, almonds, etc., increased from 5,027,788 in 1910 to 6,524,125 in 1920. At the same time the value of the nut crops increased from \$4,447,674 in 1909 to \$29,714,396 in 1919. Peanut acreage enlarged from 869,887 acres in 1909 to 1,125,100 acres in 1919; white potato acreage decreased from 3,666,855 to 3,251,701; sweet potato acreage increased from 641,255 to 803,727; and small fruit acreage decreased from 272,460 to 249,084. The nursery industry of the country showed no gain; sales in 1919 amounted to \$20,434,389 as compared with \$21,050,822 in 1909. The number of square feet under glass was increased from 114,655,276 to 162,368,593. Imports of vegetables, fruits, and nuts reached a maximum in 1919 and 1920 and thereafter exhibited a sharp decline. Export trade in these items followed the same general trend. However, both imports and exports were considerably higher in value at the end of the 10-year period than at the beginning. In respect to the horticultural industry throughout the world at large, one of the most striking features was the rapid extension of the citrus industry in South Africa and Australia. Both countries developed their plantations to such an extent as to oversupply home consumption and render exportation to Great Britain a necessity.

Protective Acts. One of the most important developments was the organization of the Federal Horticultural Board, as the result of the plant quarantine act of Aug. 20, 1912. This board, given power to promulgate and enforce necessary protective measures for preventing the entrance of insect and fungus pests into the United States, became at once a power for good to the Nation's agriculture. That such protection was long needed is shown by the entrance in the past of many serious pests, including the San José scale, gipsy moth, Japanese beetle, chestnut blight, white pine blister rust, etc. The enactment of Quarantine 37, effective on and after June 1, 1919, prohibiting, with certain exceptions, the importation of nursery stocks and other plants and seeds into the United States, had a very great effect on American horticulture, especially on those branches concerned in the propagation and dissemination of ornamental plants. As a result, it became necessary for the nurserymen in this country to propagate many species of plants hitherto imported from foreign countries.

The continued spread, despite vigorous repressive efforts, of the European corn borer, Japanese beetle, and many other serious pests entering the United States previous to the organization of the Federal Horticultural Board, caused serious alarm. In many cases the pests had spread so rapidly that their eradication was considered out of the question. The potato wart disease, for a time considered a very serious menace to the potato industry of the United States, was found controllable by the planting of resistant varieties. (See POTATOES.) The gipsy moth, continuing its westward march through-

out New England, threatened the Adirondack and Catskill forests, in spite of vigorous efforts made to stay its progress. More encouraging was the likelihood of eradicating the *Parlatoria* date scale, an insect which, if uncontrolled, was believed capable of wiping out the infant date industry of the southwestern States.

Transportation. Material advances were made in the shipping of perishable products. The cooling of fruits and vegetables previous to placement in refrigerator cars became general and enabled distant growers to get their products to the consumer without material loss in quality. The motor truck practically replaced the horse in the truck garden industry in the vicinity of large cities, making possible not only a geographical expansion of the trucking industry but also a quicker movement of highly perishable products.

Marketing. No phase of horticultural activity exhibited such radical changes as that of marketing. Literally hundreds of coöperative agencies sprang up in various parts of the country and in most cases rendered material assistance to the long-suffering grower. The marked success of the California Fruit Growers' Exchange, operating under the adverse conditions of the War, propagated the coöperative idea, at a time when extremely low prices were being received for most commodities. A new system of selling fruits and vegetables arose. This was the f. o. b. auction, in which the product is inspected at the point of origin by government authorities and sold on this basis while in transit to market, and the returns are made to the grower within 48 hours after sale. One striking development was the tremendous growth of roadside markets in the vicinity of cities and along important highways. An idea of the importance of this way of selling can be gained from the rough estimate of 500,000 stands in operation in the United States in 1923. These markets became important in the disposal not only of fruits and vegetables, but also of flowers, canned products, cider, etc. Marketing was greatly aided by the development of better grading and packing practices, stimulated not only by greater demand for selected uniform products but also by the enactment of various Federal and State laws on the marketing and branding of fruits and vegetables. In response to these regulations numerous coöperative packing plants sprang up in various parts of the country.

Investigation. Despite the serious disrupting forces of the War, investigation progressed satisfactorily. The Oregon Experiment Station promulgated in 1918 the theory that growth and fruitfulness in plants is directly related to the proportion of carbohydrates and nitrogen in them. This concept has been of great benefit in assisting in the explanation of many cultural, pruning, and fertilization practices hitherto generally accepted but not understood. During the period it became definitely acknowledged that of the many fertilizers applied to fruit trees, nitrogen is the only material making an adequate return, and then only on poor soils or where trees are growing in sod. Studies in fruit storage contributed greatly to the knowledge of the proper time of picking and the importance of careful handling of fruit at all stages. Work of the United States Department of Agriculture in the standardizing of fruit and vegetable packages did much to protect the consumer from fraud. The development by the same depart-

ment of large-fruited blueberries afforded proof that much may yet be done to improve our native species of fruits. The discovery of bud variations in the citrus family explained the existence of many unfruitful and undesirable trees. Experimental results disproved one popular fallacy, namely, that all fruit trees require severe annual pruning.

War Gardens. Literally thousands of vegetable gardens were grown in war gardens, during the two years of the United States' participation in the war, by people who hitherto had never been interested in horticulture. The value of these gardens to the food reserves of the nation was estimated as approximately \$500,000 in 1918.

Plant Protection. Material advances were made in the method of protecting horticultural plants from various insect and fungus enemies. The utilization of dry insecticides and fungicides, known as dusts, steadily increased, until in many parts of the United States and Canada their use became an important part of the protective programme. The discovery that many economic plants, including the potato, tomato, raspberry, etc., are subject to a serious form of disease commonly known as mosaic caused a great deal of concern. Widespread, disastrous freezes occurring during the blooming periods of 1921 greatly injured the fruit crop in many parts of the country and reawakened an interest in orchard heating as a means of protecting fruits from disastrous loss. Considerable agitation was aroused in New England and New York over the death of Baldwin apple trees following the severe winter of 1919. However, it was generally conceded that this old and standard variety, despite its occasional tenderness to cold, could not be replaced.

Miscellaneous. One striking feature of the period was the gradual replacement of established varieties of fruits and vegetables by new and better sorts. The Delicious apple, from a modest position, became one of the leading varieties. The Stayman Winesap proved so much better than its parent, the Winesap, as to replace it largely in new plantings. The Golden Bantam and other yellow sweet corns gained favor over the older white sorts.

Necrology. Among prominent horticulturists who died between 1914 and 1924 were Jackson Dawson, horticulturist, Aug. 3, 1916; Philippe de Vilmorin, French seedsman and scientist, June 30, 1917; J. H. Hale, fruit grower and public servant, Oct. 11, 1917; J. C. Whitten, scientific horticulturist, June 5, 1922; G. Harold Powell, manager of the California Fruit Growers' Exchange, Feb. 18, 1922; Walter Van Fleet, plant breeder, Jan. 27, 1922; and Samuel Parsons, landscape gardener, Feb. 3, 1923.

Bibliography. A few of the large number of horticultural books appearing during this decade were S. W. Fletcher, *The Strawberry in North America* (New York, 1917); V. R. Gardner, F. C. Bradford, and H. D. Hooker, Jr., *Fundamentals of Fruit Production* (New York and London, 1922); U. P. Hedrick et al., *The Cherries of New York* (Albany, 1915); *The Peaches of New York* (Albany, 1917), and *The Pears of New York* (Albany, 1921); W. Poponoe, *Manual of Tropical and Subtropical Vegetable Gardening* (New York and London, 1916); E. A. White, *The Principles of Floriculture* (New York, 1915).

HORTON, ROBERT FORMAN (1855-). An

English Congregational minister (see Vol. XI). His later volumes include *Reconstruction* (1915); *An Autobiography* (1917); and *The Mystical Quest of Christ* (1923.)

HOUBEN, HEINRICH HUBERT (1875-). A German author and director of the literary department of the annual Leipzig book fair. He was born at Aix-la-Chapelle and studied in Bonn, Berlin, and Greifswald. He founded the *Deutsche Bibliographische Gesellschaft* and was literary director of F. A. Brockhaus' publishing house (1907-19). He is the author of *Karl Gutzkow* (1899-1901); *Emil Devrient, Leben und Wirken* (1903); *Jungdeutschlands Sturm und Drang* (1911); *Die Deutsche Revolution* (1919); *Hartmanns Revolutionäre Erinnerungen* (1919); *Karl Schurz's Befreiung Kinkels* (1920); and *Adele Schopenhauer, Tagebuch einer Einsamen* (1921). He also compiled *Berühmte Autoren des Verlags F. A. Brockhaus* and edited the works of Sven Hedin.

HOUDINI, HARRY (1874-). An American magician, born at Appleton, Wis. He began his career as a trapeze performer in 1882. He invented a diving suit, was interested in producing moving pictures, and was awarded a prize by the Australian Aëronautic League in 1910 for the first successful flight in Australia. He made many tours of the world and gave performances before the notables of various countries. He gained fame by exposing the tricks of mediums, as well as by his own remarkable achievements as a magician. He wrote *The Right Way to do Wrong* (1906); *Handcuff Secrets* (1907); *The Unmasking of Robert Houdini* (1908); *Miracle Mongers* (1920); *Spooks and Spiritualism*; and *Rope Ties and Escapes*.

HOUGH, EMERSON (1857-1923). An American writer, born in Newton, Iowa, and educated at the University of Iowa in 1880. He spent many years in traveling over the West and wrote much on the protection of game and other subjects relating to the public domain of the United States. He was responsible for the passage of the act of Congress for preserving buffalo in Yellowstone Park. He wrote *The Singing Mouse Stories* (1895); *The Story of the Cowboy* (1897); *Mississippi Bubble* (1902); *The Lady and the Pirate* (1913); *The Magnificent Adventure* (1915); *The Way Out* (1918); *The Covered Wagon* (1922); *North of 36* (1923); and the posthumous *Mother of Gold* (1924). *The Covered Wagon*, as a moving-picture, was the most successful made up to that time. It ran steadily over a year in New York City.

HOUGH, LYNN HAROLD (1877-). An American clergyman (see Vol. XI). Among his later works were: *The Quest for Wonder* (1915); *In the Valley of Decision* (1916); *The Little Old Lady* (1917); *The Significance of the Protestant Reformation* (1918); *The Clean Sword* (1918); *The Productive Beliefs* (Columbia Lectures at Vanderbilt University; 1919); *The Eyes of Faith* (1920); *The Opinions of John Clearfield* (1921); and other volumes.

HOUGHTON, ALANSON BIGELOW (1863-). An American manufacturer and diplomat, born at Cambridge, Mass., and educated at Harvard University, in Germany, and in Paris. He engaged in the manufacture of glass at Corning, N. Y., and became president and official in several important glass companies and other concerns. He was a member of Congress, 1919-23, but resigned on his ap-

pointment as Ambassador to Germany by President Harding in February, 1922.

HOURS OF LABOR. The last 10 years have seen a marked general reduction of hours of labor. That long hours do not pay had been coming more and more to be believed. The experiences of the War and particularly the report of the British munitions workers' committee established this general principle beyond doubt. Moreover, the influence of the forces of labor was steadily gaining and culminated in considerable economic power during the War. These two circumstances combined not only to stimulate legislation for the limitation of working hours, but also to decrease hours of work in the industries which were not affected by the protective laws.

According to the Census of Manufacturers of 1914, 11.8 per cent of the workers covered worked in eight-hour establishments. In the 1919 census, 48.6 per cent did so, while advance figures compiled for the 1924 census showed that 51.5 per cent worked in eight-hour plants.

Hour legislation in this country is still, due to constitutional limitation, largely confined to the protection of women and children. During the past decade, however, were enacted the La Follette Seamen's Act of 1915 and the Adamson Act of 1916, regulating respectively the hours of maritime and interstate railway workers. Numerous eight-hour restrictions on work undertaken for the State and several special prohibitions of long working hours in certain particularly dangerous occupations such as mining and caisson work have also become law. A recent Oregon statute provides for an eight-hour day in the lumbering industry when the adjoining States have adopted similar restrictions. Within the decade, 16 States have been added to the ranks of those which regulate the working day or week of women either generally or in certain occupations, while the scope of many other laws and orders which applied only to specified employments has been made more general.

Legislation, however, has not been limited to the restriction of daily or weekly hours of work. In addition, nine more jurisdictions now prohibit or regulate the night work of women, while of the eight night-work laws already in effect in 1914 several have since been enlarged in scope. New regulations providing for daily rest periods and a weekly day of rest have also been adopted, while the effectiveness of many of those previously operating has been increased (see WOMEN IN INDUSTRY).

The working hours of children are limited to eight in 35 jurisdictions—a substantial gain over 1914—while every State now regulates to some extent either the daily or weekly hours of child labor. Some of these restrictions, however, are generally regarded as inadequate, such as a 60-hour week in South Dakota, Louisiana, Georgia and North Carolina and an 11-hour day in North Carolina. Some are difficult to enforce, while others permit a large number of exceptions. The recent Federal child labor amendment will, when it has been ratified by the necessary three-fourths of the States, enable Congress to enact an adequate universal restriction of hours of labor for children (see also CHILD LABOR).

In addition to these statutory limitations on working hours in the United States, union pressure as well as public sentiment has worked

towards a general reduction of hours in fields not affected by legislation. Perhaps the most outstanding example of this is the final adoption in 1923 by the steel industry of a three-shift eight-hour system instead of the former two-shift system, in deference, according to the executive head of the United States Steel Corporation, to "public sentiment, however created." See TRADE UNIONISM; LABOR ORGANIZATIONS, INTERNATIONAL; LABOR LEGISLATION; LABOR ARBITRATION; STRIKES.

HOURTICQ, LOUIS (1875-). A French art critic, born at Brossac, in Charente, and educated in Paris at the Ecole Normale. He was appointed professor of aesthetics and the history of art at the Ecole des Beaux Arts and was also a member of the Superior Council of Public Instruction.

He is the author of *Rubens; France, Histoire Générale de l'Art Français; Les Tableaux du Louvre; Récits et Réflexions d'un Combattant; La Jeunesse de Titien; Initiation Artistique; Manet; Histoire de la Peinture, des Origines au Seizième Siècle; La Galerie de Médicis au Louvre; Every One's History of French Art; De Poussin à Watteau.*

HOURLWICH, ISAAC A (ARONVICH) (1860-). An American statistician (see VOL. XI). His later works include *Mooted Questions of Socialism* (1917); he was also editor of a Yiddish translation of *Das Kapital* by Karl Marx (1919).

HOUSE, EDWARD MANDELL (1858-). An American publicist, born at Houston, Tex., and educated at Cornell University. He engaged in business in Texas and was at the same time active in Democratic politics as adviser, though not as an active participant or candidate for office. He was among the most prominent of those who worked for the nomination of Woodrow Wilson for the presidency in 1912, and he gained the confidence of Mr. Wilson to a marked degree. The President relied on him for advice in matters of appointment and policy. In 1914, at the outbreak of the War, he visited the warring countries in an effort to find a basis for peace. During the years following he made several other visits to Europe with the same purpose. When the United States entered the War in 1917, he attended the meetings of the Supreme War Council of the Allies in London, as chairman of the American Commission, and in that capacity communicated the views of the American government in regard to the conduct of the War to the Allied premiers and foreign ministers. As the end of the War approached in 1918, he was designated by President Wilson to act for the United States in negotiations for an armistice with the Central Powers. He was a member of the American Commission to Negotiate Peace at Paris, and during the absence of President Wilson from the United States, was practically in charge of American negotiations. On President Wilson's return to Paris, a break occurred in the relationship, and Mr. House ceased to take a prominent part in the deliberations. Following the War he retired from public life. He was joint editor, with Prof. Charles Seymour, of *What Really Happened at Paris*, and also published an autobiographical novel. In 1920 he joined the staff of the Philadelphia *Public Ledger*.

HOUSE, ROY TEMPLE (1878-). An American educator, born at Lexington, Neb., and educated at Miami University and the Uni-

versity of Michigan. He taught French and German in several schools and colleges until 1905, when he was appointed head of the modern language department at the Oklahoma Southwestern State Normal School, where he served until 1910. In the following year he was exchange professor in Germany. In 1911 he became professor of German and in 1918 head of the modern language department of the State University of Oklahoma. He was director for the Commission of Relief in Belgium in 1916 and was engaged in other important war work; he received decorations from the Belgian government for his services. His published writings include *Three French Comedies* (1905) and *Classroom French* (1910). He also translated several foreign plays and contributed book reviews to periodicals.

HOUSING. The housing problem even before the War was rapidly becoming serious. Already overcrowded conditions were being aggravated by the normal increase in population and the concentration in industrial centres. The difficulty of providing houses to rent at a figure attractive to workmen was discouraging new building by investors, and the tradition of home ownership by workers appeared to be dying out. War conditions brought the situation to a crisis. For a time after the opening of the War there was practically general suspension of building activities, on account of the shortage of material and labor and the highly increased costs: Repairs were neglected, replacements were not made, adequate provision was not supplied even for the normal increase in population, to say nothing of the emergency concentration at industrial centres. The congestion reached the previously unaffected middle classes. The return of the soldiers after the Armistice increased the urgency, and those governments which were not forced to deal with the situation during the War were unable to evade the issue in the years that followed. A brief account is given below of the widespread legislation, marking the post-war period, which aimed fully to utilize existing facilities, to curb profiteering, and to encourage building. Although in 1921 the house shortage was still serious, not only in every important country but even in centres as remote as Bagdad and Bombay, it was generally held that the crisis had been passed, notwithstanding the fact that it would take many favorable years to make up the deficit.

United States. In 1917, the acute scarcity of housing accommodation, especially in munitions and shipbuilding centres, made Federal action imperative. The United States Shipping Board was given an appropriation to provide housing for its workers (\$10,000,000 was spent at Hog Island alone in that year); and in 1918 an additional \$95,000,000 was granted for this purpose, \$20,000,000 of which was to go for transportation facilities. The War Department also built temporary villages adjacent to inaccessible munitions plants. The United States Housing Corporation, with a total appropriation of \$100,000,000, carried on construction for the Bureau of Industrial Housing and Transportation in 128 communities, housing 25,000 families and 25,000 single laborers; after the Armistice, 6000 families and 8000 single laborers. (See BRIDGEPORT.) One of the benefits resulting from Federal investigation was the development of standards for industrial housing. Although it was

estimated that between \$150,000,000 and \$250,000,000 was spent for workers' housing throughout the country in 1918, rents continued high, and in 1919 it was estimated that 1,000,000 additional houses were needed. There was a shortage of 35,000 apartments in New York City, and Chicago reported facilities 20 per cent less than requisite. To alleviate the situation, New York passed laws to permit the remodeling of old-type buildings, to protect tenants, and to stimulate building; the St. Louis Chamber of Commerce formed a \$2,000,000 building association; North Dakota launched a programme of State aid for houses not exceeding a cost of \$5000. The effort to stimulate building produced laws

of their incomes for rent, and that the total surplus of vacancies was so small as to necessitate the immediate extension of the emergency rent legislation, without discrimination as to rentals, for two years. It recommended the use of State and municipal credit for housing purposes. By the middle of January, 1924, several bills relating to rent laws were before the Legislature and two constitutional amendments had been proposed. See LAW, PROGRESS OF THE.

The following table comparing home-ownership statistics for the years 1910 and 1920 shows a decrease, slight yet of some significance, in the economic independence of the population of the United States:

Year	Per cent of all homes			Per cent of owned homes		
	Rented	Owned	Owned Free	Owned Encumbered	Free	Encumbered
1910	54.2	45.8	30.8	15.0	67.2	32.8
1920	54.4	45.6	28.2	17.5	61.7	38.3

exempting new structures from taxation; and other laws attempted to control profiteering by setting a maximum per cent of increase within a given period and by limiting the landlord's arbitrary right to dispossess. In 76 cities profiteering committees were formed; in 50 others, the Bureau of Industrial Housing and Transportation adjusted rent disputes. Although, after some improvement in conditions during the summer and fall, the crisis was believed to have been passed toward the close of 1920, the United States in 1921 was still facing a deficit of about 147 per cent of its normal building programme, which affected about 4,000,000 people. It was true that building costs had fallen, but private builders were still holding off awaiting a still further decrease. As for investors, with building costs still 100 per cent above the pre-war level and rents only 25 per cent above, home-building did not attract their capital; and while investigation pointed to from 13 to 14 per cent gross as the minimum return from any rented property, it was claimed that legislative interference kept rents at a figure that did not encourage building as an investment. About this time, price-fixing combines among contractors and producers of material, in some cases working in conjunction with corrupt labor leaders, were uncovered in New York and in Illinois. The general level of rent increases in 1921 was far above 25 per cent over pre-war figures. In one or two localities where there were rent laws, landlords were required to prove the reasonableness of any increase over 25 per cent above 1914 rents, but in general there were few places where the increase was not much greater. The cities covered by the Bureau of Labor Statistics showed in 1921 an increase ranging from 25.8 per cent in San Francisco and Oakland to 93.4 per cent in Norfolk, Va., the general increase ranging about 60 per cent (*Monthly Labor Review*, February, 1922, pp. 59-64). Other authorities show a greater increase. (See COST OF LIVING.) Figures for the first six months of 1923, returned from 65 cities of 100,000 or more inhabitants, showed issues of permits to house 195,016 families, or an increase of 47,766 over the first half and 49,361 over the second half of 1922.

In New York State, the housing commission, after an investigation, handed in a report in December, 1923, finding that rents had increased in three years between 40 and 93 per cent, that families with an income of from \$1000 to \$1500 a year were paying approximately 23 per cent

Investigation of housing conditions and legislation for their control were much stimulated and guided during the years after 1910 by the activities of the National Housing Association. Other attempts to improve the type of workers' homes were made by limited dividend companies (formed by philanthropic organizations, chambers of commerce, etc.), coöperative housing associations, and by both Federal and State authorities. Coöperative housing showed a little progress. There were some successful experiments in the larger cities, and Wisconsin passed an act promoting it. There had been no tendency in the United States to follow that European policy under which the government builds workers' homes; for, although Massachusetts did, with State money, build and sell 12 houses, the experiment seemed to have been abandoned afterward, and the Federal government's construction during the period was concerned only with war industry. Those forms of encouragement most in favor seemed to be the elimination of taxes on mortgages, tax exemption on new buildings, and government aid in the financing of local activities; construction itself was chiefly in the hands of contractors, although a considerable activity was shown by building and loan associations.

Great Britain. Following the outbreak of the War, two housing acts were passed, in 1914, but these being limited in scope were not generally productive of results. Investigations in 1917 uncovered an immediate need of 400,000 dwellings in England and Wales and 109,000 in Scotland. Since it was evident that private enterprise could not meet the situation, the Housing Bill of 1919 was passed, making it incumbent on local authorities to carry out housing schemes, with the government assuming the annual deficit in excess of a penny rate. In the same year an additional act went into force, providing a subsidy of £15,000,000 for private persons building small houses; checking luxury building and the wrecking of dwellings; and otherwise facilitating construction. This undertaking to provide for a shortage of from 500,000 to 800,000 houses was abandoned in 1921, in an effort to cut down expenditures. The new policy called only for the completion of 198,000 houses already undertaken, at a cost of £10,005,000, and an expenditure of £200,000 in improvement of slum areas. This discouraging outlook, however, was lightened by the activities of about 60 local building guilds. A rent law fixing the percentage of increase and controlling

dispossession had been extended in 1919, and replaced by a new law in 1920. Further extension of these provisions became a definite political issue in 1923, when general decontrol was deferred to June 24, 1925, and the protection of the tenant extended to 1930. Nevertheless, under the 1923 rent law, it was much easier for landlords to evict tenants, and since with the coming in of a new tenant a house was "decontrolled," thereafter the landlord could charge what rent he pleased, subject only to a vague review by the courts. Complaints were coming in from various cities that tenants were being forced out, and being unable to secure other quarters, were crowding workhouses in London to an alarming extent. Another bill providing for state aid to housing, on a smaller scale, was passed also in 1923, under which about 40,000 houses a year were being built.

France. In 1919, there were still 550,000 buildings to be supplied in the devastated area, and there was much overcrowding in the larger towns. A Cheap Dwellings Bureau was making some progress in that year with garden suburbs outside of Paris; and the destruction of the Paris wall and military zone was ordered, making available about 3025 acres. Government aid was being given in 1921 to about 2000 coöperative societies of reconstruction. Rent-limiting legislation had been found necessary; also some control over lodging and boarding houses.

Germany. The situation in Germany was complicated by the unsettled financial and labor conditions. In a number of towns, house room was rationed and civilians were billeted in private homes; and letting or selling was subject to regulation. In 1921, a national law required all states to spend at least 30 marks per head on house construction in 1921-22. Nevertheless, by 1922, construction had practically ceased. The owners, with only about $\frac{1}{2000}$ of their interest left to them by the rent-fixing law, had been practically expropriated. An attempt to raise a special fund for building was made in 1923 by levying a housing tax, fixed at 30 times the pre-war rent of houses. A law passed in 1923 to protect tenants was to have force until 1926.

Italy. In 1920, Italy was trying to meet the situation through coöperative societies and building clubs in the north and by the building of garden suburbs around Rome (where one-third of the population were without permanent homes), building activity being encouraged by a government subsidy of 100,000,000 lire, a drastic rent law passed in 1919, and certain tax exemptions. Restrictions on rent were, however, to end June 30, 1923, profiteering thereafter to be checked by the creation of a court of arbitration with power to decide in case of a deadlock between landlord and tenant, and by a threat to renew the rent law for 10 years if the landlords abused their privileges.

Other Countries. Canada did nothing with respect to housing during the War but in 1919 voted \$25,000,000 to assist workmen, particularly soldiers, to build homes at lowest cost, the fund to be distributed among the provinces on the basis of population; and similar action was taken in Australia in 1920 and in New Zealand in 1921. Belgium provided a housing subsidy of 100,000 francs in 1920; only 4000 of its 150,000 devastated dwellings having been replaced by that time. In Holland, where, notwithstanding an act in 1918 that provided

for 90 per cent loans for building purposes, there was a shortage of 60,000 houses in 1920, the situation in 1923 was much improved, partly due to a movement back to country towns and villages. Norway had a shortage of 18,000 houses at the beginning of 1919 and in 1920 several municipalities were going heavily into new construction. In Sweden where it had been necessary in 1919 to float a lottery bond loan to aid in building, and to pass rent restriction laws, by 1923 the shortage had perceptibly decreased. In 1920, Czecho-Slovakia was rationing rooms. Conditions in Soviet Russia were difficult to ascertain, but building permits to the number of 8914 from 271 municipalities in 1923 showed that 98.6 per cent of the structures planned for in that year were one-story houses of wood and other semipermanent materials; no buildings were to be more than two stories; and all were being built by owners. A survey of the principal centres of Denmark in October, 1923, showed 20,088 homeless individuals. In May, 1923, Copenhagen, finding part of its congestion due to an influx from the provinces, passed a law, retroactive to April 21, to check the movement by forbidding the leasing of apartments without a permit to persons with a residence elsewhere or whose last residence was outside the city.

HOUSMAN, LAURENCE (1865-). An English artist and author (see VOL. XI). His later publications include: *Bird in Hand* (1916); *The Sheepfold* (1918); *St. Francis Poverello* (1918); *The Heart of Peace* (1919); *The Wheel* (1919); *Ploughshare and Pruning-hook* (1919); *The Death of Orpheus* (1921); *Angels and Ministers* (1921); *A Peep-show in Paradise* (1921); *Little Plays of St. Francis* (1922); *Dethronements* (1922); *Moonshine and Clover* (1922); *A Doorway in Fairyland* (1922); *False Premises* (1922); and *Echo de Paris* (1923).

HOUSTON. A city and port of entry of Texas, situated on the Houston Ship Channel. The population increased 61 per cent from 85,784 in 1910 to 138,278 in 1920, to 154,970 by estimate of the Bureau of the Census for 1923 and to 195,409 by local estimate. In 1919, the development of Houston as a cotton port was inaugurated; in 1924, the city celebrated the exportation of her millionth cotton bale for one shipping season, and the attainment of rank of second cotton port in America. A \$4,000,000 bond issue was voted in 1923 to provide for the construction of six additional wharves 500 by 150 feet, a 5-mile extension of the harbor belt railway, and a grain elevator with initial capacity of 1,000,000 bushels and storage capacity of 9,000,000 bushels. The tonnage of the port increased 340 per cent in the four years from 1920 to 1923, from 714,621 to 3,149,196, and its value 194.8 per cent from \$72,967,344 to \$215,109,522; building increased 435 per cent between 1914 and 1923.

HOUSTON, DAVID FRANKLIN (1866-). An American public official (see VOL. XI). From February, 1920, to March, 1921, he was Secretary of the Treasury. He was also chairman of the Federal Reserve and Farm Loan Boards. From 1916 to 1920 he was a member of the Council of National Defense.

HOVGAARD, WILLIAM (1857-). An American naval architect, born at Aarhus in Denmark. He graduated from the Naval Academy of Denmark in 1879 and from the Royal

Naval College at Greenwich, England, in 1886. After service in the Royal Danish Navy he was a member of the Danish expedition at St. Croix to observe the transit of Venus in 1882. After naval service from 1897 to 1901, he came to the United States and became professor of naval design and construction at the Massachusetts Institute of Technology. He was employed in the Bureau of Construction and Repair of the Department of the Navy in 1917-18. He is a member of many naval and scientific societies and is the author of *Submarine Boats* (1887); *Voyages of the Norsemen to America* (1914); *Structure and Design of Warships* (1915); *Modern History of Warships* (1920), and *General Design of Warships* (1920).

HOWARD, CLINTON NORMAN (1868-). An American lecturer and temperance advocate (see VOL. XI). Some of his later lectures were "The World on Fire" (1917); "A Scrap of Paper" (1917); and "Cost, Cause and Cure of War" (1917).

HOWARD, JOHN GALEN (1864-). An American architect (see VOL. XI). From 1912 he was a member of the Board of Consulting Architects of San Francisco and from 1913 director of the School of Architecture of the University of California, for which he designed the Greek Theatre and other buildings. He was a member of the National Institute of Arts and Letters and was formerly president of the Society of Beaux Arts Architects. In 1918-19 he served as captain in the American Red Cross in France.

HOWARD UNIVERSITY. A nonsectarian, coeducational institution for the higher education of Negroes in Washington, D. C., founded in 1867, and largely supported by Congress. In 1918, all the secondary schools of the university were abolished and the whole plan of undergraduate work changed. The four-year college course was divided into two periods of two years each, the Junior College, and the Senior Schools. The semester system was abolished in June, 1919, and the quarter system substituted. Departments of architecture, of public health and of physical education were established. Despite the loss of the secondary students the total enrollment of the university rose from 1463 students in 1914 to 2123 in 1923. Twenty-six new members were added to the faculty between the reorganization of the university in 1918 and 1923, and the Congressional appropriations in the same period increased from \$117,937 to \$232,500 annually. A dining hall building with class rooms for the department of home economics was built in 1921 at a cost of \$301,000, and plans were under way for a new gymnasium and stadium. A greenhouse was erected in 1919, and Howard Hall, for many years used as a detention house for incorrigible children, was renovated and made a dormitory for girls; many improvements were also made on the campus. The General Education Board offered to give \$250,000 as an endowment to the Medical School provided the university raised a like sum. J. Stanley Durkee, Ph.D., D.D., became president in 1918.

HOWE, FREDERICK CLEMSON (1867-). An American lawyer and public official (see VOL. XI). From 1914 to 1919 he was Commissioner of Immigration at the Port of New York and published *Socialized Germany* (1915), *Why War?* (1916), and other economic and political works.

HOWE, GEORGE (1876-). An American educator, born at Wilmington, N. C., and educated at Princeton, the University of Halle, Oxford, and the American Classical School in Rome. He became professor of Latin at the University of North Carolina in 1903, and in 1919 dean of the College of Arts. He was a member of the State Council of Defense, 1917-18. Professor Howe was the author of several textbooks and associate editor of *Study and Philology*.

HOWE, HARRISON ESTELL (1881-). An American chemist, born at Georgetown, Ky., and educated at Earlham College and Michigan and Rochester Universities. In 1901 he became chemist to the Sanilac Sugar Refining Company and in 1902 went to the Bausch and Lomb Optical Company, with which he remained until 1915, when he became assistant to the president and later department manager of the research concern of A. D. Little in Cambridge, Mass. In 1919-22 he was chairman of the division of research extension of the National Research Council and also served as consulting chemist to the Ordnance Bureau. Later he was a major in the Retired Corps. In 1921 he became editor of the *Journal of Industrial and Engineering Chemistry*, and in the same year published *The New Stone Age*.

HOWE, MARK ANTONY DE WOLFE (1864-). An American editor and author (see VOL. XI). His later works include: *The Humane Society of the Commonwealth of Massachusetts* (1918); *The Atlantic Monthly and Its Makers* (1919); *George von Lengerke Meyer, his Life and Public Services* (1919); and *Memoirs of the Harvard Dead in the War against Germany*, 2 vols. (1920, 1921). He was the editor of *Harvard Volunteers in Europe* (1916).

HOWELLS, JOHN MEAD (1868-). An American architect, born at Cambridge, Mass., son of William Dean Howells. He graduated from Harvard in 1891 and afterward studied at the Ecole des Beaux Arts. From 1907 to 1917 he was a member of the architectural firm of Howells and Stokes of New York and Seattle. He designed and erected buildings for Harvard, Yale, and Columbia Universities and for banks and other financial institutions in New York, San Francisco, Seattle, and other cities. He was a member of the American Institute of Architects and the American Institute of Arts and Letters and president of the New York Society of Diplomat Architects of Paris. He contributed frequent articles on technical and literary subjects to magazines.

HOWITZERS. See ARTILLERY.

HOWLAND, HAROLD JACOBS (1877-). An American writer, born at Chatham, N. Y., and educated at Amherst College. He was with several publishing companies in New York and elsewhere until 1902, when he became a member of the editorial staff of *The Outlook*. He was associate editor of *The Independent*, 1913-20, and managing director of the Independent Corporation, 1919-20. In 1910 he was a candidate of the Progressive party for Congress and was a member of the State Executive Progressive Committee of New Jersey. During the War he served with the Y. M. C. A. in Italy. He was the author of *Theodore Roosevelt and His Times*, in the *Chronicles of America* series.

HOWZE, ROBERT LEE (1864-). An American soldier, born in Rusk county, Tex. He graduated from the United States Military

Academy in 1888 and was commissioned 2d lieutenant in the same year. He served as a volunteer in the Spanish-American War and rose to the rank of captain. In 1901 he was commissioned captain of the Regular Army. He served as major of the Porto Rico provisional regiment, 1901-04, and from 1905 was commandant of cadets of the United States Military Academy. After service in Porto Rico and as colonel of the 11th Cavalry, he was detailed to the General Staff in 1916. In the following year he was appointed brigadier-general in the National Army and commanded the 2d Cavalry Brigade on the Mexican border. He became major-general in 1918 and was given command of the 38th Division. With this he served in the Meuse-Argonne campaign and then was commander of the 3d Division with the Army of Occupation in Germany until Aug. 14, 1919. He was assigned to the Mexican border, commanding the 1st Cavalry Division.

HRDLICKA, ALES (1869-). An American anthropologist (see VOL. XI). His later works include *Notes on the Pathology of the Ancient Peruvians* (1914); *The Most Ancient Skeletal Remains of Man* (1914); *Physical Anthropology in America* (1914); *Anthropology of the Chippewas* (1916); *Physical Anthropology of the Lenape, Delaware and Eastern Indians in General* (1916); *The Old White American* (1917); *The Genesis of the American Indian* (1917); and *Anthropology of Florida* (1922).

HUARD, FRANCES WILSON (BARONESS HUARD) (1885-). An American writer and relief worker, born in New York City. She was privately educated and in 1905 married Baron Charles Huard, a painter and illustrator of Paris. At the outbreak of the War she turned her château over to the French government. When this building was destroyed, she transferred the hospital in 1917 to Paris, where she maintained 100 beds through funds collected during lecture tours in the United States. She wrote *My Home in the Field of Honor* (1916); *My Home in the Field of Mercy* (1917); and *Lilies White and Red*.

HUBBARD, HENRY VINCENT (1875-). An American landscape architect, born at Taunton, Mass. He graduated from Harvard University in 1897 and afterward studied landscape architecture there and also at the Massachusetts Institute of Technology. From 1906 to 1918 he was a member of the firm of Pray, Hubbard, and White, Boston. He was appointed instructor of landscape architecture at Harvard in 1906, assistant professor in 1910, and professor in 1921. He was a founder and chief editor of *Landscape Architecture*. During the War he designed and built several cantonments and also assisted in designing housing communities. He was a Fellow of the American Society of Landscape Architects and a member of the American City Planning Institute and the British Town Planning Institute. His writings on architectural subjects include *Introduction to the Study of Landscape Design*, in collaboration with Theodora Kimball (1917). In 1919 he edited the report of the United States Housing Corporation.

HUBERICH, CHARLES HENRY (1877-). An American lawyer, born at Toledo, Ohio. He was educated privately and studied law at the University of Texas, and in Germany. In 1898 he was admitted to the bar. He was a member of the faculty of the University of Texas from

1900 to 1905, when he was appointed assistant professor of law at Leland Stanford Junior University. He became professor in 1907. In 1909-10 he was professor of law at the University of Wisconsin. He was a member of several legal associations and is the author of *The Trans-Isthmian Canal* (1904), *Law Relating to Trading with the Enemy* (1918), and volumes on the commercial law of Australia, New Zealand, Canada, and other British dominions. He also edited volumes on the laws of the United States.

HUCH, RICARDA (1864-). A German poet, novelist, and historian (see VOL. XI). Her later works include a war novel in three volumes, *Der grosse Krieg in Deutschland* (1914); *Natur und Geist als die Wurzeln des Lebens und der Kunst* (1914); *Wallenstein* (1915); *Das Judengrab* (1916); *Luthers Glaube* (1916); *Der Fall Deruga* (1917); and *Der Sinn der Heiligen Schrift* (1919).

HUDSON, MANLET OTTMER (1886-). An American lawyer and educator, born at St. Petersburg, Mo., and educated at William Jewell College, Harvard University, and the Harvard Law School. He was assistant in history at Harvard and Radcliffe Colleges from 1907 to 1910, and from 1910 to 1919 professor of law at the University of Missouri. He joined the faculty of Harvard as assistant professor of law in 1919 and was made full professor in 1921. He was a member of many important commissions on State laws and in 1917 was attached to the office of the Solicitor to the Department of State. He was counsel of the United States Government Inquiry on the terms of peace, 1917-18, and served in other capacities at the Peace Conference in Paris. In 1919 he was a member of the legal section of the Secretariat of the League of Nations and acted as legal adviser to the International Labor Conferences in Washington and Genoa. He was the author of many articles in legal periodicals.

HUDSON, W. H. (1841-1922). A British naturalist and author, born at Quilmes near Buenos Aires, Argentina, of American parents who had settled there. He remained in South America till the age of twenty-nine, when after the death of both parents he made his home in England. Details of his early life except so far as they appear in his books are not known, but from the age of fifteen until he went to England he had traveled beyond the Rio Negro to Banda Oriental across the La Plata and westward over the pampas. Apart from his considerable reputation as an originally sympathetic and understanding writer in natural history, which began with the publication of *Argentine Ornithology* (1888-9), he attained also, by the quality of his prose, a high place in English literature. While his books dealing with England, in their informal, pleasing revelation of its people, its birds, all its small life, as he came upon these in less frequented corners, are here and there set with passages of a stirring, lyric beauty, it is in his writings on South America that he is most effective, poetic and colorful. In *Green Mansions* (1904), by far his finest literary work, he produced a masterpiece of poetic and compelling fiction, woven consistently in beautifully-textured prose. His published works include also: *The Purple Land* (1885); *A Crystal Age* (1887); *Naturalist in La Plata* (1892); *Idle Days in Patagonia* and *Birds in a Village* (1893); *British Birds* (1895); *Birds*

in London (1899); *Nature in Downland* (1900); *Birds and Man* (1901); *El Ombú* (1902); *Hampshire Days* (1903); *A Little Boy Lost* (1907); *The Land's End* (1908); *Afoot in England* (1909); *A Shepherd's Life* (1910); *Adventure Among Birds* (1913); *Far Away and Long Ago and History of My Early Life* (1918); *Birds in Town and Village* and *The Book of a Naturalist* (1919); *A Traveller in Little Things and Dead Man's Pluck* (1921); and *A Hind in Richmond Park* (1922). Mr. Morley Roberts in *W. H. Hudson, A Portrait* (New York, 1924) while expressly disclaiming the office of biographer supplies a valuable body of information and personal reminiscences.

HUDSON RIVER TUNNEL. See TUNNELS.

HUGEL, FRIEDRICH, BARON VON (1852-). An Austrian-English writer on religion (see VOL. XI). In 1916 he wrote *The German Soul*; in 1921, *Essays and Addresses*.

HUGGENBERGER, ALFRED (1867-). A Swiss writer. He was born at Bewangen of farmer folk and attended only a village school. His writing, done in intervals of hard manual labor, found warm appreciation among German critics. He has written, in verse and fiction, *Hinterr Pfluge* (1908); *Von den Kleinen Leuten* (1909); *Das Ebenhöchst* (1911); *Die Bauern von Steig* (1913); *Die Stille der Felder* (1913); *Dorfgenossen* (1914); *Die Geschichte des Heinrich Lentz* (1915); *Aus Meinem Sonnengarten* (1917); *Die Heimliche Macht* (1919); and *Wenn der Märzwind Weht* (1920).

HUGGINS, MILLER J. (1880-). Professional baseball player and manager, born at Cincinnati, Ohio. His first big league engagement was with the Cincinnati National League Club where he served from 1904 to 1909 when he was traded to the St. Louis Club of the same league. He managed this club for five years and was then made manager of the New York American League Club, his team the "Yankees," winning pennants in 1921, 1922 and 1923, and the world's championship in the last-named year.

HUGHES, CHARLES EVANS (1862-). An American jurist and public official (see VOL. XI). He resigned from the Supreme Court, to which he had been appointed in 1910 by President Taft, in order to become Republican candidate for the presidency in 1916. He was defeated by Woodrow Wilson and returned to the practice of law. In 1919-20, by the appointment of President Wilson, he investigated alleged irregularities in the building of army and navy airplanes during the War. In March, 1921, he became Secretary of State in the cabinet of President Harding, and as such presided at the Disarmament Conference, Washington, in 1921-22. Other important problems which he handled as Secretary of State related to the German treaty, mandates, the oil controversy, and American participation in the World Court, which he advocated in 1923.

HUGHES, CHARLES FREDERICK (1860-). An American naval officer, born in Bath, Me. He graduated from the United States Naval Academy in 1884. During the Spanish-American War he served on board the *Monterey*, participating in the battle of Manila. He was on duty with the Bureau of Equipment from 1904 to 1906 and served as Chief of Staff of the Atlantic Fleet in 1913-14. He was a member of the General Board of the Navy Department

from 1914 to 1916 and served with the British Grand Fleet in the North Sea in 1917-18. In the latter year he was promoted to the rank of rear-admiral and was placed in command of the Navy Yard in Philadelphia.

HUGHES, HATCHER (?-). An American playwright, born in South Carolina, and educated at the University of South Carolina and Columbia University. In 1912 he started giving courses in the drama and playwriting at Columbia. For four years he directed the Morningside Players, an organization of Columbia University, which was the first to present a play by Elmer Rice. In 1922, with Elmer Rice, Mr. Hughes wrote *Wake Up, Jonathan*, in which Mrs. Fiske starred on tour for a solid season after three months in New York. In 1924 Mr. Hughes's *Hell-bent fer Heaven* was awarded the Pulitzer Prize.

HUGHES, HECTOR JAMES (1871-). An American educator, born at Centralia, Pa. He graduated from Harvard in 1894 and later studied at its Lawrence Scientific School. Meanwhile, during 1894-98, he was connected with the Brookline (Mass.) Town Engineer's Office and in 1899-1902 was connected professionally with the Chicago, Burlington, and Quincy Railroad in Chicago. In 1902 he returned to Harvard as instructor in civil engineering, becoming in 1914 professor of that subject, and in 1920 dean of the Engineering School. Also during 1914-18, he lectured on his specialty at the Massachusetts Institute of Technology. He is the author of *A Treatise on Hydraulics*, with A. T. Safford (1911), *Roads and Toll Roads in America* (1913), and *Highway Engineering Education* (1914, 1916).

HUGHES, RUPERT (1872-). An American writer (see VOL. XI). His later writings include: *Empty Pockets* (1915); *Clipped Wings* (1916); *The Thirteenth Commandment* (1916); *In a Little Town* (1917); *We Can't Have Everything* (1917); *The Unpardonable Sin* (1919); *Long Ever Ago*, a volume of Irish stories (1919); *What's the World Coming To?* (1920); *Beauty* (1921); *Monna* (1921); *Souls for Sale* (1922). He wrote and directed many motion pictures, including *Scratch My Back* (1920); *The Old Nest* (1921); *Dangerous Curve Ahead* (1921).

HUGHES, THOMAS WELBURN (1858-). An American lawyer and educator, born in Canada and educated in Canada and at the University of Michigan. From 1892 to 1898 he was instructor in law at that university and later served on the faculties of the University of Illinois and Louisiana State University. From 1912 to 1915 he was dean and professor of law at the University of Florida and served as dean there from 1919. He was the author of *Hughes on Evidence* (1908); *Hughes on Criminal Law* (1913); *Hughes: Cases on Evidence* (1920), and many pamphlets and magazine articles.

HUGHES, WILLIAM MORRIS (1864-). An Australian statesman, born in Wales. In 1844 he went to Australia, where he entered politics as a member of the Legislative Assembly of New South Wales, in 1893. He resigned this position to become a member of the Federal Parliament. In this body he devoted himself to the interest of labor and advocated a very advanced policy. He was attorney-general of various labor administrations from 1908 to 1915. In the following year he became Prime Minister. During the War he was defeated

twice on the subject of conscription. He formed a coalition with the Liberals and was again defeated in 1922. In 1923 he was again chosen Premier but was obliged to resign on the defeat of his government later in that year. He was a delegate at the Paris Peace Conference and took a prominent part in the deliberations. See AUSTRALIA.

HULETT, GEORGE AUGUSTUS (1867-). An American chemist, born in Illinois, and educated at Princeton and Leipzig. He was an assistant in chemistry at Princeton, then an instructor at the University of Michigan (1899-1904), and again at Princeton, where in 1909 he became professor of physical chemistry. He was also chief chemist of the Bureau of Mines (1912-13). During the War he was a member of the foreign service commission of the Natural Research Council and visited France and England to study the origin and development of scientific activities in connection with warfare. His original investigations were almost entirely in problems of physical chemistry, e.g. isomorphism in precipitates, occlusions in electrodeposits, and decomposition potentials. He was a member of the United States Assay Commission in 1906.

HULL, CORDELL (1871-). An American public official (see VOL. XI). He served as a member of Congress, 1907-21. From the latter date he was chairman of the Democratic National Committee and was later chairman of the Democratic National Executive Committee. In this capacity he called to order the Democratic national convention of 1924 and was also chairman of the platform committee at that convention.

HULSE, HIRAM RICHARD (1868-). An American bishop, born at Middletown, N. Y., and educated in Philadelphia. After studying theology he was ordained deacon and priest. He was for several years vicar of the Pro-Cathedral in New York and from 1899 to 1912 was rector of St. Mary's Church there. He was also Secretary of the American Church Missionary Society and in 1915 was consecrated bishop of Cuba.

HÜLSEN, CHRISTIAN K. F. (1858-). A German historian and archaeologist. He was born in Berlin and studied at the university under Mommsen. After teaching several years he was appointed director of the German archaeological institute in Rome; in 1917 he became honorary professor at Heidelberg. He is the author of *Die Thermen des Caracalla* (1898); *Forum Romanum* (1904); *Topographie der Stadt Rom im Altertum* (1897); *Die Thermen des Agrippa* (1910); *Il Libro di Giuliano di Sangallo* (1910); and *Roms Antikengärten* (1917).

HUMAN EVOLUTION. See ANTHROPOLOGY.

HUMBERT, GEORGES LOUIS (1862-). A French general, born in Gazaran. He entered the army in 1883 and served in Indo-China, Madagascar, and other French colonies. He was in service in Morocco in 1913 and in 1914 and was placed in command of the Moroccan division at the outbreak of the War. Later in 1914 he commanded the 23d Army Corps. He was given command of the 3d Army in 1915. This post he held for three years, with distinguished success. In 1919 he was made governor of Strassburg and in 1920 a member of the Superior War Council.

HUME, SAMUEL JAMES (1885-). A dramatic director and producer, born in San Francisco, Cal., and educated at California and Harvard Universities. He organized the first exhibition of stagecraft in the United States in 1914 and exhibited in Boston, New York, Chicago, Detroit, and Cleveland. In 1918 he became assistant professor of dramatic literature and art at the University of California and directed the Greek Theatre there. He is also interested in pageant and masque productions.

HUNEKER, JAMES GIBBONS (1860-1921). An American musical and literary critic (see VOL. XI). In 1921 he published *Steeplejack*, largely autobiographical. His death cost American letters one of its most discerning critics whose large and contagious enthusiasms succeeded, more than any other single force, in familiarizing Americans with modern European artistic movements. He was one of the first to write of Gauguin, Ibsen, Wagner, Nietzsche, France, Faguet, Van Gogh, and George Moore. In this sense possibly he was only a reporter; but he reported the advent of new genius with discrimination, a rare gift.

HUNGARIAN LITERATURE. The great events of the decade 1914-24 did not much influence the literature of Hungary, as that country acted always a rather passive part in European politics. As no Hungarian felt enthusiasm for the War and nobody surmised the tragic end fate prepared for the old kingdom, the national literature of the Hungarians continued its course of natural evolution even during the great cataclysm. Literary production grew continuously and the people were willing to pay hundreds of thousands of their depreciated crowns for a good book. During the last years, as was to be foreseen, modern tendencies became prevalent. Tradition and political conditions had created for centuries a retrospective seclusion of Hungarian literature. On the eve of the new century a small group of young poets and writers, all admirers of the great western nations, revolted against the old traditions. The very title of their magazine *Nyugat* (The West) expresses their programme. Amid the great contest of national and human ideas they were fighting on humanity's side, but after their victory they were again returning to a sound and sober nationalism. The representatives of the old school, some of them fed at the breast of classicism, but finally growing into a languishing triviality, were slowly dying out. The young authors revived the whole literature, filled it with strength, added very much to the treasury of language and were refining all styles of writing from classical down to the futurist. Among the modern poets, Endre Ady (1877-1919) representing lyric poetry, was the most prominent. A staunch admirer of the French "decadents," he learned their affectation in showing a neglect of the forms while, in fact, they were bringing these same forms to perfection. Many of his poems are of permanent value. Mihály Babits was the most sensible, most erudite, and perhaps the greatest living poet of Hungary. His translation of Dante's *Divina Commedia* is unsurpassed. Dezső Kosztolányi was also a great master of his art, and a soul of very deep feeling. His *Complaints of a Poor Little Child* is on a level with the best creations of modern poetry. Being a keen philologist, he translated many American, English, French, German, Ital-

ian, and Spanish poems into Hungarian (*Modern Poets*, 3 vols., 1922). Among the other lyric poets, Gyula Juhász, Simon Kemény and Árpád Tóth were most popular. In the field of fiction, after the quarter-century interval of sterility that followed the great novels of Lókai and Mikszáth, Zsigmond Móricz was in the last years of the decade leading a small but vigorous troop of young novelists, the best among them Margit Kaffka, Lajos Biró, Mihály Babits, Dezső Kosztolányi, Aurél Kárpáti, and Miklós Surányi. In a class by herself was Renée Erdős with her realistic novels; *Cardinal Santerra* is her most admirable work. The modern Hungarian drama already enjoyed a good reputation in the theatrical world. The vigorous, quick action and the finely-spun dialogue, full of life and wit, made some Hungarian dramatists world-famous. Ferenc Molnár's *The Devil, Liliom*, *Fashions for Men*, *The Swan*, Lajos Biró's *Moonflower* and *Highwayman*, Menyhért Lengyel's *Typhoon* and *Sancho Panza* and Ernő Vajda's *Fata Morgana*, were uncommon successes on the American stage, too. Among modern dramatists, not yet known in America, Ferenc Herczeg, Jenő Heltai, and Frigyes Karinthy are to be mentioned. In the scientific literature, two great historical works, Sándor Márki's *Francis Rákóczi II*, and László Erdélyi's *The Period of the Árpád Dynasty*, also Jenő Cholnoky's monumental *Geography of America* and the literary studies of György Király, are achievements of serious value.

HUNGARY. A republic of Europe from Nov. 16, 1918, to Mar. 23, 1920, when the country was declared a monarchy. The throne, however, was vacant. Under the terms of the Treaty of Trianon, the area of Hungary is 35,790 square miles. It is bounded on the north by Czecho-Slovakia, on the east by Rumania and Poland, on the south by Jugo-Slavia, and on the west by Austria. The population, according to the census of 1921, was 7,945,000. The principal cities were Budapest with a population of 1,194,616; Szeged, 110,000; and Debreczen, 103,000.

Agriculture. Hungary was chiefly an agricultural country. The acreage and yield of the principal crops for 1923 was as follows:

Commodity	Area (acres)	Yield (metric tons)
Wheat	3,478,150	1,841,880
Rye	1,682,087	815,660
Barley	1,198,657	536,660
Oats	872,763	379,820
Corn	2,513,983	1,401,100
Potatoes	649,988	1,715,800
Sugar beets	137,355	881,500

According to the census of 1920, the live stock was as follows: horses, 746,423; cattle, 2,221,988; sheep, 1,817,405; pigs, 3,729,190.

Commerce. According to figures published in 1924, the trade balance for 1923 showed an excess of imports over exports of 80.4 million gold crowns as compared with an adverse balance of 214 million gold crowns in 1922. While details for the 1923 trade were not available, the 1922 figures showed imports of 166 billion paper crowns and exports of 91 billion paper crowns, or an adverse balance of 75 billion crowns, which is estimated at 214 million gold crowns. The chief items entering into the 1922 figures were as follows (in millions of paper crowns): wheat and rye flour, 18,000; wine, 3600; fruit,

880; vegetables, 924; grain, 1539; food products, 20,800.

The chief countries of destination of Hungarian goods in the order of importance were Austria, Czecho-Slovakia, Rumania, Jugo-Slavia, Germany, Italy, and Switzerland. Hungarian imports were drawn principally from Austria, Czecho-Slovakia, Germany, Rumania, Poland, Great Britain, and Italy.

Mining and Manufacturing. The Hungarian production of coal in 1922 totaled 741,000 tons of bituminous and 5,615,000 tons of brown coal. The chief Hungarian industries were those that were allied with the agricultural resources of the country and consisted of grain mills, distilleries, sugar refineries, and plants for the manufacture of hemp and flax. Some iron and steel was produced.

Transportation. The total length of Hungarian railways in 1922 was 4493 miles, of which 1858 were owned by the state. Of the total railways, 598 miles were of double track.

Finance. Figures on Hungary's national debt were difficult to obtain. Considerable confusion existed as to Austria's share of the debts of the old Austro-Hungarian Monarchy, and until this question could be cleared up no definite figures were possible. The rapid depreciation of the Hungarian crown, which occurred throughout 1922 and 1923, made it impossible accurately to estimate the amount of government revenue and expenditure. The budget for the fiscal year 1922-23 (June 30, 1922, to July 1, 1923,) estimated expenditures at 193,000,000,000 paper crowns and revenues at 153,000,000,000 paper crowns, or a deficit of 40,000,000,000 crowns. Inasmuch as this budget was not presented until the eighth month of the budget year, and since exchange fluctuated considerably in the meantime, any conversion into stable values would be misleading. During 1921 and 1922 and the early months of 1923, the Hungarian crown, except for occasional periods of stability, declined steadily. At no time, however, were fluctuations as violent as in the summer of 1923, when the crown fell from 0.0118 cent to 0.0039 cent in less than two weeks. Foreign exchange quotations for the Hungarian crown stood at 0.0409 on Jan. 1, 1923; at 0.0052 cent on December 31; and at 0.0013 cent on Mar. 15, 1924. The statement of the Royal National Bank of Hungary of Dec. 23, 1923, showed a total note circulation of 901,000,000,000 paper crowns as compared with 75,000,000,000 paper crowns on Dec. 31, 1922. The metal reserve of the bank, consisting of gold coin and gold bullion, and foreign currencies and securities, amounted to 22,800,000 gold crowns. Silver and other currency totaled 595,674 gold crowns. On Dec. 31, 1922, the metal reserve amounted to 16,000,000,000 paper crowns.

Economic Conditions. Throughout 1923 the cost of living rose steadily. On the basis of 100 for 1913, the general average cost of living index figure for Oct. 31, 1923, was 410,529, as against 48,516 on Mar. 31, 1923, and 25,624 on Dec. 31, 1922. As a result primarily of the rapid depreciation of the foreign exchange value of the crown, the second half of the year 1923 was marked by disorganization both in business and in finance. The principal causes of the decline were the inability of the government to balance its budget and the heavily adverse balance of trade. In order to meet these conditions the government was obliged to resort to

note inflation. Thanks to Hungary's agricultural character, however, the effects on trade and industry of currency depreciation were less severe than in the case of Germany and Poland. As a matter of fact, many industries, notably the cotton, wool and silk industries, were temporarily stimulated by increased foreign and domestic demand. Internal buying was largely of a speculative character and contributed to a great extent to the sharp increases in living costs which followed the decline in exchange. The most important development during 1923 was the application made to the Reparations Commission by the Hungarian government for an international loan for the purpose of rehabilitating the country's finances. The plan, which was accepted by the Hungarian government, provided for a loan of \$50,000,000 to be repaid over a period of 20 years; amortization and interest charges to be met from receipts from monopolies and other sources. The plan also granted a moratorium of two years on reparations payments. At the expiration of this period Hungary would be required to pay \$2,000,000 a year for 20 years on account of reparations. In consideration of this loan, Hungary agreed to discontinue the policy of note inflation; to establish a new bank of issue independent of the state; to balance its budget by June 30, 1926; and to place the railways and other state institutions on a self-supporting basis. The plan also called for a financial supervision by the League of Nations similar to that of Austria.

History. Under the government of Count Tisza, Hungary participated in the conduct of the War, unquestioningly as far as the Magyars were concerned, but with reluctance by the other nationals. The death of the aged Emperor (Nov. 21, 1916) loosed all those dissident forces which had yielded only a reluctant allegiance. The independent spirit of the Prime Minister quickly antagonized the new King, who, listening to the counsels of the court cabal, dismissed Tisza in May, 1917. Weaker men assumed control, with the result that the country was rent by political dissensions. Count Esterhazy became premier for a time but was soon succeeded by Herr Wekerle. The agitation over the extension of the political franchise attracted attention away from more pressing concerns, with the result that the hardships of the civil population increased with the failure of the government to buy up the harvests, etc. All the familiar customs were now to go down before the new revolutionary spirit that gripped the Hungarian people as the War dragged on. The demand for reform became increasingly insistent and gained importance from the personal prestige of Count Karolyi who had assumed leadership of the forces of discontent. His hand was strengthened by the royal manifesto of Oct. 16, 1918, which was tantamount to a dissolution of the Dual Monarchy. Thenceforth Hungary went her separate way. Believing that Karolyi was in a position to gain more favorable terms from the Allies, Hungarian statesman yielded to his advice and on Oct. 25, 1918, formed a National Council. Five days later Karolyi was summoned to head it as minister-president. In accordance with his liberal, nay, republican professions, he recalled the Hungarian troops from the front and viewed with complacency the formation of workers' and soldiers' councils in Budapest. The revolution

took a more violent character when, on October 30, Count Tisza, the leading representative of the old régime, was killed. On November 16, the National Council proclaimed Hungary a republic; on Jan. 11, 1919, it elected Karolyi provisional president. Karolyi's hopes that his anti-war and republican sentiments might serve to gain more favorable peace terms for Hungary received a rude check when a new armistice deprived Hungary of large territories in favor of Rumania and Serbia. This setback, the invasion of Hungarian lands by Rumanian and Czech troops, the increasing war-weariness that made any régime other than the one in power desirable, the growing turbulence of the workers, and the example of the successful Russian Revolution, united to undermine the government. Karolyi, with more prudence than courage, yielded up his post, and on Mar. 22, 1919, Hungary became a Soviet Republic dominated by an alliance between the Social Democrats and the Communists, the only well organized parties.

From March 22 to August 1, the doctrine of the dictatorship of the proletariat ruled the distracted country. Alexander Garbai became president of the Republic, though the actual ruler was Béla Kun, commissary for foreign affairs, and friend of Trotsky and Lenin. Other leaders were Szamuely, Pagany, Böhm, and Varga. Initial measures were rigorous. The revolutionary government council proclaimed the socialization of large properties, mines, industries, banks, and other commercial institutions. All ranks and titles were abolished and church and state separated. A strict censorship of the press was imposed. Money was sent into Vienna in an attempt to spread the Bolshevik propaganda there. The middleman was singled out for attack; all raw materials were made a state monopoly. For the conciliation of the peasantry, private property in holdings of 100 acres or less was permitted. The career of the Soviet Republic was short. The closing of the factories for want of materials stirred the workers into hostility, while the persecutions of the church and the placement of Jews in high offices antagonized the devout peasants. The nobility was naturally embittered and intrigues soon led to the formation of a counter-government with an army recruited by Vice-Admiral Horthy. Béla Kun's failure to come to an understanding with the Supreme Council's representative, General Smuts, and his policy of militant opposition to Hungary's enemies, hastened his downfall. His Red Army was soon at war with the troops of Rumania, Jugo-Slavia, and Czecho-Slovakia. An initial victory against the Czechs brought down the wrath of the Supreme Council on Béla Kun, and Hungary was threatened with military and economic reprisals. To conciliate the Peace Conference, Béla Kun withdrew his forces from the conquered Slovak territory, only to be confronted by an advancing Rumanian army on the east. Resistance was useless; the Rumanians advanced on the capital with the tacit consent of the Allies; and beset by obstacles everywhere, the Soviet government resigned and took refuge in flight, finding a haven first in Vienna and later in Russia.

A White government, except for a brief interval, now succeeded the Reds. As a result of the intercession of the Allies, a moderate Social Democratic government was at once overthrown on August 7, and the reactionary Archduke

Joseph was set up as regent of the state with Herr S. Friedrich as premier. All interest was diverted from internal affairs in the face of the advancing Rumanian army. On August 3, after having pillaged the countryside, the Rumanians entered the suburbs of Budapest; on August 5, against the injunction of the Supreme Council, the army took the city; on August 6, an ultimatum was served on the Hungarians demanding 30 per cent of the harvest, farm animals, and farm tools, 50 per cent of the rolling stock, and the equipment for an army of 300,000 men. Not until after they had stripped the country bare did the Rumanians yield to the reiterated remonstrances of the Allied Supreme Council and quit the capital, November 11, and the country entirely, February, 1920. Meanwhile, reaction was in the saddle. Archduke Joseph, at the order of the Allies, was compelled to quit the regency only to be succeeded by the virtual rule of Admiral Horthy backed by his White army. For a time Friedrich stayed on as premier; he was succeeded for another brief period by Herr K. Huzzár. A rapid succession of ministers during 1920-21 availed the country nothing in view of the economic demoralization, the hostility of her neighbors, and the loss of the rich agricultural territories of the Banat, the Bačka and the Little Alföld.

On Jan. 25, 1920, a general election chose delegates to the National Assembly. Hostility toward the Socialists accounted for heavy victories for the parties of the Right. In March, Admiral Horthy was formally chosen regent, the step being dictated by the antagonism of the Little Entente toward the creation of a monarchy. An indication of the bitterness of the reaction was revealed in the obstructions placed in the way of the trade unions' participation in politics. To lift such discriminations, the International Federation of Trade Unions ordered an economic boycott against Hungary and Hungarians retaliated by boycotting Austria. Demonstrations against the Jews occurred frequently and even the government participated by restricting the number of Jewish students in the universities. Monarchist sentiment continued to prevail, and on Mar. 26, 1921, believing that the country favored his accession, the ex-King Charles (q.v.) suddenly appeared, to ascend the throne. The regent refused to countenance his restoration, with the result that Charles left for Switzerland, only once more to appear in Hungary on October 22. The hostility of the Little Entente again proved disastrous for his hopes, with the result that Charles was compelled to surrender himself to the British and suffer internment on the island of Madeira which he reached November 19, and where he died, Apr. 1, 1922, of pneumonia.

The international situation, possibly more than any other single factor, contributed to the prevailing hopeless temper. On June 4, 1920, a Hungarian peace delegation, of which Count Albert Apponyi was the chief, was compelled to sign away, by the Treaty of the Trianon, at least two-thirds of the former Hungarian kingdom to the new succession states. Hungarian groups were left in Czecho-Slovak, Jugo-Slav, and Rumanian districts, while the new frontiers cut across railways, roads, waterways, and long-established administrative units. In the Bačka and the Banat, rich maize and wheat lands were lost, and in the Little Alföld north of the Danube, barley and sugar-beet fields, and

pastures. With the cession of the Carpathian and Transylvanian country, Hungary saw taken from her all her salt deposits, four-fifths of her iron ore and many coal fields, as well as her sources of water power and a large share of her valuable forests. The continued hostility of the Little Entente prevented the formulation of an economic accord between Hungary and those territories upon which her industries so much depended. In August, 1921, Hungary's burdens were increased by the cession of the Burgenland to Austria, at the bidding of the Allies.

The events of 1922 and 1923 proved how profoundly Hungary was shaken by its unhappy economic and political status. The republic was continually being threatened by the agitations of the royalists, headed by Counts Andrássy and Apponyi, who proclaimed Prince Otto heir to the throne after the death of Charles. Horthy, quite as reactionary as the royalists, attempted to reduce the electorate by one-fourth, and to substitute open voting for secret. A rigorous censorship of the press was maintained which applied, too, to the publication and circulation of the writings of such men as Marx, Lenin, and Walt Whitman. A move was originated for the practical suppression of the civil liberties, its purpose being the imprisonment or banishment of all those suspected of questioning the prevailing political, economic and religious beliefs. Two disturbing factors were also evident in 1923: that the courts had become the mere instruments of the authorities and that conscription had been practically restored. The populace was daily irritated by the presence of the Inter-Allied Commission of Military Control which was being maintained at Hungary's expense. Anti-Semitism was on the increase and Hungarian Fascists were being recruited. Nothing indicated better the broken *morale* of the people than the ease with which lawless bands incessantly operated. The most powerful, led by one Hejjas, terrorized Jews, trade unionists, and Communists, and led forays into the Burgenland in the summer of 1922. Attempts to suppress them legally were unavailing. Liberals in other countries believed that Hungary had been given over to a "White Terror," characterized by reactionary violence as cruel, perhaps, as any revolutionary terrorism.

The deplorable economic and financial situation resulting from the War and, hardly less, from civil turmoil and territorial transfers after the War, presented so grave an international problem that in December, 1923, at the instance of Czecho-Slovakia, the League Council proposed to undertake the financial rehabilitation of Hungary on a basis similar to that which had proved so successful in Austria. In return for an international loan of 250,000,000 gold crowns, floated under the League's auspices, Hungary was to accept League supervision of her finances, assign to the League the revenue from customs and state monopolies, abide by the terms of the Treaty of Trianon, and pay the war indemnity in 20 annual installments of 10,000,000 gold crowns. Humiliating as they were to Hungarian nationalists, these terms were accepted by Premier Bethlen in February, 1924, and an American banker, Mr. W. P. G. Harding, was invited by the League to act as its Commissioner-General in charge of Hungarian finances. On Mr. Harding's refusal, the post was accepted by Mr. Jeremiah Smith of Boston, who was

cordially received in Budapest, May 1. Meanwhile, despite stubborn Socialist opposition, Premier Bethlen had carried through Parliament, April 18, a series of bills authorizing his government to fulfill the agreement. For Hungary's rôle in Central European politics, see *LITTLE ENTENTE*. For the history of Hungary's lost territories, see *BURGENLAND*, *BANAT*, *TRANSYLVANIA*, *FIUME-ADRIATIC CONTROVERSY*. Also see *HUNGARIAN LITERATURE*.

HUNGERLAND, HEINZ F. W. (1873-). A German writer, born at Bremen and educated at the universities of Greifswald, Göttingen, Kiel, and Münster. He traveled in England and Scandinavia, did some work at the universities of London, Copenhagen, and Lund, and was instructor at Lund. He specialized in Old German language and Old Norse literature. He is the author of *Zeugnisse zur Wölsung- und Nibelungensage aus der Skaldenpoesie* (1903); *Das Wissenschaftliche Studium der Deutschen Sprache* (1906); *Deutschland und die Deutschen* (1913); *Deutsche Marinenymnen* (1911); *Die Weisen aus dem Morgendämmer* (1911); *Siegrunen, Kriegsgedichte* (1915); and *Die Volkshochschule, Deutschlands Rettung* (1919). He also compiled an anthology of Scandinavian lyrics, which he had translated.

HUNSAKER, JEROME C. (1886-). An American airman born in Creston, Iowa, and educated at the Naval Academy and the Massachusetts Institute of Technology. He studied aerodynamics abroad and in 1914-16 was instructor at the Massachusetts Institute of Technology in aeronautical engineering and research in aerodynamics. He translated much of Eiffel's work, including *Resistance of the Air*, and built the first wind tunnel at the Institute where original research was conducted, the results of which were given to builders. Under him, graduate students were trained as aeronautical engineers. Commander Hunsaker was in charge of the aircraft division of the Bureau of Construction and Repair of the Navy Department, 1916-17. He designed the first modern airship produced in the United States as well as the *C* and *D* class Navy airships. He also designed the *NC* flying boats with Westervelt and Richardson. In 1917 he was a member of the joint Army and Navy Technical Board to frame an aircraft programme and in 1918 was attached to the Inter-Allied Naval Armistice Commission. Among his published works are *Stable Biplane Arrangements*; *Aerodynamic Properties of the Triplane*; and *Aéroplane Stability*.

HUNT, CLARA WHITEHILL (1871-). An American librarian, born at Utica, N. Y. She graduated from the New York State Library School in 1898 and for several years taught in the public schools. In 1898 she organized the work with children in the Apprentices' Library in Philadelphia and from that year to 1902 was with the Newark Free Public Library. In 1903 she became superintendent of the Children's Department of the Brooklyn Public Library. She lectured much on library topics and was the author of *What Shall We Read to the Children?* (1915); *About Harriet* (1916); and *The Little House in the Woods* (1918).

HUNT, EDWARD AYRE (1885-). An American sociologist, educated at Harvard. He was engaged in clerical work and as assistant in the Harvard English department, 1910-12. From 1912 to 1914 he was on the editorial staff

of the *American Magazine* and was also war correspondent in Europe. From 1914 to 1916 he was American delegate of the Commission of Relief to Belgium in charge of the province of Antwerp. He was a director of publicity for the American Red Cross in 1917 and was head of the economic rehabilitation work of the Red Cross in France in the year following. He served in several other important capacities during the War and in 1920 was a member of the commission on the elimination of waste in industry. In 1921 he acted as secretary of the conference on unemployment. His published writings include *War Bread—A Personal Narrative of the War and Relief in Belgium* (1916); *Tales from a Famished Land* (1918); and *Waste in Industry*, with Herbert Hoover and others (1921).

HUNT, GEORGE WILEY PAUL (1859-). An American public official and diplomat, born at Huntsville, Mo., and educated in the public schools. For several years he was engaged in ranching in Arizona. In 1893 he was elected a member of the Legislature of that State and of the Senate in 1897 and was reelected for several terms. He was president of the Constitutional Convention (1910) and in 1911 was elected first governor of the State of Arizona. He was reelected for terms from 1915 to 1919 and was meanwhile United States Commissioner of Conciliation to negotiate settlement of the miners' strike in Arizona (1917). In 1920 he served as minister to Siam, resigning in the following year. He was again elected governor of Arizona in 1922.

HUNT, HENRY THOMAS (1878-). An American lawyer, born at Cincinnati, and educated at Yale and the Cincinnati Law School. In the same year he was admitted to the bar. He took an active interest in civic and State politics and was a member of the Ohio House of Representatives, 1906-07. From 1908 to 1911 he was prosecuting attorney of Hamilton County and was mayor of Cincinnati from 1912 to 1914. He was active in securing elective reforms in municipal and State government. During the War he served in France and as a member of the War Department Claims Board in Washington. In 1920-21 he was a member of the Railroad Labor Board.

HUNT, THOMAS FORSYTH (1862-). An American agriculturist, born at Ridott, Ill., and educated at the University of Illinois. After serving as assistant to the Illinois State entomologist, he became assistant in agriculture at the University of Illinois in 1886, and from 1888 to 1891 was assistant agriculturist for the Illinois Agricultural Experiment Station. He was on the faculty of the Pennsylvania State College as professor of agriculture, 1891-92, and became in 1892 professor of agriculture at the Ohio State University, where from 1896 to 1903 he was dean of the College of Agriculture and Domestic Science. He was professor of agronomy at Cornell University from 1903 to 1907 and dean of the School of Agriculture and director of the Pennsylvania Agricultural Experiment Station of the Pennsylvania State College from 1907 to 1912. In the latter year he became professor of agriculture and dean of the College of Agriculture at the University of California. Until 1919 he was also director of the Agricultural Experiment Station at that university. Professor Hunt wrote: *History of Agriculture and Rural Economics* (1899);

How to Choose a Farm (1906); and *Farm Animals*, with Charles W. Burkett (1917).

HUNTER, GEORGE LELAND (1867-). An American art authority (see Vol. XI). During the period he published *Inside the House That Jack Built* (1914); *Italian Furniture and Interiors* (1917); and *Decorative Textiles* (1918); and contributed to the magazines many articles on related subjects.

HUNTER, WALTER SAMUEL (1889-). An American psychologist, born at Decatur, Ill., and educated at the universities of Texas and Chicago. He taught at the University of Texas from 1912 to 1916 and after 1916 at the University of Kansas. In 1916 he became associate editor of the *Psychological Bulletin*. He was the author of various studies in animal behavior, space perception, and social psychology. His best known work is his textbook, *General Psychology* (1919).

HUNTER, WILES ROBERT (1874-). An American social worker, born at Terre Haute, Ind., and educated at the University of Indiana. He was for several years an official of the Chicago Bureau of Charities and a resident at Hull House from 1899 to 1902. After doing settlement work in England, he became head worker at the University Settlement of New York City in 1902 and served for one year. From 1902 to 1906 he was chairman of the New York Child Labor Committee. He was president of the Berkeley Commission of Public Charities in 1921. His books include: *Tenement Conditions in Chicago* (1901); *Poverty* (1904); *Violence and the Labor Movement* (1914); *Labor and Politics* (1915); and *Why We Fail as Christians* (1919). In 1918 he became lecturer on economics and English at the University of California.

HUNTER, WILLIAM (1861-). A British physician, credited by the English with priority in the recognition of buccal infection (oral sepsis) as an extensive cause of disease (neuritis, anæmia, etc.). His announcement of this doctrine appeared in 1901, years before that of Billings and others in the United States. After studying at the University of Edinburgh, he spent several years as a research student at Cambridge. He then became associated with Charing Cross Hospital and was dean of the medical school there, 1910-15. He was also physician to the London Fever Hospital and in 1915 was sent by the British Government to Serbia to study the epidemics of typhus and relapsing fever. His major writings comprise *Pernicious Anæmia* (1901), expanded in 1909 to *Severest Anæmias*, the second volume of which had not yet been published in 1924. He also wrote *Historical Account of Charing Cross Hospital and Medical School* (1914).

HUNTER COLLEGE OF THE CITY OF NEW YORK. A college of liberal arts established in 1870 for the education of women. The student enrollment increased from 1400 in 1915 to 1514 in 1924, and the teaching staff from 121 to 124 members. A summer session was established in 1916 which in 1923 had 894 students and a faculty of 55 members. In the year following evening and extension sessions were established which enrolled 3265 students and 110 members of the faculty in 1924; in 1921 courses leading to the A.M. degree were offered in this division. The name of the college was changed in April, 1914, from Normal College of the City of New York to the

title given above. President, George Samler Davis, LL.D.

HUNTING, GEORGE COOLIDGE (1871-). An American bishop, born at Milwaukee. He studied theology at the Virginia Theological Seminary and was ordained deacon of the Protestant Episcopal Church in 1894 and priest in 1897. For several years he was engaged in missionary work in Nevada and Utah and from 1899 to 1902 was rector of St. Paul's Church at Evanston, Wyo. For the five years following he was superintendent and chaplain at St. Mark's Hospital at Salt Lake City and again engaged in missionary work until 1914, when he was consecrated bishop of Nevada. From 1909 to 1911 he was editor of *The Nevada Churchman*.

HUNTINGTON, EDWARD VERMILYE (1874-). An American mathematician, born at Clinton, N. Y., and educated at Harvard and in Europe. He was instructor in mathematics at Harvard, 1895-97, and held a similar place at Williams College during 1897-99. In 1901 he went to Harvard, where he became in 1919 professor of mechanics. During 1918-19 he was engaged in statistical work for the General Staff with the rank of major. His scientific work has had to do with various systems of postulates forming the bases of elementary mathematical theories. He was editor of *Annals of Mathematics* during 1902-11 and was president in 1918 of the Mathematical Association of America. In addition to editing various scientific memoirs and works, he is known as author of *Four Place Tables of Logarithms and Trigonometric Functions* (1907), *The Fundamental Propositions in Algebra*, the fourth in *Young's Mathematical Monographs* (1911), *Essentials of Elementary Dynamics* (1916), *The Continuum and other Types of Serial Order* (1917), and *Handbook of Mathematics for Beginners* (1918).

HUNTINGTON, ELLSWORTH (1876-). An American geographer and educator (see Vol. XI). From 1910 to 1915 he was assistant professor of geography at Yale and from 1917 was research associate. During the War he served as captain of the Military Intelligence Division. His later books include *The Climatic Factor* (1914); *Civilization and Climate* (1915); *World Power and Evolution* (1919); *The Red Man's Continent* (1919); and *Principles of Human Geography*, with S. W. Cushing (1920).

HURLBUT, JESSE LYMAN (1843-). An American clergyman and writer (see Vol. XI). His later books include *Traveling in the Holy Land through the Stereoscope* (1913); *Hurlbut's Story of Jesus* (1915); *Story of the Christian Church* (1918); and *The Story of Chautauqua* (1921).

HURLEY, EDWARD NASH (1864-). An American public official, born in Galesburg, Ill. He was educated in the public schools of Chicago. He served as engineer and traveling salesman for several companies and organized and developed the pneumatic tool industry in the United States and Europe. From 1908 to 1915 he was president of the Hurley Machine Company of Chicago. In 1913 he was appointed trade commissioner to the Latin-American republics and served as vice-chairman and later as chairman of the Trade Commission until 1917, when he was appointed chairman of the United States Shipping Board and president of the Emergency Fleet Corporation. This post

he resigned in 1919. He wrote *The Awakening of Business* (1916) and *The New Merchant Marine* (1920).

HURST, FANNY (1889-). An American author, born in St. Louis, and educated at Washington and Columbia Universities. She early applied herself to a study of the technique and subject matter of fiction. Her short stories made an immediate popular success. They were ingenious in theme, though the characters as a rule were sentimentalized. Jewish life in America was her most usual subject. These short stories, collected in book form, included *Gaslight Sonatas* (1916); *Humoresque* (1918); and *The Vertical City* (1921). An early novel, *Star Dust* (1919), won little attention. Her *Lummo* (1923) at once raised Miss Hurst to the front rank of American fictionists. Undoubtedly showing the influence of May Sinclair in the terseness with which plot-outlines and characters were sketched, as well as that of "expressionism" with its half-hinted and at times symbolical phrasing, *Lummo* nevertheless presents the working of a mature and confident mind.

HUSE, HARRY McLAREN PINCKNEY (1858-). An American naval officer, born at West Point, N. Y. He graduated from the United States Naval Academy in 1878 and was appointed ensign in 1882. In 1905 he served as professor of mathematics at Annapolis and was promoted to be commander in 1907, captain in 1909, and rear-admiral in 1916. In 1919 he served as commander of the Atlantic Fleet Train and was on special duty in London and Paris. In 1920 he commanded the United States naval forces in European waters, with the rank of vice-admiral and after 1921 was a member of the General Board of the Navy.

HUSSEIN IBN ALI (1856-). First King of the Hedjaz. He belonged to the family of the Katada in which the sherifate of Mecca has been vested for eight centuries. He was recognized by the Mohammedans as senior descendant of Mohammed. From 1890 to 1908 he was a prisoner at Constantinople, where he gave his four sons, Ali, Abdullah, Feisal, and their half-brother Zeid, a modern education. After the Turkish revolution of 1918, he was appointed Grand Sherif of Mecca, and gained great influence over the Arab troops. He refused to proclaim a Holy War on behalf of Germany and was invited by societies in Syria and Mesopotamia to lead an Arab revolt. He subsequently took the side of the Allies and rendered efficient service with the British troops in Arabia and Mesopotamia. In recognition of these services, he was proclaimed King of the Hedjaz on Oct. 29, 1916. He vigorously set himself to organize his new kingdom, which was recognized by all the Allied Powers. With the assistance of Great Britain, he established and maintained a well organized government. See CALIPHATE.

HUSSEY, WILLIAM JOSEPH (1862-). An American astronomer, born at Mendon, Ohio, and educated at the University of Michigan. During 1884-89 he was principal of various schools in Ohio and Illinois and in 1889 served as an assistant on *The Nautical Almanac* of Washington. Also in 1889, he went to the University of Michigan as an instructor of mathematics; in 1891, he became acting director of the Detroit Observatory; and a year later went to Stanford University, where in 1894 he became

full professor. During 1896-1905 he was astronomer at the Lick Observatory but in 1905 returned to Michigan where he became professor of astronomy and director of the observatory. Dr. Hussey was director of the Argentina National Observatory at La Plata (1911-17), of the Lick Eclipse Expedition to Egypt in 1905, and of La Plata Eclipse Expedition to Brazil in 1912. He has discovered more than 1600 double stars; in recognition of this achievement he received the Lalande Prize of the French Academy in 1906. He is a foreign associate of the Royal Astronomical Society of Great Britain and a member of other scientific societies, including the Astronomical Society of the Pacific. In addition to many minor contributions to scientific journals he is the author of *Logarithmic and Other Mathematical Tables* (1891, 1895), *Mathematical Theories of Planetary Motions* (1892), and *Micrometrical Observations of the Double Stars Discovered at Pulkowa* (1901).

HUSTON, CHARLES ANDREWS (1876-). An American lawyer and educator, born at Stratford, Ont. After graduating from the University of Chicago he was fellow in political economy there. He served as assistant in English at the University of Chicago and then joined the faculty of Leland Stanford Junior University, where he was successively instructor, assistant professor, associate professor, and professor of law. In 1916 he became dean of the law school. He wrote *Enforcement of Decrees in Equity* (1915) and several articles on legal subjects. In 1917-18 he served with the War Trade Board and the Provost Marshal-general's Department at Washington.

HUTCHESON, ERNEST (1871-). An American pianist, born at Melbourne, Australia. He received his first instruction there from Max Vogrich and was exhibited as a wonder-child at the age of five. After graduating from the Leipzig Conservatory, where he had been a pupil of Reinecke, he studied for some time with Stavenhagen in Weimar. During the next 10 years he devoted himself mainly to teaching. After a successful tour of Germany and Russia in 1900, he came to the United States, where he taught at the Peabody Conservatory in Baltimore until 1912. His second European tour (1912-14), established his reputation as one of the foremost contemporary pianists. At the conclusion of this tour he returned to the United States, making his home in New York.

HUTCHESON, GROTE (1862-). An American soldier, born in Cincinnati, Ohio. He graduated from the United States Naval Academy in 1884 and was commissioned second lieutenant in the same year. He served in the Spanish-American War and in various commands in the Regular Army and became colonel of cavalry in 1916. He was promoted to be major-general of the National Army in 1917. In 1918 he created and organized ports of embarkation at New Port News and Norfolk, Va. He was promoted to be major-general in the same year and brigadier-general in the Regular Army in 1921. He was awarded the Distinguished Service Medal for specially meritorious service in the administration of the Port of Embarkation. He saw service, during his career, against the Indians, and in Porto Rico, China, and the Philippines.

HUTIER, OSKAR VON (1857-). A German soldier, born near Erfurt. In the German

advance in France in 1914, he commanded the Prussian Guards and was one of the most aggressive and skillful of the German leaders in that movement. In 1915 he was given command of the 21st Army Corps and in 1917 commanded Army Group D. Later in the same year he was assigned as commander of the 8th Army, and with this occupied Riga. He was transferred to the 18th Army on the western front and took an important part in the great German advance which began in March, 1918.

HUXLEY, ALDOUS (LEONARD) (1894-). An English author, son of Leonard Huxley. He attended Eton and Balliol, Oxford, and soon entered journalism. He wrote first for *The Athenæum* and then for *The Westminster Gazette*. His published works include poems, essays, and novels. The better known were *Limbo* (1920); *Leda* (1920); *On the Margin* (1923); and the novels, *Crome Yellow* (1921), *Mortal Coils* (1922), and *Antic Hay* (1923). Possessed of a lively wit and a feeling for the unusual in character and scene, he attracted attention with each of his published works. His characters were vivid, his situations piquant, and his intelligence mordant and unrelenting.

HYATT, ANNA VAUGHN (1876-). An American sculptor (see VOL. XI). Her able craftsmanship in the sculpture of animal life, consistently evidenced in such later works as "Great Danes," "Colts in a Snowstorm," and "Reaching Jaguars," gave her a foremost position in this field in the United States. Her achievement in the statue of Joan of Arc, Riverside Drive, New York (1915), notable among such for its truth of detail, its simplicity and dignity, turned her interest somewhat toward equestrian subjects, with noteworthy results. Among her awards were the Rodin gold medal, Philadelphia, 1917, and the Saltus gold medal, 1920. She became a member of the American National Academy in 1916, and a chevalier of the Legion of Honor (France), in 1922.

HYDE, CHARLES CHENEY (1873-). An American lawyer, born in Chicago, and educated at Yale University and the Harvard Law School. In 1898 he began practice in Chicago, where he remained until his removal to Washington in 1920. He was a lecturer on diplomacy at the Northwestern University Law School, and from 1908, professor of law and lecturer on international law at Yale University. His several works on international law included *International Law Chiefly as Interpreted and Applied by the United States* (1922).

HYDROAEROPLANE. See AÉRONAUTICS.

HYDROCARBONS. See CHEMISTRY, ORGANIC.

HYDRO-ELECTRIC STATIONS. See ELECTRIC POWER STATIONS AND GENERATING APPARATUS; WATER POWER; TURBINES; STEAM.

HYDROGEN. See CHEMISTRY.

HYDROGEN ATOM. See PHYSICS.

HYDROPHONE. This name has been applied to any instrument for listening to sounds transmitted through water. Before the War such instruments were used for receiving signals from submerged bells. The hydrophone as usually fitted consisted of a small water-tight box of which one side was a metal diaphragm operating a microphone enclosed in the box. The box itself was suspended in a tank built against the ship's outer plating which formed one side of it. Early in the war attempts were made to use some form of hydrophone for detecting the presence of vessels (particularly submarines) within sound range of their internal machinery or propellers. For some time no great success was attained but the effectiveness of listening devices was materially improved. Several fish-shaped hydrophones, 12 feet apart, towed astern and electrically connected for receiving the sound on board the vessel, gave fair results; but the Walzer hydrophone (the invention of a French naval officer), which attained its final form early in 1918, is said to have given greater satisfaction and was much used after March of that year. The receiving diaphragms were arranged at regular intervals over the surface of a hemispherical bulge built into the hull on each side towards the bows. The system acted as a sound lens, the sound focus occurring at a point where the sound paths by alternate routes were equal. From the results received the direction of the source of sound could be calculated.

HYLAN, JOHN F. (1868-). An American public official, born at Hunter, Greene Co., N. Y. He was educated in the public schools and engaged in various occupations in New York City. He graduated from the New York Law School in 1897 and in the same year was admitted to the bar. From 1906 to 1914 he was city magistrate and in 1914-15, judge of the county court. Mr. Hylan became mayor of New York City in 1918 and was reelected in 1922 for the term ending 1925.

HYTHE CONFERENCE. See REPARATIONS.

HYVERNAT (EUGÈNE XAVIER LOUIS) HENRY (1858-). A French Orientalist. He studied at Lyons, Paris, and the Pontifical University of Rome. He was professor-interpreter of Oriental languages for propaganda and professor of Assyriology and Egyptology in Rome, 1885-89, and in 1889 went on a scientific mission to Armenia for the French government. He then came to America as professor of Oriental languages and archaeology at the Catholic University. He is the author of *Les Actes des Martyres de l'Égypte* (1886), *Du Caucase au Golfe Persique* (1892), and *A Check List of Coptic Manuscripts in the Pierpont Morgan Library* (1919). He is a contributor to American, British, French, and German reviews.

I

IBAÑEZ, BLASCO. See **BLASCO IBAÑEZ, VICENTE.**

IBSEN, SIGURD (1859-). A Norwegian statesman and author (see VOL. XI). His later works include *Robert Frank* (1914) and *Tempel der Erinnerung* (1918), both of them translated into German.

ICELAND. An island in the North Atlantic, formerly a Danish possession, but since 1918 a separate kingdom united to Denmark under a single crown. Its area is estimated at 39,709 square miles, and its population (1920) at 94,679, making a density of 2.4 per square mile. The 1910 population was 85,183. Of the 1920 population, 54,246 lived in rural districts, and the rest in towns of over 300. Except for 706, it was entirely native born. The capital city, Reykjavik, had (1920) 17,678 inhabitants. Besides this, there were six other towns with a total population of 11,377. Only one quarter of one per cent of the land is under cultivation, mainly in hay, potatoes, and turnips. In 1921 the crops were hay, 2,800,000 cwt., potatoes, 33,000; turnips, 13,000. Live stock showed a little increase over the preceding decade, with a 1921 figure of 49,300 horses, 23,700 cattle, 554,000 sheep, and 554,000 goats. In 1918, the total value of the fisheries, the most important single industry, was 30,570,000 krónur (about \$9,415,000), of which the cod catch alone was valued at 27,720,000 krónur. There was little manufacturing, although Iceland has great potentialities because of its innumerable waterfalls. In 1919, exports were valued at 75,013,584 krónur (about \$20,000,000). In 1910 they were \$4,000,000. Imports were put at 62,565,532 krónur (about \$18,000,000). In 1910 they were \$3,000,000. In 1919, as before, Great Britain and Denmark were Iceland's leading trade factors; the United States was a very close third, with 16,503,518 krónur imports coming thence. The 1923 budget estimate listed revenues at 7,813,450 krónur and expenditures at 7,922,329 krónur. The largest charges were for communications, 1,940,540 krónur; for instruction, 1,305,188 krónur. At the beginning of 1922, the public debt was 16,385,525 krónur, held for the most part in Denmark. There are no railways, but there were 320 miles of carriage roads in excellent repair. In 1922, 42 steam vessels of 7456 tons were flying the Icelandic flag.

History. By the Act of Union of Nov. 30, 1918, Iceland was granted home rule under the Danish crown. Complete sovereignty was vested in the home government; foreign affairs alone were to be the charge of the Danish government until 1940. Iceland's perpetual neutrality was established, and no armed force or fortifications were permitted her. Danish goods in Iceland and Icelandic goods in Denmark were to receive no more consideration than the products of other countries. By the

new constitution promulgated in 1920, the executive power rests in the King through a responsible ministry of three, the chief of which is the president of the council; the legislative power resides in a bicameral house (*Althing*). The lower chamber is elected by universal manhood and womanhood suffrage; the upper, of 14 members, is chosen, six by proportional representation at large, and eight by the lower house. All bills must be sent to Denmark for the King's approval. At the head of the local judicial system is the Supreme Court stationed at Reykjavik; this is the court of last appeal. Complete prohibition of the import and sale of liquors containing more than 2¼ per cent alcohol has been in force since 1912.

IDAHO. Idaho is the twelfth State in size (83,888 square miles) and the forty-second in population; capital, Boise. The population increased from 325,594 in 1910 to 431,866 in 1920, a gain of 32.6 per cent. The white population rose from 319,221 to 425,668; Japanese, from 1363 to 1569; and native white, from 278,794 to 386,705; while the foreign-born white population showed a decrease from 40,427 to 38,963, the Indian from 3488 to 3098, and the Chinese from 858 to 585. The urban population mounted from 68,898 to 119,037; the rural population, from 255,696 to 312,829. The chief cities of the State are Boise and Pocatello. The former grew from 17,358 to 21,393; and the latter from 9110 to 15,001.

Agriculture. While the population of the State increased 32.6 per cent in the decade 1910-20, the number of farms increased 36.7 per cent (from 30,807 to 42,106); while the acreage of land in farms rose from 5,283,604 to 8,375,873, and the improved land in farms from 2,778,740 acres to 4,511,680. The total value of farm property showed an apparent increase, from \$305,317,185 in 1910 to \$716,137,910 in 1920, and the average value of farms from \$9911 to \$17,008. In interpreting these values, however, and, indeed, all comparative values in the decade 1914-24, the inflation of the currency in the latter part of the period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of land used for agricultural purposes in 1910 was 9.9; in 1920, 15.7. The percentage of improved land in farms increased from 52.6 to 53.9. White farmers in 1920 numbered 41,598 (35,284 native-born), compared with 30,402 in 1910; foreign born farmers numbered 6314, compared with 5708. Farms free from mortgage numbered, in 1920, 11,872; 17,933 in 1910. Those under mortgage in 1920 numbered 20,060, compared with 9010 in 1910; the change was due to the agricultural depression following the War. Of the 42,106 farms in 1920, 34,647 were operated by owners as compared with 27,169 in 1910; 758 by managers, compared with 450 and 6701 by tenants,

compared with 3188. The area under irrigation had increased from 1,430,848 acres in 1909 to 2,488,806 in 1919. The total number of cattle on farms in 1920 was 714,903; in 1910, 404,518. Sheep numbered 2,356,270 in 1920, compared with 2,110,330 in 1910. Dairy cattle in 1920 numbered 202,391. The estimated production of the chief farm crops of 1923 was: corn, 2,648,000 bushels; wheat, 30,115,000 bushels; oats, 7,834,000 bushels; barley, 3,540,000; potatoes, 11,733,000; hay, 2,990,000 tons; and sugar beets, 384,000. Comparative figures for 1913 are: corn, 448,000 bushels; wheat, 14,094,000; oats, 15,112,000; barley, 7,560,000; potatoes, 5,780,000; and hay, 2,044,000 tons. Apple trees of bearing age numbered 1,005,668 in 1910 and 2,380,523 in 1920. In 1909, 659,959 bushels of apples were grown; in 1919, 3,645,640.

Mining. Idaho is one of the important mineral-producing States, especially for its metal mining. The products in the order of their value are lead, silver, gold, and stone. In addition there is produced copper, sand and gravel, and a small amount of zinc. The condition of the mining industry in the decade 1914-24 is shown by the following comparison of production for several years: 1914, lead, 348,526,069 pounds, valued at \$13,592,517; silver, 12,479,516 ounces, \$6,901,172; gold, \$1,152,315; zinc, 42,012,435 pounds; 1917, lead, 393,559,521 pounds; silver, 12,029,338 fine ounces; gold, \$804,809; zinc, 79,854,136 pounds; 1920, lead, 249,609,976 pounds; silver, 7,326,794 fine ounces; gold, \$485,590; zinc, 27,932,326 pounds; 1922, lead, 195,834,205 pounds, \$10,770,881; silver, 6,081,865 ounces; gold, \$501,405; zinc, 4,109,131 pounds, \$234,220. A considerable amount of copper is produced; the output, in 1922, was 3,282,842 pounds, compared with 2,538,396 pounds in 1920 and 6,445,187 pounds in 1914. Since the beginning of mining in Idaho in 1860, mineral products to the value of more than \$925,000,000 have been obtained. In addition to those already mentioned, there have been produced antimony, bismuth, tungsten, cobalt, nickel, molybdenum, mica, asbestos, and coal. The total value of the mineral products in 1921 was \$16,502,273, compared with \$32,449,783 in 1920, \$19,044,567 in 1919, \$36,872,270 in 1918, and \$24,913,223 in 1914.

Manufactures. Idaho is not an important manufacturing State, although its industries have increased considerably in number and in value of products since 1909. There are only two cities having a population of more than 10,000, Boise and Pocatello. These cities, with 8.4 per cent of the total population of the State, reported, in 1919, 11.4 per cent of the total value of products. The number of establishments in the State in 1909 was 725; 1914, 698, and 1919, 922; persons engaged in manufacture, 9909, 10,529, and 16,268; while the capital invested was \$32,476,749, \$44,960,489, and \$96,061,709, in those years. The value of the products rose from \$22,399,960 in 1909 to \$28,453,797 in 1914, and in 1919 to \$80,510,749; but this increase was chiefly due to the change in industrial conditions brought about by the War, and therefore cannot be used to measure the growth of manufactures between the industrial censuses in 1914 and 1919. The increase in number of persons engaged in manufacture, and in the number of manufacturing establishments, however, indicates a large increase in the in-

dustrial activities of the State. The chief products in point of value are those from the manufacture of lumber and timber, which in 1909 were valued at \$10,689,000; 1914, \$13,329,000; and 1919, \$30,643,000. Flour-mill and grist-mill products rank second, in 1909, amounting to \$2,480,000; 1914, \$3,396,000, and in 1919, \$13,501,000. Car construction and repair, in third place, had a production valued at \$1,366,000 in 1909; \$2,034,000 in 1914, and \$4,402,000 in 1919.

Education. Idaho has always been in the forefront of the States in educational progress. In 1912 a constitutional amendment was adopted which established the so-called Idaho System. This, in brief, provided for unity in the educational system; it established a State Board of Education which has charge of both the higher institutions and the public schools. The school code of 1913 provided that the State Board of Education should consist of five members appointed by the governor. This board was made also the board of regents of the universities; board of trustees for the normal schools, the Technical Institute, the School for the Deaf and Blind, and the Industrial Training School, and had general charge of the entire public school system. It has since been made also the State Board for Vocational Education. This system had admirable results from the year in which it was inaugurated, and during the decade still further advances were made. One of the most important of these was in 1917, when it was provided that thereafter candidates for the teaching profession must have completed courses in one of the high schools of the State, or have equivalent education, and must have had at least some professional training before being certified to teach. The Legislature of 1923 passed several important measures affecting education, among them one abolishing county institutes and several amending the tax laws relating to education. One of the most notable features of the decade was the growth of the Technical Institutes. Under the coöperative agreement with the United States, vocational education was carried on with great efficiency since 1917; and work on the rehabilitation of persons injured in industry was also begun. The enrollment in the public schools increased from 92,437 in 1914 to 138,730 in 1923-24. In the high schools there were enrolled in the latter year 19,083 pupils. The expenditure for education in 1923 was \$6,722,155. The percentage of illiteracy in the State decreased from 2.7 in 1910 to 1.9 in 1920. In the native white population, it remained at 0.4 per cent; and in the foreign-born white population, at 6.6 per cent. The decrease was among the Negro population, from 6.8 per cent to 5.9.

Finance. See STATE FINANCES.

Political and Other Events. During the decade 1914-24, political control in the State fluctuated between the Republican and Democratic parties. For the greater part of the period the former party was in control. In 1914, J. H. Brady, Democrat, was elected to the Senate, while Moses Alexander, also a Democrat, was elected governor. The Democrats were successful also in 1916, when they elected their State ticket by a plurality of 572 votes. The Republicans, however, elected two representatives to Congress. In the presidential election of this year, President Wilson received 70,021 votes; Hughes, 56,368. A new irrigation proj-

ect was begun during the year to develop the territory known as the Bruneau country, about 400,000 acres in extent, and an electric railroad through this territory was begun. Several anti-alien bills were introduced in the Legislature of 1917, but at the request of the Secretary of State, followed by the protest of the Japanese Ambassador to Secretary Lansing, they were not pressed to passage. These bills would have prevented any Japanese from owning land in the State. On Dec 10, 1917, the United States Supreme Court upheld the State prohibition law. In the election of 1918, Senator Borah was reelected, and John F. Nugent, Democrat, also was elected to the Senate, to complete the unexpired term of J. H. Brady, deceased. As a result of legislation in 1919, the State administration was reorganized. For the 46 boards and commissions that were abolished was substituted a commission or cabinet of nine officials representing the department of agriculture, commerce and industry, finance, immigration, labor and statistics, law enforcement, public investment, public works, public welfare, and reclamation. In the election of 1920, the Republicans again carried the State, electing D. W. Davis governor and Frank R. Gooding United States Senator for the full term. At this election several constitutional amendments were adopted, one of them increasing the membership of the Supreme Court from three to five, and another authorizing a bond issue of \$2,000,000 for the improvement of State highways. In the elections of 1922, C. C. Moore, Republican, was elected governor, defeating both the Democratic and Progressive candidates. The question of the direct primary, the chief issue in this election, occupied the attention of the Legislature in 1923. The State primary law so far as it related to State officers had been repealed by the previous Legislature, which had a Nonpartisan-Democratic majority, and the governor had been elected on a platform which endorsed the repeal. However, sufficient number of Democrats and Progressive Republicans who favored a new direct primary law having been elected to the Legislature, a new primary law was passed; but it was vetoed by the governor. There was also an abortive attempt to pass a measure putting into effect the initiative and referendum authorized by the constitution of 1912.

Legislation. The most important actions taken by the Legislature in the decade 1914-24 are noted below. In 1915 it passed an anti-alien land ownership bill similar in its provisions to the California measures prohibiting the ownership of land in the State by alien persons, firms, or associations. A State-wide prohibition bill, to be effective in 1915, also was passed. A workmen's compensation measure was vetoed by the governor. The Legislature provided in this year for absentee voting and passed a workmen's compensation law. In 1919 it ratified the Federal prohibition amendment. In 1921, measures were passed authorizing the school districts to provide for the education of adult residents who were unable to read and write; creating a bureau of budget and taxation; providing for cooperative marketing; and establishing a teachers' retirement fund. The Legislature of 1923 created a small claims court and provided that where a person has been three times convicted of a felony, whether within or without the State, he is declared a

persistent violator of the law and may be sentenced to prison for not less than five years. A measure was passed extending the absent voter privilege to persons who because of physical disability expect to be confined to their homes on election day. Another measure reserved the mineral rights of State lands to the State, and provided for their lease on a royalty basis.

IDAHO, UNIVERSITY OF. A coeducational State institution at Moscow, Idaho, founded in 1889. In the decade 1914-24, the enrollment increased from 747 to 1647, the resident faculty from 80 to 126, and the size of the library from 32,000 volumes to 80,000. The School of Mines and the School of Forestry were established in 1917 and the School of Education in 1920, bringing the total of separate schools and colleges to seven. Curricula in pre-medical studies, in music, and in business were established in the College of Letters and Science, and departments of agricultural education, psychology, and architecture were created. The south wing of the administration building was completed in 1920; Lindley Hall, a men's dormitory, was built in 1920-22; and Mary E. Forney Hall, a dormitory for women, was opened in 1923. Accommodations of the College of Engineering were augmented in 1923 by purchase of the plant and equipment of a Moscow industrial concern, including several shop buildings. Eleven minor buildings were acquired or built in the decade. Melvin A. Brannon, Ph.D., was president until 1917; Ernest Hiram Lindley, Ph.D., from 1917 to 1921; and Alfred H. Upham, Ph.D., from 1921.

IDDINGS, EDWARD JOHN (1879-). An American educator and expert in agriculture, born at Peru, Ind., and educated at Butler College in Indianapolis and Colorado Agricultural College. He was a member of the faculty of the latter until 1910, when he joined the faculty of the University of Idaho. In 1910-11 he was principal of the School of Practical Agriculture and assistant in animal husbandry, and in 1911 he became professor of animal husbandry. Since 1918 he has been dean of agriculture and director of the Agricultural Experiment Station. He is the author of numerous bulletins and articles relating to live stock.

IDO. See INTERNATIONAL LANGUAGE.

ILLEGITIMACY. See CHILD WELFARE.

ILLINOIS. Illinois is the twenty-third State in size (56,665 square miles), and the third in population; capital, Springfield. The population increased from 5,638,591 in 1910 to 6,485,280 in 1920, a gain of 15 per cent. The white population rose from 5,526,962 to 6,229,333; Negro, from 109,049 to 182,274; native white, from 4,324,402 to 5,092,382; foreign-born from 1,202,560 to 1,206,951. The urban population mounted from 3,476,926 in 1910 to 4,403,153 in 1920, while the rural decreased from 2,161,662 to 2,082,127. The growth of the principal cities of the State was as follows: Chicago (q.v.), 2,185,203 to 2,701,705; Peoria, 66,950 to 76,121; East St. Louis, 58,547 to 66,767; Rockford, 45,401 to 65,651.

Agriculture. Illinois is one of the most important of the agricultural States, and conditions during the decade 1910-20, especially in the latter part of that period, were therefore affected by the general agricultural situation in regard to wheat and other products. See AGRICULTURE, CORN, and WHEAT. While the population of the State increased 15 per cent in the

decade 1910-20, the number of farms decreased 5.8 per cent (from 251,872 in 1910 to 237,181 in 1920); the acreage in farms decreased from 32,522,937 to 31,974,775; and the improved land from 28,048,323 to 27,294,533 acres. The total value of farm property, on the other hand, showed an apparent increase from \$3,905,321,075 in 1910 to \$6,666,767,235 in 1920, and the average value per farm from \$15,505 to \$28,108. In interpreting these values, however, and, indeed, all comparative values in the decade 1914-24, the inflation of the currency in the latter part of the period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The percentage of land in farms decreased from 90.7 in 1910 to 89.1 in 1920; percentage of improved farm land, from 86.2 to 85.4. Of the total of 237,181 in 1920, 132,574 were operated by owners, 3411 by managers, and 101,196 by tenants, while the comparative figures for 1910 were 145,107, 2386 and 104,379. The white farmers in 1920 numbered 236,288, compared with 250,447 in 1910; foreign-born farmers, 22,111 and 33,394; colored farmers, 893 and 1425. In 1920, 68,892 farms were free from mortgage, compared with 86,713 in 1910; 51,039 were mortgaged, compared with 55,792 in 1910. The number of dairy cows on the farms in 1920 was 1,148,173, as compared with 1,050,223 in 1910; "beef cows," 501,034, as compared with 281,957; mules, 168,274, as compared with 140,631; hogs, 4,639,182, as compared with 4,686,362; and sheep, 637,685, as compared with 658,484. The estimated production of the principal farm crops in 1923 was: corn, 362,678,000 bushels; wheat, 62,506,000; oats, 146,394,000; rye, 3,450,000; barley, 6,656,000; potatoes, 10,696,000; and hay, 3,786,000 tons. Comparative figures for 1913 are: corn, 282,150,000 bushels; wheat, 41,888,000; oats, 104,125,000; rye, 808,000; barley, 1,404,000; potatoes, 5,750,000; and hay, 2,450,000 tons.

Mining. Illinois, although it produces practically no metals, is one of the most important of the mineral producing States. It ranked fifth in the value of its mineral products in 1921. These, in the order of their value, are coal, petroleum, clay products, and cement. The condition of mineral production in the decade 1914-24 is indicated by the comparative figures given below. The production of coal in 1914 was 57,589,197 short tons, valued at \$64,693,529; 1915, 58,829,576 and \$64,622,471; 1916, 66,195,336 and \$82,457,954; 1917, 86,199,387 and \$162,281,822; 1918, 89,291,105 and \$206,860,291; 1919, 60,862,608 and \$140,075,969; 1920, 88,724,893 and \$273,509,000; 1921, 69,602,763 and \$190,986,000; and 1922, 58,467,736 and \$168,925,000. The falling off in 1921 and 1922 was largely the result of the six months' strike in the Middle West coal fields. Production of petroleum decreased with comparative steadiness during the decade. In 1914 there were produced 21,919,740 barrels, valued at \$25,426,179; in 1916, 17,714,235 and \$29,237,168; 1918, 13,365,974 and \$31,230,000; 1920, 10,774,000 and \$39,583,000; 1922, 9,383,000 and \$19,291,000. The value of clay products on the whole increased in the decade: in 1914 they amounted to \$13,318,953; 1918, \$12,459,777; 1920, \$26,138,419, and 1921, \$19,041,182. The production of cement, exclusive of natural cement, was practically constant, ranging from 5,401,605 barrels in 1914 to 3,594,038 in 1918;

5,538,558 barrels in 1920, and 5,587,825 barrels in 1921. The value of the product, however, greatly increased, owing chiefly to the decreased purchasing power of money and the consequent higher prices. The value of shipments in 1914 was \$4,848,522, while in 1921 for practically the same production the value was \$9,092,982. In addition to the products mentioned above, the State produces large quantities of coke, sand and gravel, and stone, and smaller quantities of asphalt, mineral waters, and natural gas. The total value of the mineral products in 1921 was \$254,019,136, compared with \$373,926,540 in 1920; \$213,701,212 in 1919, \$271,244,365 in 1918, and \$117,166,370 in 1914.

Manufactures. Illinois is one of the most important manufacturing States. It has 44 cities with populations of more than 10,000, which form 58.7 per cent of the total population. Of the total value of the manufactured products in 1919, these cities reported 84.3 per cent. In 1909 there were, in the State, 18,026 manufacturing establishments; 1914, 18,388; and 1919, 18,593; while persons engaged in manufacture numbered 561,044, 617,927, and 804,805, in those years. The capital invested amounted to \$1,548,170,701, \$1,943,835,846, and \$3,366,452,969. The value of the products in 1909 was \$1,919,276,594; in 1914, \$2,247,322,819, and 1919, \$5,425,244,694; this increase, however, was due largely to changes in industrial conditions brought about by the War and cannot be properly used to measure the growth of the manufactures during the census period, but the increase shown in the number of wage earners clearly indicates a decided growth in the manufacturing activities of the State. The most important industry in point of value of products is that connected with slaughtering and meat packing, the value of which in 1909 was \$389,595,000; in 1914, \$489,230,000, and 1919, \$1,294,167,000. Foundry and machine shop products rank second, amounting in 1909 to \$138,579,000; 1914, \$141,329,000, and 1919, \$421,969,000. The manufacture of men's clothing, in third place, in 1909 amounted to \$89,473,000; in 1914, \$89,144,000, and in 1919, \$201,816,000. Industries relating to the manufacture of iron and steel products rank fourth, with products valued at \$86,608,000 in 1909; \$64,995,000 in 1914, and \$173,345,000 in 1919. The chief manufacturing cities are Chicago, Peoria, East St. Louis, and Rockford. In Chicago, in 1909, there were 9656 manufacturing establishments, with a product valued at \$1,281,171,000; in 1914, 10,115 with \$1,483,498,000; in 1919, 10,537 with \$3,657,424,000. Rockford, in 1909, had 205 manufacturing establishments, with a product valued at \$22,226,000; in 1914, 265 with \$26,371,000, and in 1919, 312 with \$74,910,000. In Peoria, in 1909, there were 283 establishments, with a product valued at \$63,061,000; in 1914, 283 with \$64,689,000, and in 1919, 253 with \$57,075,000. Similar figures for East St. Louis were: in 1909, 138 establishments, with a product of \$18,104,000; in 1919, 157 with \$77,293,000.

Education. Illinois has always been one of the most aggressive States in the development of educational systems, and its progress continued during the decade 1914-24. During the latter part of this period an active campaign was carried on by the State Teachers' Association to secure an annual distribution of \$20,000,000 from the State and the various counties for

educational purposes. This movement had a great effect in turning the attention of taxpayers and lawmakers to the principles underlying the educational State distributive fund. The Legislatures during the period enacted several important laws, including measures providing for humane education; physical education; the teaching of all elementary subjects in the English language only; and, in 1921, a measure for making the teaching of representative government in the public schools and other educational institutions in the State compulsory. In 1923 a State continuation school law became effective, requiring that continuation classes be organized in districts having as many as 20 boys and girls between the ages of 14 and 18 out of school, unless such individuals have completed a four-year high school course. Vocational education was carried on successfully during the decade and included, under vocational home economics, courses in home-making, nursing and dietetics. The Legislature of 1921 created a State Educational Commission to investigate the entire educational system of the State with a view to the standardizing, unification, and correlation of its various efforts, policies, and agencies, and for other purposes. A teachers' pension law was enacted by the Legislature of 1915. In 1923, 325 school districts had been consolidated, in the elementary schools of which 7332 were enrolled, and in the high schools 1337. Vocational courses, including courses in agriculture, industrial education, and home economics, were being conducted in 199 cities in 1923; and \$435,327 was disbursed from Federal and State funds for their support. The enrollment in the public schools increased from 1,007,894 in 1911 to 1,200,922 in 1921; in the elementary schools from 941,549 to 1,060,304; in the high schools from 66,355 to 140,618, or 111.92 per cent. The total expenditure for educational purposes in 1922-23 amounted to \$103,434,444; in 1914-15, the total was \$41,284,275. The percentage of illiteracy in the State decreased from 4.7 per cent in 1910 to 4.3 per cent in 1920; among the native white population from 2.2 per cent to 1.4; among the Negro population, from 12.4 to 7.9. Among the foreign-born white population it increased from 10.3 to 11.7 per cent.

Finances. See STATE FINANCES.

Political and Other Events. The political history of Illinois is always eventful, and the decade 1914-24 was no exception to the general rule. In the elections in 1914, women for the first time took part. Lawrence Y. Sherman was reelected to the Senate. The Republicans also elected 16 members of the House of Representatives, including Joseph G. Cannon. The Supreme Court in 1915 upheld the woman suffrage act passed in 1913. In 1915, Carter H. Harrison, five times elected mayor of Chicago, was defeated for the Democratic nomination by Robert M. Schweitzer, who in turn was defeated by William Hale Thompson, Republican candidate, by about 147,000 votes. Women for the first time participated in the city elections. Frank O. Lowden in 1916 was nominated by the Republicans for governor, and Edward F. Dunne by the Democrats; Lowden was elected. In the election for president, Charles E. Hughes received 1,152,316 votes; President Wilson, 950,081. In 1916 a serious race riot in East St. Louis occurred on June 8 from trouble between negroes and white men; it lasted for three days.

For this period the city was in the hands of a mob. The killed numbered 29 persons, of whom 25 were negroes; over 300 houses were burned. The riot began when a negro attacked an automobile which contained several policemen. Indictments were found against more than 100 persons, 32 of whom were accused of murder. A grand jury declared in its findings that the police had been grossly negligent and could have prevented the riot. On May 26, 1917, a terrific windstorm caused considerable loss of life and great damage to several towns of the State. In the elections of 1918, Medill McCormick was elected United States Senator, defeating Senator James Hamilton Lewis, Democrat. Elections were held in 1920 for governor and other State officers, and for United States Senator. Len Small, Republican, was elected governor, and William B. McKinley, also a Republican, was elected United States Senator. In the voting for president, Warren G. Harding received 1,420,480 votes; J. M. Cox, 543,395. During the summer of 1920 and at various later periods, a constitutional convention was in session. The new constitution proposed by the convention was rejected by the people in December, 1922. On July 20, 1921, Governor Small and Lieut.-Gov. Fred E. Sterling were indicted for conspiracy to defraud the State and for embezzlement of public money during their respective terms as State Treasurer. These indictments were based on charges that the accused officials had retained for their own use large sums paid them as interest on State funds. Governor Small was arrested on August 8 and was released on \$50,000 bail. After a trial he was acquitted on June 24, 1922. During 1922, the State suffered from coal mining strikes which were accompanied in several cases by riots. In Herrin a mob of striking coal miners killed 50 nonunion miners, after they had surrendered their arms, under the most brutal conditions. The town was placed under martial law, and many persons were arrested. In trials held in 1923, the jury returned a verdict of not guilty. A report of the committee of the Legislature, on June 20, 1923, placed the blame for these riots and killings on public officials who had failed to send militia to prevent the outbreak. (See STRIKES.) In 1923, William E. Dever, Democrat, was elected mayor of Chicago, succeeding William Hale Thompson. Fred Lundin, the political boss of the city during the Thompson administration, was indicted in 1923, together with officials of the Board of Education, for fraud. Lundin was tried and acquitted, as were most of the other defendants. Primaries for the nomination for governor, for United States Senator, and for other officers were held in April, 1924. Senator McCormick, a candidate for reelection, was defeated by Charles S. Deneen. Len Small was renominated for governor by the Republicans. The Democrats nominated Albert Arnold Sprague for United States Senator and Norman L. Jones for governor. Serious trouble arose early in 1924 in Williamson County, the scene of the Herrin murders of 1922, over attempts to destroy illicit stills and to suppress related forms of lawlessness. Conflicts took place between the police, alleged members of the Ku Klux Klan, and citizens. The National Guard took control until the disturbances were quieted.

Legislation. The most important proceedings of the Legislature in the decade 1914-24

are noted below. In 1917 the Legislature adopted a State civil administrative code by which all branches of the government were readjusted, duplicated services were abolished, and departments with responsible heads were established, many beneficial changes being thus effected. The Legislature also enacted a "blue sky" law. The Legislature in 1919 ratified the Federal suffrage amendment; it was the first State Legislature to take this action. It passed a "search and seizure" bill for the enforcement of the prohibition law; entered on a roadbuilding project involving the expenditure of more than \$87,000,000; abolished the State Board of Equalization of 25 members; substituted a State Tax Commission of 3 members to be appointed by the Governor, and provided for changes in the government of Chicago, including the non-partisan election of aldermen. The movement to establish an eight-hour day for women was defeated. In 1921 the Legislature passed measures providing for equality in voting between men and women. An act was also passed providing for compensation to veterans of the War, to be paid out of a bond issue of \$55,000,000, subject to the approval of the people. The act was duly approved by popular vote. The Legislature in 1923 passed a measure forbidding the wearing of masks in public places with the intent to conceal the wearer's identity. It also passed a bill to facilitate coöperative marketing of agricultural products and made provisions for creating associations for this purpose.

ILLINOIS, UNIVERSITY OF. A coeducational State institution at Urbana, Ill., founded in 1867. The enrollment increased approximately 70 per cent during the decade 1914-24, with 5500 at the beginning of that time and 9309 for the first and second semester of 1923-24. Counting additional students in the summer term, the total net enrollment for 1923-24 was more than 11,000. The faculty increased correspondingly, from 704 in 1914 to 818 in 1922-23; the library was increased from 310,000 volumes in 1914 to 577,321 in 1923-24, and the income of the institution from \$2,775,000 to \$6,211,564. The genetics building and the vivarium were erected in 1916, a women's residence hall in 1917, education building in 1918, the Smith Memorial music building in 1919, and the medical research laboratory and library at Chicago. The horticultural and agricultural buildings and the stadium were begun in 1922, and work was to begin in the spring of 1924 on the following buildings, for which money had been granted by the Illinois Legislature: first unit of a new library (\$750,000); new commerce building (\$500,000); new men's gymnasium (\$500,000); women's residence hall (\$250,000); and a miscellaneous agricultural service building (\$380,000). David Kinley, Ph.D., LL.D., succeeded Edmund J. James, Ph.D., LL.D., in 1919, as president.

ILLINOIS COLLEGE. The oldest collegiate institution of Illinois, founded in 1829 at Jacksonville, Ill. The enrollment of the college department increased from 131 in 1914 to 332 in 1924, while that of the conservatory of music was 189 in 1914 as compared with 184 in 1924. The preparatory department was discontinued during the period. The productive endowment increased in the 10 years from \$386,717 to \$871,374, and the total yearly income from \$48,448 to \$120,517. The science building was burned in

1920; the walls remained standing, and the building was reconstructed at a cost of \$50,000. Departments of psychology and education and of economics and business administration were established. Preparations were under way in 1924 for the celebration of the centenary of the college. President, Charles Henry Rammelkamp, Ph.D.

ILLINOIS WOMAN'S COLLEGE. An institution for women founded in 1846 at Jacksonville, Ill. The number of students registered in the regular college courses increased from 185 in 1914 to 284 in 1924, and the number in special courses from 97 to 274. The preparatory academy was closed during the period, and the two-year courses in fine arts, public speaking and home economics were discontinued. The library increased from 3000 to 13,800 volumes, and the gross income from \$105,000 to \$190,000. In 1914 there was no productive endowment; in 1924 the endowment amounted to \$400,000, plus \$300,000 in pledges. A gymnasium was built in 1917. President, Joseph R. Harker.

ILLITERACY. See EDUCATION IN THE UNITED STATES.

ILLUMINATION. See ELECTRIC LIGHTING.

IMELMANN, RUDOLF H. R. (1879-). A German writer and specialist on the English language and literature, born in Berlin, and educated at the universities of Jena, Bonn, Berlin, and Freiburg. For many years he made frequent trips to England. He became professor of English literature at Rostock. His principal works are: *Das Altenglische Menologium* (1902); *Layamon* (1906); *Der Deutsche Krieg und die Englische Literatur* (1915); *Forschungen zur Altenglischen Poesie* (1920); a history of English literature; and translations of Byron and Browning.

IMMIGRATION. The widespread agitation for the restriction and control of immigration, which was increasingly successful from 1914 to 1924, seemed to indicate the abandonment, at least temporarily, of the time-honored theory that the United States should be a refuge for those persecuted and in distress; the stand was definitely taken in this period that immigration should be regulated primarily in accordance with the need and best interests of the country itself. The growth in this sentiment for restriction was based not so much, perhaps, on actual increase in the number of alien immigrants (although fear of flooding after the War had much to do with bringing the issue to a head) as on the changed character of the immigration. It was the rapidly increasing proportion from southern and eastern Europe, a class regarded as less easy to assimilate, which gave rise to fears in some quarters that the problem of assimilation, already serious, would grow quickly out of hand unless restrictive measures were taken. Some groups saw in a flood of this divergent type a danger to the fundamental character of the population and a menace to cherished institutions. Labor fought against the overcrowding of the market with workmen whose standards of living and inaccessibility for organization had a tendency to lower wages and living standards. The steady growth of this sentiment against so-called unassimilable elements in immigration, and the success of the attempt to check their influx, made the period important in the development of a definite immigration policy.

See ANTHROPOLOGY; ETHNOGRAPHY; RACE PROBLEMS.

The tendency in immigration was generally to increase numerically. For 1905-14 the average was 1,012,194 alien immigrants entering in one year. With the War there came a sharp decline in numbers, and the annual average for 1915-18 dropped to 257,887; but in 1921 the number of alien immigrants admitted was again over 800,000. The table, giving the net increase of population by arrival and departure of aliens, 1908-23, shows an equally sharp curve.

NET INCREASE OF POPULATION BY ARRIVAL AND DEPARTURE OF ALIENS, FISCAL YEARS
ENDING JUNE 30, 1908 TO 1923

	Immigrant	Admitted Nonimmigrant	Total	Emigrant	Departed Nonimmigrant	Total	Increase
1908	782,870	141,825	924,695	395,073	319,755	714,828	209,867
1909	751,786	192,449	944,235	225,802	174,590	400,392	543,843
1910	1,041,570	156,467	1,198,037	202,486	177,982	380,418	817,619
1911	878,587	151,713	1,030,300	295,666	222,549	518,215	512,085
1912	838,172	178,983	1,017,155	333,262	282,030	615,292	401,863
1913	1,197,892	229,335	1,427,227	308,190	303,734	611,924	815,303
1914	1,218,480	184,601	1,403,081	303,338	330,467	633,805	769,276
1915	826,700	107,544	934,244	204,074	180,100	384,174	550,070
1916	298,826	67,922	366,748	129,765	111,042	240,807	125,941
1917	295,408	67,474	362,877	66,277	80,102	146,379	216,498
1918	110,618	101,235	211,873	94,585	98,683	193,268	18,585
1919	141,132	95,889	237,021	123,522	92,709	216,231	20,790
1920	430,001	191,575	621,576	288,315	139,747	428,062	193,514
Total 10 years, 1911-1920 ..	5,735,811	1,376,271	7,112,082	2,146,994	1,841,163	3,988,157	3,123,925
1921	805,228	172,935	978,163	247,718	178,313	426,031	552,132
1922	809,556	122,949	932,505	198,712	146,672	345,384	587,121
1923	522,919	150,487	673,406	81,450	119,136	200,586	472,820
Grand total	9,949,740	2,313,383	12,263,123	3,498,185	2,957,611	6,455,796	5,807,327

The number of alien immigrants admitted in the decade ending in 1910 was 8,795,386, or 116 per 1000 of the initial population. For the decade ending in 1920 the number was 5,735,811, or 62 per 1000. While in 1910, out of a total population of 91,972,266, the foreign-born numbered 13,345,545 or 14.5 per cent, in 1920, out of 105,710,620, they numbered 13,712,754, or 13 per cent, practically the same proportion as in 1860 (13.2). (See POPULATION.) The lessening of the proportion of foreign-born during the decade was no doubt due in large part not only to the falling off in immigration during the War but also to the unusually high rate of emigration among aliens. In 1916, 129,765 aliens left the United States; in 1917-21, the average annual emigration amounted to 164,083; in the two years following the War the outward movement to Europe, largely to the south and east, practically offset the immigration from that continent. In the latter part of 1920, however, the tide began to turn, and by 1921 the annual increase in population because of immigration was well on its way back to the peak figure.

It was the marked change in the character of the immigration, however, which seemed the main cause of uneasiness. In 1882, 85 per cent of the European immigrants came from the North and West; by 1907, 85 per cent was coming from the East and South. For a considerable number of years before 1914 the normal annual number of alien immigrants from the North and West had been 185,000, as compared with 750,000 from the East and South. Although immigration from Austria, Hungary, Germany and Russia fell off to practically nothing in the years immediately after 1917, and although about this time there was a striking increase in immigration from Mexico and Canada,

in 1920-21, 66.7 per cent of the total number of immigrants admitted were of races and peoples peculiar to South and East Europe and Asiatic Turkey. With the turn of the tide in the latter part of 1920, and the prospect of increasing numbers from southern and eastern Europe, the feeling against this type of immigrant grew stronger. Because of racial differences they were not easy to assimilate; they showed a greater tendency than the north-western Europeans to crowd in urban centres and thus oversupply the labor market; they

brought with them more often the danger of radicalism.

The growing movement to control immigration, which up to 1910 had developed only so far as to exclude the morally and physically undesirable and the contract laborer, to bar Chinese, and practically to bar Japanese by virtue of the "Gentleman's Agreement," at first contented itself with efforts to set a literacy test. The struggle for this restrictive measure dated back to 1897, when Cleveland vetoed the proposal; it had become prominent again in 1906. Taft vetoed such a bill in 1912, Wilson in 1915. In 1917, Wilson vetoed the proposal for the second time, on the ground that it punished the immigrant for what was no fault of his, and because, in allowing for the exemption of refugees from religious persecution, it might lead to embarrassing expressions of opinion on governmental policies abroad; but the measure was passed over his veto. This bill required that all aliens over 16, who were physically able, in order to be admitted must be able to read English or some other language or dialect, although it allowed for the bringing in of father or grandfather over 55, wife, mother, grandmother, unmarried or widowed daughter, and for the entry of those persecuted for religious reasons, even if illiterate. It also contained a clause restricting Oriental immigration and increased the poll tax on entering aliens to \$8. The effect of this bill is shown in the fact that while between 1908 and 1917, 1,617,000 illiterates over 14 had been admitted, and while in 1913 illiterates made up 26.6 per cent of the entering alien immigrants, in 1920 this class numbered only 15,094, or 4.4 per cent of the total number admitted. There is some significance also in the increased proportion of rejected applicants: 2.3 in 1914; 5.3 in 1915;

4.9 in 1916; 4.2 in 1917; 3.3 in 1918; 3.6 in 1919; this, although due in some measure to the more rigid inspection possible when immigration had fallen low during the War, was also attributable to the new requirement.

In 1920, with a marked increase in immigration toward the end of the year, the fear of a flood from the war-stricken countries of Europe was intensified, and the demand for still further restriction became insistent. In 1921, the American Federation of Labor, fearful for one thing of the unemployment situation, was vigorously advocating complete prohibition of immigration for two years. The American Legion was calling for rigorous exclusion of revolutionaries. On the other hand, the Inter-Racial Council, chiefly representative of large employers, continued to argue the need of unskilled labor, and the danger of giving labor in this country a monopolistic control of the

ed with excess applicants to such a serious extent that steps had to be taken to admit many temporarily. The congestion continued for about six months, to some degree. Nevertheless, from July 1, 1921, to Apr. 30, 1922, less than 4000 in excess of quotas had applied, and only about 1250 of these had been returned. There was some question as to whether priority was to be established by arrival or by application, and the method of deciding which of the excess applicants should be rejected came in for criticism. The law succeeded, however, in restricting the number of alien immigrants to 180,000 in the first nine months of 1921-22, as compared with 793,000 in the same period in 1913-14; and it had about doubled the proportion from the North and West of Europe, raising it from 14 to 31 per cent. Its effect is shown in the table, which compares the figures for 1922-23 with those for two years before the law was passed.

IMMIGRANT ALIENS ADMITTED BY PRINCIPAL RACES OR PEOPLES IN FISCAL YEARS SPECIFIED

RACE OR PEOPLE	Number admitted			Per cent of total		
	1922-23	1920-21	1913-14	1922-23	1920-21	1913-14
Northern and western Europe	274,507	206,995	253,855	52.5	25.7	20.8
Southern and eastern Europe and Turkey	162,695	537,144	921,160	31.1	66.7	75.6
Mexicans	62,709	29,603	13,089	12.0	3.7	1.1
All others	23,008	31,486	30,376	4.4	3.9	2.5
Total	522,919	805,228	1,218,480	100.0	100.0	100.0

market; and there was not lacking a large body of sentiment that the United States should still continue to be an asylum for the politically and economically oppressed. Among the remedies proposed was an agency to regulate the flow and the nature of immigration in accordance with the country's need; examination at ports of debarkation was advocated. An emergency measure presented to Congress in 1920 provided for a practical shutting off of immigration for 14 months. The bill finally passed, in 1921, was based on the percentum limit plan; it provided that the number of aliens of any nationality admitted in any fiscal year was not to exceed 3 per cent of the number of foreign-born residents of that nationality in the United States in 1910, nationality to be determined by country of birth. It applied only to Europe, the Near East (including Turkey, Persia, Mesopotamia, and Arabia), Africa, Australia, New Zealand, Asiatic Russia, and islands of the Atlantic and Pacific not adjacent to the mainland of the western hemisphere. This percentum limit arrangement was designed seemingly to decrease the number of immigrants from southern and eastern Europe and to increase proportionately the number from the North and West; whereas in the years before 1914, the normal annual number of immigrants from the North and West had been about 185,000 and from the South and East about 750,000, under the new quota arrangement these figures were limited to 200,000 and 155,000 respectively. Since the law was passed only on May 19 and became effective June 3, a good deal of confusion and difficulty followed. According to its provisions, not more than 20 per cent of the total of any quota was admissible in any one month; in June, 1921, 11,000 in excess of quotas applied for admission. Entering ports, particularly Ellis Island (which at this time and later came in for violent criticism on the score of inhumane accommodation for detained aliens), were crowd-

In May, 1922, the life of this percentum act was extended to June 30, 1924; at the same time the requirement of one year's residence in an adjacent country, to escape the quota restriction, was raised to five years.

Restriction still continued an important issue. In 1922 there was an agitation for relaxation. In that year 100,058 unskilled laborers had left the country and only 32,728 had been admitted; it was urged that there was about to be a dearth of men for work that did not attract workers already in the country. But the advocates of more severe restriction were successful. A measure to replace the existing bill, which expired June 30, 1924, was drawn up in that year, and after much heated discussion over the method of fixing the quota, and over the Japanese exclusion clause, it was passed in both houses by a large majority. After Congress, by more than a two-thirds majority, had refused his request to postpone until March, 1925, the date on which the Japanese exclusion clause became effective, President Coolidge signed the bill on May 26. By this measure the aggregate immigration from outside the western hemisphere was limited to 161,000 persons annually for three years, and to 150,000 thereafter. After July 1, 1927, the aggregate quota was to be divided exactly in accordance with the national origin of the whole population, according to the latest census. Under the new arrangement, 75 per cent of the immigrants would be drawn from northern and western Europe. Wives, minor children, and elderly parents were privileged to enter as a nonquota class. Apart from the contention that it was not in accordance with American ideals to base immigration on a selfishly economic basis, the bill was criticized as an undesirable "expression of responsible thought in America on controversial theories as to relative worth of nationalities." As proclaimed by President Coolidge, June 30, 1924, the largest quota for 1924-25 was that of

Germany, 51,227. The quota for Great Britain and Northern Ireland was 34,007; Irish Free State, 28,507; Italy, 3845; Russia, 2248.

Asiatic Immigration. Under the Chinese exclusion bill, and the "Gentleman's Agreement" (1907) by which Japan bound herself to give no passports to laborers coming to the United States and to limit the number to Canada and Mexico, the influx of Asiatics had already been greatly restricted. The 71,531 Chinese residents in the United States at the census of 1910 had decreased to 61,686 in 1920. On the other hand, the number of Japanese had increased 53.86 per cent in the 10 years, from 72,157 to 111,025, an increase of about 30,000 in California and about 4000 in Washington. A growing protest against Oriental immigrants began to make itself heard. In 1914 two amendments to the general immigration bill were proposed and rejected, one to exclude all Asiatics except those with rights under existing agreements, and the other anti-Japanese. The immigration bill of 1917 contained a clause excluding Oriental laborers and directed chiefly at Hindus and Malays. Meanwhile on the Pacific coast, feeling against the Japanese had been growing more intense. Not only was the Japanese, like other Orientals, considered unassimilable; the American farmer was not able to compete with his gift for intensive cultivation, his unflagging energy, and lower working and living standards; his growing numbers, and increasing success at the expense of other farmers, changed uneasiness into alarm. The desire for protection was reflected in State laws in California, Washington, Arizona, and Oregon. Not only the right to own land was taken from the Japanese; the right to lease it for three years, which had previously been allowed, was denied in 1920; in 1923 even croppage contracts were forbidden. Resolutions were passed in the latter year in California asking Congress to prohibit Japanese immigration altogether and petitioning for an amendment to the Constitution to exclude from citizenship those children born in the United States of parents ineligible to citizenship. Following all this there was incorporated in the new immigration bill in 1924 a clause excluding would-be immigrants who were not eligible for citizenship, in abrogation of the "Gentleman's Agreement." During the lively debate that followed, the Japanese Ambassador Hanihara, in a letter to the State Department, asked that Japan be given the opportunity to arrange the matter by treaty and called attention to the possibility of "grave consequences" if the Japanese were subjected to the indignity of such discrimination. His letter aroused much criticism, and was styled an attempt to intimidate and to dictate legislation on a domestic matter. Contrary to the advice of Secretary Hughes that Japan be placed on the quota basis, the bill was quickly passed by the Senate by a vote of 76 to 2. The House had previously passed the bill by a vote of 376 to 71. All Japanese, except ministers, members of the learned professions and arts, and students, with their wives and children, were barred. President Coolidge favored the general principle of exclusion but recommended a delay till March, 1925, to arrange the matter by treaty with Japan, if possible. Congress, however, refused by a large majority to accept this recommendation, and the President, moved by other considerations, gave the bill his signature as it

originally stood. Among the arguments advanced in favor of the bill was the impossibility of a situation in which two races with such divergent standards of living were side by side; the right to retain the country for the Caucasian race against a flood of unassimilables; the feeling in some quarters that Japan had not lived up to the "Gentleman's Agreement"; that since no other Oriental country was included in the quota arrangement, Japan had no right to feel herself the object of discrimination. On the other hand the bill was severely criticized as abrupt and a breach of international good manners. It was contended that Japan had kept her agreement to the best of her ability and that if Japanese laborers had continued to be smuggled in under that arrangement, the smuggling could only increase without Japan's coöperation. Moreover, Japan was willing to coöperate in excluding any or all of her citizens and desired only that it be by a law putting her on a par with other nations or by a treaty. Perhaps the most convincing argument against the clause was the claim that it was unnecessary. Secretary Hughes had advocated that the Japanese be included in the 2 per cent quota provision, calling attention to the fact that the entailed admission of 250 immigrants a year was virtual exclusion. The President, in favor of settlement of exclusion by treaty, styled the measure "unnecessary and deplorable." There was much comment on the fact that in so vital a matter, affecting sensibly the general attitude of Japan toward the United States, the definitely expressed opinion of the President and Department of State could be overridden by a Congress without party control.

IMPERIAL CONFERENCES. See BRITISH EMPIRE.

IMPRESSIONISM. See PAINTING; SCULPTURE; AND MUSIC.

INCANDESCENT LAMPS. See ELECTRIC LIGHTING.

INCE, THOMAS HARPER (1880-). An American moving-picture director, born at Newport, R. I., and educated in the public schools. He was for several years an actor under Charles Frohman. In 1909 he was appointed general director of the New York Motion Picture Corporation and was later president of the Thomas H. Ince Studios and other companies. He directed many successful pictures.

INCOME TAX. See TAXATION IN THE UNITED STATES.

INDIA. The peninsula of Hindustan and the regions to the North, including all those territories governed directly and indirectly by the British. Total area, 1,802,332 square miles; total population in 1911, 315,156,396; in 1921, 318,942,480; gain in population for the decade, 1.2 per cent. Of the British provinces, losses for the decade 1911-21 were shown by Bihar and Orissa, Bombay, Berar, and the United Provinces of Agra and Oudah. Among the native states and agencies the following declined: Central India Agency, Hyderabad, Rajputana Agency, and the United Provinces States. The heavy ravages of famine, the plague, and other diseases accounted for the population's remaining almost stationary. In 1919, for example, births were 30.24 per 1000 to 35.87 deaths; for 1920, births were 33 per 1000 and deaths were 30.8. The 1918 losses of population as a result of harvest failures and the influenza epidemic were among the severest recorded.

The death rate in that year mounted past 62 per cent per 1000. Populations of the largest cities in 1921 were (1911 figure in parentheses): Calcutta, with suburbs, 1,327,547 (1,222,313); Bombay, 1,175,914 (979,445); Madras, 526,911 (511,660); Hyderabad, 404,187 (500,623); Rangoon, 341,962 (293,316); Delhi, the winter capital, 304,420 (232,837). By religions, the population in 1921 was divided as follows (1911 figure in parentheses): Hindus, 216,734,586 (217,586,900); Sikhs, 3,238,803 (3,014,466); Buddhists, 11,571,268 (10,721,449); Mohammedans, 68,735,233 (66,623,412); Christians, 4,754,079 (3,876,196); Animists, 9,774,661 (10,295,168).

Education. The 1921 census indicated that in spite of recent educational progress, the total illiteracy remained enormous. In Bengal, the most advanced of the provinces, 43,000,000 out of the total 47,000,000 were classed as wholly illiterate. Only some 500,000 of the women of Bengal might be classed as literate. The increase in education may be seen from the fact that in 1919-20, in a total of 202,981 institutions there were in attendance in British India 7,612,839 (1,306,711 of these female) as compared with 6,128,725 (875,660 female) in 1912. The cost of maintenance of educational institutions in 1913-14 was £6,696,585; 1919-20, £14,889,696. The well attended colleges and secondary schools seemed strangely out of place in a system where primary education was so largely neglected. This feature was one of the leading preoccupations of the administration during the decade 1914-24, with the result that more attention was being applied toward reaching the masses. University supervision over the colleges was exercised by the six universities of Calcutta, Madras, Bombay, the Punjab, Allahabad, and Patna (established in 1917); the three residential universities of Dacca, Lucknow, and Rangoon; the two denominational universities at Benares (Hindu, established 1917) and Aligarh (Moslem); and the two universities in Indian states at Mysore (established 1916) and Hyderabad.

Agriculture. Agriculture, which occupied the great mass of the population (225,000,000 out of 313,000,000 in 1911) accounted for the cultivation of 224,931,000 acres in 1922-23, out of the 426,988,000 acres of agricultural land, as compared with 219,192,000 acres out of the 387,599,000 of 1913-14. Distribution in 1922-23 was fallow land, 47,411,000 acres; net area sown, 224,931,000; culturable waste, 151,656,000; not available for cultivation, 152,650,000; under forest, 85,595,000; irrigated area, 48,054,000. The table in the next column indicated the progress of agriculture over the period (figures in thousands).

Figures for live stock in 1921-22, with 1913-14 figures in parentheses, were: cattle, 117,685,000 (125,141,000); buffalo, 27,334,899 (18,232,000); sheep, 22,082,000 (23,092,000); goats, 24,333,000 (30,673,000); horses, mules, and donkeys, 3,124,000 (3,230,000); camels, 410,000 (496,000). The favorable harvests which continued up to 1918, and the increasing demands made on agriculture by the Empire during the War, accounted for an unprecedented prosperity. The government instituted a control on prices to protect the laboring classes and in general directed the export flow of wheat and rice. In 1918 the failure of the monsoon hit agriculture severely and caused the necessity

for heavy importations of cereals from Australia. The spread of coöperative societies among agriculturists was noteworthy. In 1923 there

Crop	1913-14		1921-22	
	Acres	Tons	Acres	Tons
Total area of food crops	202,406		191,000	
Rice	79,908	81,547	81,256	87,003
Wheat	28,496	9,370	28,234	9,817
Millet	36,213	6,753	41,128	7,584
Grain	8,958	2,170	14,630	4,855
Sugar-cane	2,537		2,382	
Raw sugar		2,298		2,590
Total area of non-food crops	46,100		40,700	
Oilseeds	16,490	2,627	15,700	3,015
Cotton	25,027	1,013	18,346	992
Jute	3,352	1,699	1,546	1,567
Indigo	173	2,680	317	6,090
Tea	625	313,301	709	274,264

* Crop given in pounds; all others in net tons.

were 56,136 coöperatives with a membership of 2,102,446, engaged for the most part in credit activities. The movement was regarded as an excellent instrument for placing the agricultural classes on a securer foundation. The problem of irrigation continued to loom large. In 1922-23, 48,054,000 acres were being irrigated as compared with 40,679,000 in 1911-12. It was estimated that irrigation canals in existence were valued at £78,600,000 in 1920-21; the net revenue from them was £5,422,000. The Punjab, which has been the seat of greatest activity, saw completed in 1915 a system of canals serving 1,750,000 acres. After the War schemes were projected for the construction of several systems, notably in the Punjab and in Sind, which would serve 10,000,000 acres. In the Madras, Mysore, and Gwalior state governments, important projects were under construction in 1923 for the damming of the Cauvery and Chambal Rivers for hydro-electric as well as irrigation purposes.

Mining. The following comparative figures reveal the state of the mining industry over the period under discussion. Coal production: 1914, 17,565,000 tons; 1922, 19,010,986 tons; 1923, 18,672,798 tons. Gold production: 1914, 4007 fine ounces; 1921, 2855 fine ounces; 1922, 2900 fine ounces. Silver production: 1914, 236,446 fine ounces; 1921, 3,587,587 fine ounces; 1922, 4,244,304 fine ounces. Iron ore production: 1914, 441,674 tons; 1921, 942,084 tons; 1923, 625,274 tons. Manganese production: 1914, 622,898 tons; 1921, 679,286 tons; 1922, 474,401 tons. Petroleum production: 1914, 259,342,710 imperial gallons; 1922, 298,504,000 imperial gallons. Mica production: 1914, 4,537,000 pounds; 1921, 3,639,000; 1922, 3,536,000. Progress was thus inconsiderable. The average number of workers in the mines was 250,000, of which, in 1921, 65,786 men, 42,000 women, and 1171 children were engaged in the collieries. Legislation affecting mine workers prohibited the employ of children in the mines; fixed the maximum hours of labor at 54 hours a week; and gave the government power to regulate the conditions of women employed underground.

Manufacturing. The weaving of cotton cloths continued the most important single industry and showed increases, too; the production of cotton cloth mounted from 1,164,292,000 yards in 1913-14 to 1,752,000,000 yards in 1922-23. Similarly, the manufacture of gunny bags and jute cloth rose from 487,848,000 bags and

447,309,000 yards of jute cloth (1914) to 500,000,000 bags and 1,450,000,000 yards of jute cloth (1923). The impetus that the War gave to industry in India by cutting off the foreign sources of supply, and the encouragement accorded to industrialization by the existence of such large stocks of raw materials, were immediately perceptible. From 1917 to 1922 rice mills increased 12 per cent, engineering works 30 per cent, woolen mills 50 per cent, sugar factories 37 per cent, and flour mills 25 per cent. In all, the 4939 establishments of 1917 increased to 6140 in 1922; 1,252,606 workers of 1917 increased to 1,367,136 in 1922. The increased capitalization of joint stock companies over the period 1913-22 again reflected the trend toward industrialization. The total paid-up capital of such companies increased from 750,000,000 rupees in 1913 to 2,500,000,000 in 1922. Again, imports of industrial machinery displayed the same tendency; in 1913-14, such imports were valued at £6,076,606; in 1920-21, £21,004,032. The years 1922 and 1923 saw an alleviation of the political and economic disturbances characteristic of India's late history. In 1923 there were only 132 industrial disputes involving 350,000 workers and incurring a loss of 2,736,000 days as compared with 400 disputes, 523,155 workers, and 6,637,862 days in 1921. It was becoming evident that with encouragement of trade unionism, readjustment of wages, decreased cost of living, better housing conditions, and increasing interest in technical education, the status of labor was taking on an optimistic cast.

Commerce. It did not take long for India to become readjusted to war conditions. The insistent demand for foodstuffs, cotton materials, bagging, and hides from the Allies immediately put Indian raw materials at a premium. But for the depression of 1921, India's commercial activity showed an unbroken advance. Total exports, foreign and domestic, were valued at \$610,836,000 in 1913-14; \$991,378,000 in 1922-23. Total imports for 1913-14 were \$826,875,000; \$956,778,000 in 1922-23. That the increases were real may be adduced from the following export figures, in volume: raw cotton in 1913-14, 531,000 tons; in 1922-23, 673,000 tons; cotton piece goods in 1913-14, 89,234,000 yards; in 1922-23, 156,951,000 yards; tea in 1913-14, 289,474,000 pounds; in 1922-23, 287,448,000 pounds. Similarly, the trade in foodstuffs showed a favorable balance of 38,171,000 rupees for 1921-22 as compared with an adverse balance of 234,320,000 in 1913-14. The following figures reveal proportions by countries of origin (imports) and countries of destination (exports) of India's foreign trade for 1913-14, 1918-19, and 1921-22. Imports: United Kingdom, 64, 46, 57 per cent; Japan, 2, 20, 5 per cent; the United States, 3, 10, 9 per cent. Exports (pre-war and 1921-22): United Kingdom, 25 and 18 per cent; Japan, 7 and 16 per cent; the United States, 7 and 10 per cent. Principal imports and countries of origin for 1921-22 were, for electrical appliances, Great Britain and the United States; hardware, Great Britain, Germany, the United States; iron and steel, Belgium and Germany; sheets and plates, Great Britain, Belgium, Germany; machinery, Great Britain, Germany, the United States; kerosene oil, the United States, Borneo; fuel oil, Persia; textiles, Great Britain and Japan. Similarly for exports: raw cotton, Japan, China,

Germany; dyes and tanning substances, Great Britain and the United States; rice, Ceylon, Straits Settlements, Germany; wheat, Great Britain, Egypt; hides and skins, Germany, Great Britain, the United States; oilseeds, Great Britain, Belgium, France; spices, Aden, Ceylon, the United States; tea, Great Britain, Canada, Australia, the United States; cotton piece goods, Turkey, Persia, Ceylon; raw jute, Great Britain, Germany, the United States; jute bags, Great Britain, Japan, Australia, the United States. Another indication of India's sound commercial status was the record of shipping. In 1913-14, 3168 ships of 6,785,000 tons entered; in 1921-22, 3527 ships of 6,966,000 tons. In 1913-14, 4012 ships of 8,252,000 tons cleared; in 1921-22, 3529 ships of 6,553,000 tons. In 1922-23, 2,986 ships entered of 6,518,150 tons and 3502 cleared of 7,443,517 tons.

Communications. Comparative figures are instructive. In 1913-14 there were 34,652 miles of railway open; in 1921-22, 37,265 miles; in 1922-23, 37,618 miles. Of the last, 7698 miles were state lines worked by the state; 19,107 miles state lines worked by companies; 2951 Indian state lines worked by Indian states; 2306 miles were company lines subsidized by the central or local governments. The passengers carried in 1913-14 were 457,718,000; in 1922-23, 572,695,400. Freight tonnage in 1913-14, 82,613,000 tons; in 1922-23, 93,704,000 tons. In 1922-23 there were 9740 locomotives, 24,695 passenger cars, and 209,134 freight cars. Total capital expended on railways to the end of 1921-22 was 6,560,624,000 rupees as compared with 4,768,250,000 rupees at the end of 1912. Up to the end of the War the Indian railways were able to show a profit, but with depreciation of stocks as a result of the great strain of carrying war materials, higher wages, etc., the inevitable decline manifested itself. The result was that in 1922 the British Parliament sanctioned the request for the flotation of loans amounting to £50,000,000 for the rehabilitation of Indian railroads. Another £50,000,000 was allowed in 1923 for allocation as necessary. By 1921-22 working expenses absorbed 76.2 per cent of the gross earnings so that the net loss to the state, after meeting interest charges, was £9,273,000. By comparison, in 1918-19 the net profit was £11,000,000. In 1920 a committee headed by Sir William Acworth took under consideration the whole problem of railway management. The question which agitated Indians primarily was that of foreign, i.e. English, corporation control of the majority of the lines operated. In the opinion of five members of the committee, direct state management was the most feasible scheme; five others advocated a combination of direct state management and company operation, with central administration, however, located in India. In conformity with the recommendations of the Acworth commission, a high commissioner for railways, as head technical officer, was appointed in November, 1922. An indication of the prevailing trend was the decision on the part of the Legislative Assembly in 1923 to put under state management two of the largest Indian railway systems, operated by English companies, on the expiration of their contracts. These were the East Indian Railway (contract ending 1924) and the Great Indian Peninsular Railway (1925). The perplexing problem of fuel supplies turned India toward a serious consideration of elec-

trification. The first important project aimed at the damming of the Sutlej River for the electrification of the Kalka-Simla line (60 miles). Important schemes carried through in the period 1914-24 were the Muttra-Kotah line, connecting northern India with Bombay, and the bridge across the Ganges at Sara.

Finance. Beginning with 1921, a policy of devolution was applied to the Indian budget whereby the provincial revenues and expenditures were separated from the central government accounts. Incidentally the budget of 1921-22 was the first submitted to the Legislative Assembly. Strenuous measures to check the advancing expenditures, the chief concern of Indian financing for the five years 1919-24, were of no avail, for deficits steadily mounted. The annual deficits of the period totaled 1,000,000,000 rupees, so that the estimated national debt amounted to 7,810,000,000 rupees on Mar. 31, 1923, as against 4,110,000,000 rupees in 1914. It should be noted, however, that 310,000,000 rupees of the annual deficit were covered by the inflation of the currency. Total revenues for 1913-14 for imperial and provincial governments, with the rupee rated at 15 to £1, were £85,207,000; expenditures, £82,895,000. Revenues for 1922-23 for the imperial government alone, with the rupee rated at 10 to £1, were £133,228,000; expenditures, £142,391,000. By the devolution rules, the following heads of revenue were allocated to the central government: opium, salt, customs, income tax, tributes, post office and telegraph, railways, mint, military services; the following to the provincial governments: land revenue, stamps, excise, forest, registration, irrigation, and civil departments. Provincial governments were required to pay annual contributions to the central government. The revenue items to show the largest increases over the period, in the figures for 1913-14 and 1922-23, were: customs, £7,558,000 to £45,418,000; income tax, £1,950,000 to £22,114,000; land, £21,392,000 to £35,030,000 (for 1921-22). The greatest single expenditure was that on the military establishment, which mounted from £19,789,239 for 1913-14 to £60,317,100 for 1921-22, or almost half of the total expenditure. The debt service rose from £2,037,735 (1911-12) to £15,200,900 (1922-23). In 1916 the salt duty was increased, and in 1917 a supertax on incomes was imposed. In 1917 and 1918 Indian war loans were raised for a total of £100,000,000 to aid the home government in the conduct of the War. Of this, £77,274,000 was paid to the British government. Additional amounts to a total of £20,705,000 were paid out toward the same end by 1920-21. The rise in the value of the rupee, due to heavy war expenditures and favorable trade surpluses, and the disappearance of silver from the money markets of the world, sent it from the fixed rate of 1s. 4d. before the War to 2s. 4d. by the end of 1919. With silver selling at almost 90d. per ounce in 1920 as compared with 26d. per ounce before the War, it was inevitable that silver should disappear from circulation. The government was compelled to resort to the issuance of paper, so that within the war period almost £80,000,000 in notes was put into circulation. Inconvertibility seemed imminent and might have become an actuality had it not been for the sale of 200,000,000 ounces of silver to the Indian government by the United States, beginning with

1918. However, the factors above cited, together with the fall of the pound sterling and the melting down of rupees into bullion, necessitated drastic action in fixing the relationship between the rupee and the gold sovereign, instead of the pound sterling. Finally in 1920 a committee recommended that the rupee be converted into the gold sovereign on the basis of 10 rupees to the pound instead of the former 15 rupees. The Indian government tried to maintain the new rate by selling drafts on the London exchange, but the depression of 1920-21, the turning of the favorable trade balance into an unfavorable one in 1921, and the fall of the value of silver to 32d. per ounce in 1921, compelled the authorities to relinquish their attempt to bolster up the exchange. By 1924 nothing had been done to force the universal acceptance of the new rate, although in government transactions the rupee was converted at the one-tenth pound sterling rate. Notes in circulation, 1913-14, 661,175,935 rupees; in 1920-21, 1,661,569,750; Dec. 31, 1923, 1,966,000,000. By an amendment to the Indian Paper Currency Act in 1920 the government was permitted to emit paper notes without limit on provision that 50 per cent was to be secured by gold or silver, most of it held in India and not England. The financial system was further strengthened by the amalgamation, in 1920, of the three Presidency Banks into the Imperial Bank of India. The general prosperity during the period under discussion accounted for a higher level of wages, though prices rose proportionately. Using prices of July, 1914, as the basis, i.e. at the index 100, the general average wholesale price index for 1920 was 204; 1921, 180; 1922, 180; 1923, 176.

Immigration. In 1916 it was announced by the Indian government that the policy of providing for the eventual abolition of indentured labor in Jamaica, Trinidad, British Guiana, Dutch Guiana, and Fiji, had been accepted by the Secretary of State for India. The system, which had been inaugurated in 1842 and had been pressed by licensed agents, had led to annual migrations of 10,000 coolies, on an average, for work under contract. The permanent settlement of these coolies in Africa, in particular, had led to vexing internal problems. (See KENYA; SOUTH AFRICA, UNION OF.) The result had been the prohibition of such emigrations to Natal and Mauritius (1910) and then (1917) to the areas cited above. The decision to put an end to this system was received with approval by the Indians, who had always regarded contract labor as a form of slavery.

Government. In 1919, in order to hasten a more effective native participation in Indian affairs, the Government of India Act was passed, effective for 1919-29. It was based on the report formulated by the Secretary of State for India, Mr. Montagu, and by Lord Chelmsford, the Viceroy. The keynote of the report was the recommendation of a progressive movement toward responsible government founded on a native ministry. With this as its purpose the Act incorporated the idea of a dual form of government for the major provinces, i.e. the Presidencies of Madras, Bombay, and Bengal; the United Provinces, the Punjab, Behar, Cissar; and the Central Provinces, Assam, and Burma. This system, called "dyarchy," consists of the division of provincial matters into two groups, viz., "reserved subjects" over which

the governor-in-council of the province retains control, and "transferred subjects" over which the provincial ministry is the final arbiter. The "transferred subjects" include local self-government, medical administration, public health and sanitation, education, public works, agriculture, fisheries, coöperative societies, excise, registration, adulteration, weights and measures, and religious and charitable endowments. The governor-in-council was in charge of the "reserved subjects"; the governor and a responsible ministry were in charge of the "transferred subjects." The purse for both branches was held in common, and definite sources of revenues were assigned the provinces (see above, *Finance*). Responsible government was assured by making the provincial ministers, appointed by the governor of each province, answerable to the provincial legislative council, at least 70 per cent of whose members were to be elected. Representation by special interests was provided for; the franchise was extended, and in Madras (by statute) and in Burma women were given the ballot. For example, of Bengal's 139 members, 113 were elected, 20 were nominated officials, and 6 were nominated non-officials representing special interests. The governor's powers remained large; he was permitted to withdraw from consideration or to pass over the heads of the council any legislation which he considered jeopardizing the tranquillity or safety of his province. Incidentally he was the focal point to which the affairs of the executive council, the legislative council, and the larger concerns of the central government radiated.

Responsible government was not the rule of the central government. In place of the unicameral house there was a two-chamber legislature, made up of the Council of State and the Legislative Assembly. The Council of State consists of 60 members, only 29 of whom were to be nominated members. The Legislative Assembly was to be made up of 144 members, of whom only 26 of the 41 nominated members could be officials; the other 103 were elective. The Governor-General, or Viceroy, was not a member of the legislature, but for the direction of affairs he was to have to aid him an Executive Council consisting, in 1923, of 8 members. The Governor-General had the power of enacting legislation, subject to the approval of Parliament, and of vetoing legislation that affected the tranquillity or safety of the country. Within clearly defined limitations the annual budget was to be submitted to the Legislative Assembly and Council of State for their approval, though the Governor-General may certify any item in the budget, or even the whole of it. The Act of 1919 also provided for the appointment of a high commissioner for India resident in London.

History. The outbreak of the War found India tranquil. The pledges of loyalty and the offers of money and munitions which poured in reassured the home government that any effort in the war prosecution would not meet with an organized opposition. The result was that India was stripped of its internal defenses to a remarkable degree so that men and war materials might be dispatched to the theatres of war. By 1916 upward of 300,000 men, both British and natives, had left the country. Indian contingents saw service in France, Egypt, East Africa, Gallipoli, and Mesopotamia. The

campaign in Mesopotamia was under the exclusive control of the Indian government. Even the entry of Turkey into the War failed to stir up any considerable discontent. Recruiting was pushed vigorously; a war munitions board controlled the output of materials; and a loan of £100,000,000 was floated for the aid of the Empire. The active measures taken by the government in the regulation of prices and exports and the increased prosperity which came to the population from the sale of raw materials served further to assure tranquillity.

Lord Hardinge was followed by Lord Chelmsford as Viceroy in 1916. The latter's administration was confronted by an awakened nationalistic sentiment taking on greater proportions as the War progressed, and echoed in a growing repressive policy on the part of the Indian government. Under the lead of the National Congress and the Moslem League, the demand for Indian Home Rule became widespread. In 1916 the proposal formulated at the meeting of the two organizations at Lucknow became the official statement of policy of the dissidents and received wide currency as the agitation continued. Unfortunate official tactics added fuel to the flames. Mrs. Annie Besant was in 1917 compelled by the Madras government to quit the city and confine her activities to certain delimited areas. It became increasingly necessary for the home government to make a clear-cut pronouncement of its policy as Lord Chelmsford's position became more difficult. In 1917, Edwin Samuel Montagu, who had just come to the Indian Office after the resignation of Austen Chamberlain, realizing the changed state of affairs in India as well as the new attitude toward the country in the whole Empire, made a declaration promising radical reforms. The chief point of his statement was that an increasing measure of self-government for India was inevitable. In the winter of 1917 and into 1918, Montagu, together with Lord Chelmsford, held extended hearings in India, resulting in the Montagu-Chelmsford Report. The findings set forth the proposal that self-government be tried just in the major provinces under a limited scheme, and that, for the whole of India, complete home rule was as yet inadvisable because of the dissimilar elements in the population and the general unpreparedness. Some moderate elements in the Indian population expressed their approval, but their attitude was overshadowed by the pronounced disappointment and indignation of the thoroughly conscious Indian nationalists, who regarded the proposed reforms as utterly inadequate. On Sept. 1, 1918, the Indian National Congress at Bombay unanimously rejected the reforms. Counter-proposals demanded the extension of the dual government idea to the central government of India and the abolition of the Council of State. Other resolutions passed called for a guarantee of full responsible government within 15 years, equal rights for women, and a large proportion of native Indians in the civil service. Meanwhile the suggestions embodied in the report had been incorporated in the Government of India Bill, which passed the British Parliament in December, 1919. (See above, *Government*.)

India's war effort may be summarized here. In men, India had contributed upward of 1,250,000 recruits, of whom some 30,000 had died overseas as a result of wounds and disease. A

loan of £100,000,000 had been guaranteed. India had been the sole source of supply for the operations in India, Mesopotamia, and Egypt in respect to great variety of commodities, including butter, oatmeal, tinned beef, mutton, biscuits, boots, wearing apparel, as well as 1500 miles of railway, 4500 vehicles, and 250 engines. Strong measures in 1918 had prevented an invasion of India from the North after the collapse of Russia, and the friendly relations with Afghanistan had kept that country well disposed during the War. In all, considering the usual poverty of the great proportion of India's population, the effort had been extraordinary. No doubt the following unrest was engendered by the after-effects of the War.

The years 1919-24 saw increasing disorder. The passage of the untimely Rowlatt Acts in March, 1919, brought matters to a head. These measures, which included the Indian Criminal Law Act and the Emergency Criminal Law Act, were aimed at a more rigorous enforcement of the penal statutes against sedition and gave the Governor-General extraordinary powers in the matter of search and punishment of those suspected of propagating revolutionary doctrines. Many members of the Legislative Council refused their consent to the passage of the acts; several members of the government resigned in protest; Indian leaders universally condemned the measures. The Indian National Congress, meeting at Allahabad, pronounced against the laws and approved several other resolutions of a radical tenor. Among these was a demand for self-determination and the appointment of a commission comprising Tilak, Gandhi, and Hassan Imam, to put the Indian case before the Peace Conference. As the only way open, short of violence, to contest the growing British power, a Passive Resistance League was formed at Bombay as a result of the activities of M. K. Gandhi. The movement quickly spread through northern India, and in March and April, 1919, disturbances were frequent throughout the Punjab and the Bombay Presidency. A riot and street fighting occurred in Delhi; at Amritsar, government buildings were burned, telegraph wires were cut, and fighting was general. Lahore became prominent in the troubles, and the government was compelled to extend martial law over the whole district from April to June. Meanwhile, the arrest of Gandhi had inflamed the rioting. The intemperance with which the disorders had been put down, in Amritsar in particular, made no friends for the British cause. On Apr. 13, 1919, an outbreak which reached tragic proportions occurred at Amritsar. As a result of the zeal of General Dyer, British soldiers fired on a meeting of unarmed Indians, with the result that 400 were killed and at least 1000 wounded.

Affairs were rendered more serious for the British by the outbreak of the Afghan War in 1919. The accession of the Amir, Amanulla, in February, 1919, as a result of the assassination of his father, and the unfriendly feeling which had been generated among Mohammedans as a result of British successes in the War, together with excesses in India, made the northern regions a real danger zone for India. The Amir moved his troops into the Khyber, attempting to catch the Indian army unawares, but a hasty mobilization of troops and the capture of Dacca, together with the bombing of Kabul and Jalalabad, immediately brought the

Amir to terms. The treaty, as signed in August, terminated the payment of the subsidy to Afghanistan but freed her from outside control in foreign relations. Another campaign in the country adjacent, the Waziristan, as a result of the outbreak of the Mahsuds and Wazirs, was undertaken at the same time. Before the tribesmen could be completely pacified the British lost heavily in two encounters, one in December, 1919, and the other in January, 1920. Not until May, 1920, did hostilities terminate. An official investigation revealed the inefficiency of the Indian army and the fact that these two operations had cost the government £15,000,000.

Indian nationalistic activity continued. The unhappy results of the passive resistance policy merely strengthened the opposition. The "non-coöperation" movement inaugurated by Gandhi late in 1919 received the approval of the Indian National Congress in 1920. Boycotts against the courts by lawyers, of the legislative councils by public men, of foreign imports by consumers, and of educational institutions by students, became the rule. The hostility was reflected in England, where Montagu was severely attacked in the House of Commons; General Dyer, who had been responsible for the killings at Amritsar, was penalized by retirement and a vote of censure. The anti-Mohammedan character of the Treaty of Sévres was responsible for serious disorders in southern India, for in Malabar rioting was frequent throughout 1921. The influence of Gandhi showed no signs of weakening. As a result of his propaganda the committee sitting for the Congress of All India in November, 1921, adopted a resolution advocating the principle of "civic disobedience," i.e. a refusal to pay taxes and to coöperate with the government. The boycott of English imports, cotton goods, and clothing in particular, spread over the country. The meeting of the Indian National Congress at the end of 1921 put its stamp of approval on Gandhi's procedure and put down an attempt to force through a policy favoring violence. The Prince of Wales's visit in November, 1921, while it was received with good will in official quarters, indicated the temper of the people. Rioting, in which some 20,000 natives participated, broke out in Bombay; similar demonstrations took place all along the route. The tidal wave of unrest and censure reached even the distant English shores. Throughout 1921 and 1922 liberal opinion was unsparing in its criticism of the government's position. Authority was given to the opposition by the attack on the government of India by Sir Michael O'Dwyer, former lieutenant governor of the Punjab, who declared that the reforms effected by the Government of India Act were illusory. It was evident in 1921 that the high-handed policy of the government had only the reluctant consent of Montagu and Lord Reading, the new Viceroy. Matters came to a head in 1922 when Montagu's resignation was asked for, following his publication of a dispatch from the Indian government setting forth the objections of Mohammedans to the Treaty of Sévres. Point was given to the matter by the evidences of acute disaffection in the Moslem communities. Outbreaks were prevalent in Malabar in particular; Moslems everywhere prayed openly for the success of the Turkish arms; protests were made against the dispatching of British forces to Constantinople. Meanwhile, noncoöperation continued unabated. In

spite of Gandhi's protests, violence was frequent; tax-collectors in particular were subjected to indignities. On Feb. 9, 1922, the government proceeded to a summary step by ordering the arrest of Gandhi on the charge of sedition. After a brief hearing he was found guilty and sentenced to prison for six years. Under the executive committee of the Indian National Congress the obstructionist tactics were carried on. At the meeting of the Congress late in 1922 the proposal to seek seats in the Legislative Assembly was rejected. Non-intercourse thus continued, and Gandhi's incarceration strengthened the resolve of the Nationalists.

In the following year, 1923, these matters appeared to be near a solution. With Gandhi in jail and the boycott of British-made goods a failure for economic reasons, it became increasingly evident that noncoöperation was doomed. As early as December, 1922, a group of influential members of the Indian Nationalist Congress had formed a new party for the purpose of contesting seats in the provincial and national assemblies, and this action merely presaged the subsequent events of 1923. The Indian Nationalist Congress, meeting at Delhi, September 15, was therefore advised by Gandhi to relinquish noncoöperation, at least for the time being, to permit its members to contest seats in the Legislative Assembly and provincial councils, and to drop the boycott of British-made goods. As far as participation in government was concerned, nationalists hastened to point out that their acceptance of the governmental machinery was for the purpose of employing obstructionist tactics rather than an indication of a change of policy. At any rate, this was the announced programme of the Swaraj party, headed by Das of Bengal; its strength was indicated by its gaining 50 seats of the total 145 in the elections for the second Legislative Assembly late in 1923, as well as a preponderating majority in the Central Provinces. Disorders did not abate. That Communism was gaining a foothold in India was indicated by the energetic steps taken by the government against suspects. There were outbreaks in the Punjab in midsummer; conflicts between the police and nationalists at Calcutta in July; and a perceptible antagonism between Hindus and Mohammedans which very often throughout 1923 revealed itself in open fighting. In the face of these disorders nothing revealed the short-sighted policy of the Indian government better than its inability to cope with situations such as these.

In July, 1923, the last session of the first Legislative Assembly closed. Its initial steps had been taken with so much caution that doubt was expressed in British circles as to whether its work was of a nature to justify its existence. The rise of the Labor party to power in Great Britain did not materially affect the situation. True, Gandhi was released, on Feb. 4, 1924, because of illness, Sir Sidney Oliver, appointed to the Indian Office was a champion of equal rights. But the British Labor government proceeded to reject the native Assembly's demand for a round-table conference on home rule; and point was given to this general attitude when Ramsay Macdonald issued a warning against the entertainment of too sanguine hopes. Hostility thus became general and outspoken once more. On March 17 the Swaraj majority re-

jected the government's budget in the Legislative Assembly, which had convened January 31; three days later, in spite of the recurrence of disorders, the Assembly voted to deprive the government of summary power. The only answer the British government could give to all this was the appointment of a commission to consider defects in the Government of India Act of 1919, and not a wholesale revision. It was plain in the summer of 1924 that militant nationalism was in the saddle, and that, as far as Indians were concerned, only one of two alternatives was feasible, i. e. home rule or complete independence.

INDIA RUBBER. See RUBBER.

INDIAN PROBLEM. See KENYA COLONY; SOUTH AFRICA, UNION OF.

INDIANA. Indiana is the thirty-seventh State in size (36,354 square miles), and the eleventh in population; capital, Indianapolis. The population increased from 2,700,876 in 1910 to 2,930,390 in 1920, a gain of 8.5 per cent. The white population rose from 2,639,961 to 2,849,071; Negro, from 60,320 to 80,810; native white, from 2,480,639 to 2,698,203; and the foreign-born white decreased from 159,322 to 150,868. The urban population of the State mounted from 1,143,835 in 1910 to 1,482,855 in 1920; the rural fell from 1,557,041 to 1,447,535. The principal cities of the State grew during the decade, as follows: Indianapolis (q.v.), 233,650 to 314,194; Fort Wayne, 63,933 to 86,549; Evansville, 69,647 to 85,264; South Bend, 53,684 to 70,983.

Agriculture. Indiana is one of the chief agricultural States, and general conditions during the decade 1910-20 were reflected by fluctuations in the local production and prices of the chief products, particularly grains. For a full discussion of this general situation, see AGRICULTURE, CORN, WHEAT, OATS, etc.

While the population of the State increased 8.5 per cent in the decade 1910-20, the rural population declined from 65.7 per cent in 1900 to 57.6 per cent in 1910 and 49.4 per cent in 1920. The number of farms decreased 4.8 per cent (from 215,485 to 205,126), the total acreage in farms from 21,299,823 to 21,063,332, or 1.1 per cent; and the improved land in farms from 16,931,252 to 16,680,212 acres. The total value of farm property, on the other hand, showed an apparent increase, from \$1,809,135,238 in 1910 to \$3,042,311,247 in 1920; the average value per farm, from \$8396 to \$14,831. Prices of farm land increased greatly, stimulated by war-time prices for products. In interpreting these values, however, and, indeed, all comparative values in the decade 1914-24, the inflation of the currency in the latter part of that period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The percentage of land in farms decreased from 92.3 in 1910 to 91.3 in 1920, while the improved land in farms decreased from 73.4 to 72.3 per cent. Of the 205,126 farms in 1920, 137,210 were operated by owners, 2329 by managers, and 65,587 by tenants. The comparative figures for 1910 were 148,501, 2297, and 64,687. White farmers in 1920 numbered 204,554, compared with 214,680 in 1910; colored farmers, 572 compared with 805. The farms free from mortgage in 1920 numbered 73,233; those under mortgage, 51,474. In 1910, 89,847 farms were free from mortgage; 56,914,

under mortgage. The total number of cattle in 1920 was 1,546,095, compared with 1,363,016 in 1910. Dairy cows increased to 946,401 from 633,591; hogs, from 3,613,906 to 3,757,135; but sheep decreased to 643,889 from 1,336,967. The estimated production of the principal farm crops in 1923 was: corn, 201,473,000 bushels; spring wheat, 81,000; winter wheat, 34,188,000; oats, 48,909,000; rye, 4,186,000; barley, 965,000; potatoes, 7,308,000; sweet potatoes, 368,000; tobacco, 22,374,000 pounds; and hay, 2,470,000 tons. Comparative figures for 1913 are: corn, 176,400,000 bushels; wheat, 39,775,000; oats, 36,380,000; rye, 1,566,000; barley, 200,000; potatoes, 3,975,000; hay, 1,800,000 tons; and tobacco, 11,925,000 pounds.

Mining. Indiana ranked tenth among the States in the value of its mineral products in 1921. These are almost entirely nonmetallic; in order of their value, they are coal, cement, clay products, and stone. There is also a large quantity of petroleum. During the decade 1914-24, coal production showed considerable fluctuation, indicated by the following comparative values: In 1914 16,641,132 short tons, valued at \$18,290,928; in 1915, 17,006,152 at \$18,637,476; 1916, 20,093,528 at \$25,506,246; 1917, 26,539,329 at \$52,940,106; 1918, 30,678,634 at \$70,384,601; 1919, 20,912,288 at \$46,345,750; 1920, 29,350,585 at \$92,867,000; 1921, 20,319,509 at \$52,269,000. The production in 1922 was 19,132,889 tons; the decrease was due chiefly to the protracted coal miners' strike in the Middle West. Cement ranged from 9,595,923 barrels in 1914 to 10,050,433 in 1916 and 5,291,851 in 1918. The value of clay products showed a considerable increase, largely the result of the decreased purchasing power of money, and the consequent higher prices during the decade. The value in 1914 was \$7,655,285; in 1918, \$7,950,926; in 1920, \$15,494,795, and in 1921, \$11,199,024. The output of stone increased in value from \$4,136,132 in 1914 to \$8,985,036 in 1921. Petroleum production during the decade varied from 1,335,456 barrels in 1914 to 769,036 in 1916; 877,558 in 1918; 1,158,000 in 1921, and 1,087,000 in 1922. In addition to the minerals noted above, the State produces coke, sand and gravel, and pig iron. The total value of the mineral production in 1921 was \$97,700,676, compared with \$146,736,294 in 1920; \$82,270,784 in 1919, \$96,558,784 in 1918, and \$42,864,267 in 1914.

Manufactures. Indiana is an important manufacturing State. It has 31 cities with a population over 10,000, and six of these, Evansville, Fort Wayne, Gary, Indianapolis, South Bend, and Terre Haute, have 50,000 or more. Of these cities, 20, with a combined population of 37.8 per cent of the total for the State, had, in 1919, 62.5 per cent of the value of the manufactured products. There were in the State, in 1909, 7969 manufacturing establishments; 8022 in 1914, and 7916 in 1919, while persons engaged in manufacture numbered 218,263, 233,270, and 330,145. The capital invested in those years amounted to \$508,717,197, \$666,863,232, and \$1,335,714,103. The value of the products in 1909 was \$579,075,046; in 1914, \$730,795,021, and in 1919, \$1,898,753,387. The large increase in the value of products is, however, due largely to the change in industrial conditions brought about by the War and cannot properly be used to measure the growth of manufactures during the census period 1914-

19; but the increase in the number of wage earners clearly indicates a decided growth in the manufacturing activities of the State. The first industry in point of value of products is that connected with iron and steel works and rolling mills, the value of which in 1909 was \$38,652,000; 1914, \$58,883,000, and 1919, \$199,274,000. Slaughtering and meat packing ranks second, with \$47,289,000 in 1909; \$51,022,000 in 1914, and \$134,029,000 in 1919. Automobiles are third, valued at \$23,764,000 in 1909; in 1914, \$29,389,000, and in 1919, \$179,065,000. The manufacture and repair of steam railways had products in 1909 worth \$9,498,000; in 1914, \$21,570,000, and in 1919, \$86,021,000. Indianapolis is first among the cities of the State in manufactures, having, in 1909, 853 establishments, with a product of \$126,313,000; in 1914, 886 with \$139,700,000, and in 1919, 1004 with \$398,667,000. In South Bend there were, in 1909, 218 establishments, with a product of \$27,855,000; in 1914, 250 with \$31,180,000, and in 1919, 214 with \$75,339,000. Similar figures for Fort Wayne were: 230 with \$23,687,000 in 1909; 1914, 228 with \$30,205,000; 1919, 247 with \$76,713,000.

Education. Indiana has always been in the forefront among the States in the interest of its citizens in education, and great progress was made during 1913-23. In 1913 the Legislature enacted three measures which had an important effect on the schools of the State; the vocational educational law, the high school inspection law, and a compulsory attendance law. Succeeding Legislatures amended these laws and passed others. The Legislature of 1920 enacted a minimum wage law for teachers, fixing the minimum at \$800, which became effective in 1920-21. The general Senate of 1921 enacted a compulsory attendance law providing that employment certifications shall not be issued until a pupil has completed the elementary school course. The establishment of a division of teacher training in excellent work was followed by improvement in ability of the teaching force. In 1921-22, 98 school corporations conducted schools in one or more of the fields of agriculture, home economics, and industry, with nearly 20,000 pupils enrolled. The Division of Vocational Rehabilitation, charged with the duty of returning physically disabled civilians to profitable employment, was eminently successful. In 1922-23, the General Education Board made a comprehensive investigation of the public school system of the State and recommended sweeping changes in regard to a State school administration, local school administration, and the training and certification of teachers. The enrollment in the public schools in 1914 was 548,497, including both elementary and high school; in 1921-22 it was 589,763, with 494,760 in elementary and 96,930 in high schools. The expenditures for elementary schools in 1921-22 amounted to \$26,830,588, and for high schools, \$10,133,628. The percentage of illiteracy in the State decreased from 3.9 in 1910 to 2.8 in 1920. Among the native white population it fell from 3 per cent in 1910 to 1.8 per cent in 1920; among the Negro, from 17.5 to 11.7; among the foreign-born population illiteracy increased from 11.8 to 12.4.

Finance. See STATE FINANCES.

Political and Other Events. There was much political activity in Indiana during the decade 1914-24. Elections were held in 1914

for congressman, United States senator, and several State officers. Although the Democratic vote showed a decrease of about 10,000, Senator Shively, Democrat, was reelected. The Democrats also elected 11 representatives to Congress. Charges of election frauds in Vigo and other counties resulted in investigations which brought about the arrest of the mayor of Terre Haute, two judges, the chief of police, the sheriff, other officials, and nearly 100 citizens. In June, 1915, 128 men, including some of the most important politicians of the State, were indicted by the Marion County grand jury; several pleaded guilty. In the presidential election of 1916, both candidates for vice-president were residents of Indiana. As a result of the election the Republican Party was returned to power in the State; James P. Goodrich was elected governor. Owing to the death of Senator Shively in 1916, it was necessary to elect two senators. James E. Watson and Harry S. New, both Republicans, were the successful candidates. In the voting for president in 1916, Charles E. Hughes received 341,005 votes; President Wilson, 334,063. In 1917 the mayor of Indianapolis, Joseph E. Bell, and other officials were indicted for alleged election frauds during the campaign of 1914. In the elections of 1918, the Republicans elected the entire State ticket. On Aug. 2, 1918, the State came under the operation of the "bone dry" prohibition law. Elections were held in 1920 for governor and other State officers and United States Senator. Warren T. McRay, Republican, was elected governor, and James E. Watson, Republican, was reelected United States senator. In the voting for president in this year, Warren G. Harding received 696,370 votes; James M. Cox, 511,364. In 1921 a special election was held on September 26 for the ratification or rejection of 13 proposed constitutional amendments adopted by the Legislature in 1919 and 1921. One amendment, conferring full suffrage on women and prohibiting aliens from voting until they were fully naturalized, was adopted; the others were defeated. In the primary elections of 1922, Albert J. Beveridge, nominated for United States senator, defeated Harry S. New. The Democrats nominated Samuel M. Ralston, former governor of the State. In the November elections, Mr. Ralston was elected senator. On Mar. 31, 1921, the mayor of Gary, Roswell C. Johnson, and other officials, were found guilty of a liquor conspiracy and were sentenced to fines and terms of imprisonment. Gov. Warren T. McRay was indicted for fraudulent misuse of the mails and for other offenses in 1923, and in 1924 he was found guilty and sentenced to a term in the Federal prison in Atlanta. In the presidential primary elections of May, 1924, President Coolidge defeated Hiram W. Johnson.

Legislation. Following are the most important acts of the Legislature in the decade 1914-24. In 1915 several important measures were passed, relating to electoral reform and liquor regulation, and also a workmen's compensation law. The Legislature of 1917 passed an act providing for a constitutional convention, granted women the right to vote, and enacted a State-wide "bone dry" prohibition law which went into effect on Apr. 2, 1918. On Jan. 14, 1919, the Legislature approved the National Prohibition Amendment. At this session was enacted a measure giving the State

Board of Tax Commissioners power over State and local levies and municipal bond issues, and women were given the right to vote for president. The Legislature recreated the legislative reference bureau which had been permitted to lapse in 1917. Measures were also passed forbidding the display of the red flag or any other symbol or emblem calculated to excite hostility or violence against the government. The Legislature of 1921 enacted a pure agricultural seed law, provided for the creation of an executive State budget, authorized cities to create city planning and zoning commissions, and provided for a commission to make an educational survey of the State. In 1923 the Legislature passed a measure for establishing equal rights for women, abolishing the legal disability of married women to make contracts and allowing them to hold property as if single. At this session, the penalties for violating the prohibition law were increased, and a uniform stock transfer act was passed.

INDIANAPOLIS. The capital and largest city of Indiana. The population rose from 233,650 in 1910 to 315,746 in 1920, a growth of 30 per cent, and to 342,718, by estimate of the Bureau of the Census, for 1923. A city planning commission of nine members was created in 1921, and in the year following a comprehensive zoning plan with distinct use, height, and area districts was adopted. The city purchased the privately owned reduction works in 1918; in 1924 it was engaged in building a new sewage plant using the activated sludge system, which, when completed, was expected to be the largest of its kind in the world. Two municipal theatres were established in 1922 in the public parks, and free entertainments were given. National headquarters of the American Legion were established in Indianapolis. The number of industrial establishments increased from 886 in 1914, employing 31,971 persons and making products valued at \$39,700,016, to 1215 in 1922, employing 56,000 persons and making products valued at \$427,100,000; the capital investment rose from \$87,569,251 to \$220,250,000. Bank clearings increased from \$414,612,000 in 1914 to \$910,881,000 in 1922, new building from \$7,933,081 to \$26,038,579, the assessed valuation from \$310,000,000 to \$605,000,000 and post office receipts from \$1,542,032 to \$3,307,943.

INDIANA UNIVERSITY. A coeducational State institution at Bloomington, Ind., founded in 1820. It has the following divisions: College of Arts and Sciences, Graduate School, School of Education, School of Law, School of Medicine, School of Commerce and Finance, School of Music, and Extension Division. The work in the School of Medicine is done at Bloomington and at Indianapolis. The 27 buildings were valued at \$1,842,263. The new commerce and finance building, costing \$235,000, was completed in 1923, and a stadium with a seating capacity of 22,000, costing approximately \$150,000, was under construction. There were 155 members of the faculty at Bloomington and 50 members at Indianapolis in 1923. During the decade 1914-24, the attendance increased from 2620 to 4837. The income increased during that time from \$396,216 to \$1,492,265, and the number of volumes in the library rose from 99,760 to 157,066. By the close of 1923 more than \$1,000,000 had been subscribed toward a goal of \$1,600,000 for the erection of memorial

buildings; and the campaign to raise \$2,000,000 for the construction and equipment of the James Whitcomb Riley Hospital for Children had passed the halfway mark, while the first unit of the hospital was nearing completion. President, William Lowe Bryan, Ph.D.

INDIANS (UNITED STATES). The American Indian continued to be on the public conscience. In the latter part of the nineteenth century the policy of assimilation was projected as the greatest possible good that could be meted out to the Red Man. By education and civil discipline the members of the race were to be inducted gradually into citizenship and established upon parcels of land as farmers, and of this land they were to attain full ownership. Each Indian was to be allotted a farm and settled thereon. It was then contemplated that the Indians, as individuals, would merge into the national population and cease to concern the government and the public as a problem. While the theory upon which this policy rests is sound and ethical, the fundamental difficulty lay in that the Indian was still a dependent and that those administering his wardship were naturally averse to relinquishing their power. The Indian lands were surveyed, divided into farms, and allotted to individual Indians. The surplus lands were then sold or thrown open to white settlers. As the Indian was a ward, and inexperienced, he had little chance of getting the land allotments best suited for farming, and in consequence he often found himself assigned to worthless land, or to land whose cultivation would require expensive and complicated equipment. It is not strange then that he failed to become self-supporting and thus delayed his release from guardianship.

Another factor was important. Only a small portion of the Indian tribes were native agriculturists, and farming did not appeal to them; to become farmers meant a radical turnover in their lives. The resistance thus caused, together with the frequent unsuitableness of the lands allotted, greatly delayed the consummation of the national Indian policy with regard to the Indians as a whole. It is obvious therefore that the day is far distant when there will be no Indian wards to look after. For instance, the Bureau of Indian Affairs in 1924 was renting out more than 16,000,000 acres of land and cared for personal property of Indians to the value of approximately \$200,000,000.

Naturally, during the War public attention was drawn away from the Indian, except for the laudable part his young men took in the conflict; but with the close of the War and the centring of attention on the nation's internal affairs, several events served to bring this problem to the fore again. Among these was the Pueblo Indian land question. A bill was introduced into Congress providing that the white claimants to Pueblo Indian lands and water rights in New Mexico should be recognized without regard to the right of the Indians and that if in this way the Indians were deprived of sufficient land to support them, then the National Government should remove them to other lands. It happened that these Indians held their lands under titles from the Government of Mexico, which were granted by treaty between the United States and Mexico when the territory was taken over at the close of the Mexican War. The proposed legislation so aroused public sentiment that the

bill was withdrawn and new legislation framed which in 1924 was pending enactment. Whether the Pueblo Indian would receive his due in full remained problematical. One beneficial result of this agitation was to bring into review the whole land policy of the Indian Bureau and to halt for the time a number of land bills and lease projects. For the time being, at least, all such questions were to be held pending public discussion.

About the same time the Commissioner of Indian Affairs issued a pronouncement against Indian dances, a term which, as used in the Indian country, meant any kind of social or religious gathering. This policy, if rigidly enforced, would stop all ceremonial and traditional practices except those favored by government officials. The demands for such prohibition came in the main from religious organizations and were aimed at the native Indian religion. Thus another fundamental issue was raised, this time a question of religious freedom. In the first place all those interested in art and Indian lore, a large part of the traveling public, the leaders of Boy Scout and similar organizations, etc., were aroused, chiefly because these people had come into an understanding of the serious side of Indian life and desired that the Indian should have fair play. They saw no reason why the Indian should not be accorded full religious freedom and the right of peaceful assembly, even if some of his practices were considered unchristian. It was pointed out that Jew, Mohammedan, and Mormon were free to set up their churches where they would, and that so long as the Indian obeyed the law, he should have the same privilege.

As a matter of fact, the past policy of the Indian Bureau had been not to interfere with native ceremonies except in respect to unlawful practices. Such practices were rare, and their prohibition did not greatly interfere with the Indian's religious freedom. Naturally the pronouncement of the Indian Commissioner, which seemed to threaten all native practices, even the care of the sick, aroused the Indians themselves, or at least all who were not completely Christianized. Opposition spread rapidly among the whites also, and led to the organization of the Indian Defense Society. The idea back of this organization was an advanced view of the right of a social group to work out its own adjustment to modern conditions. In the matter of costume, for example, the effort of those having the Indian in charge was to force the aborigines to adopt the current style of shoes and dress and to give up their own idea of what is becoming; so the Defense Society was organized to defend the right of the Indian to exercise his individuality on the ground that modern costume and similar conventionalities are not essential to civilization or to Christianity.

The movements just enumerated were related to a survey of Protestant religious and educational work among the Indian tribes of the United States, under the auspices of the Inter-Church World Movement. This survey was begun in 1919 and a report published in 1923, over the name of G. E. E. Lindquist, on *The Red Man in the United States*. Unfortunately, this report did not deal with the work of the Roman Catholic Church, which had been in the field from the start, but it gave in great detail the number of Protestant churches, schools, financial support, etc., for each Indian Reserva-

tion in turn. It also commented upon the economic status for each and particularly the non-Christian influences to be observed. The statistics compiled showed that the annual contribution for Protestant Indian Missions is about \$750,000 and the number of Indians enrolled in the churches a little more than 30,000. The Catholic enrollment was estimated at 60,000. If the total number of adherents to all churches be counted, the estimate was for 80,000 Protestants and 65,000 Catholics. On the other hand, 46,000 were listed as pagan. The situation respecting schooling was stated as 70,000 children in school, 20,000 not attending, and 10,000 unprovided with school facilities. One effort of this survey report was to stimulate Protestant missionary efforts to convert the pagan Indians, and it was from this source also that the pressure came on the Indian Bureau for the forceful suppression of all vestiges of native Indian culture.

To add to the tensivity of the situation it should be remembered that in almost every tribe there were two factors, the Christian Indians and the pagans. The former were fired with the zeal of all new converts and were ready to advocate forceful measures to suppress their heathen brothers. Many of the protests and appeals to the Indian Bureau come from these Christian Indians, who would, in some instances, favor the arrest and imprisonment of any one attempting to observe a pagan form of worship. When Dr. Hubert Work became Secretary of the Interior in 1922, the Indian Bureau was facing protests on all the points mentioned. An Advisory Committee of One Hundred was named by the Secretary. On this committee were distinguished statesmen, educators, scientists, missionaries, philanthropists, and a few outstanding Indian leaders. A two days' session of this committee was held in Washington, Dec. 12 and 13, 1923, for the discussion of Indian policy, and a series of recommendations were made to the Secretary. These embodied general recommendations to increase the effectiveness of Indian schools, to provide adequate medical and health supervision and, while recognizing the value of missionary work among the Indians, to emphasize the right of the Indian to freedom of thought and religious belief. Perhaps the most significant pronouncement of the Committee of One Hundred was its resolution: "These same problems have faced the government for nearly fifty years. Regardless of progress actually made, the great objectives of our benevolent desires have not been attained. This situation and this history show the extravagance of all efforts which are not directed by the best ability, supported by adequate funds, or maintained by sufficient consistency." This statement seemed to accord with enlightened public opinion.

The fundamental ideal has been to make the Indian a citizen and thus destroy his identity. Progress toward civilization among the Indians was showing rapid strides. Everywhere the young men were seeking seasonal employment and thus gradually adapting themselves to the economic life of the country. Yet, reviewing the history of the Indian tribes during the last century, it is noted that few tribes have become extinct, and no matter how completely Christianized some of them may now be, the tribal group is maintained. The function of the tribal organization under these new

conditions is social. Also, the native language still survives in the home and the social circle. Naturally, these languages carry with them old elements of social procedure, ethics, and ideals, the background to Indian thought and aspiration, and so long as the memory of these survives it may be expected that the social nucleus of the tribe will persist, but it will for the most part be valued for its aesthetic qualities. The Indians of New York State, for example, have been in direct contact with civilization for a long time, but they still maintain a number of social and ceremonial procedures peculiar to their forefathers. It is, therefore, evident that so long as Indians maintain their tribal communities, they will tend to preserve their native tongues and to hold on to a core of social traditions and aspirations. In course of time, however, this will be outside of the main affairs of life which will become in all respects American and so put the Indian on the same level as other racial blocs in the national population. The student of social phenomena have, however, from time to time protested against the overambitious forcing methods of missionaries and educators, on the ground that the transition must be gradual, or the individual will be wrecked. In the meetings of the Committee of One Hundred, attention was called to the entire collapse of morale in a number of tribes by the hasty destruction of traditional procedures. The plea of scientific men is for a policy based upon knowledge of primitive life, a policy that will efficiently as well as humanly conserve the native's wellbeing to the end that he may normally grow into citizenship.

Finally, a bird's-eye view of the Indian in the United States may be obtained from the following statements compiled from the reports of the United States Indian Bureau. The population in 1923 totaled 344,303 a gain of about 18,000 in ten years. There were 200 reservations and 193 Indian tribes, speaking languages of 58 different stocks. Two-thirds of the Indians were citizens, and about 50,000 were voters. In all about 240,000 Indians were still under government guardianship. Allotments of land were made to 227,000 Indians, 38,000,000 acres in all. There were, however, more than 125,000 Indians, on 91 reservations, to whom lands had not been allotted, and a reserve acreage of 35,000,000. The economic status of the Indian indicated progress. There were 40,962 farmers, cultivating 890,700 acres of land. Their cattle were valued at \$35,000,000; 366,000 acres of land were irrigated, with more than a million acres in reserve. The timber resources on Indian lands were estimated at 35,000,000 board feet, valued at \$100,000,000. The total value of property owned by Indians was estimated at \$1,000,000,000. Tribal funds held in government trust were more than \$25,000,000 and those of individual Indians approximated \$35,000,000. During the War \$25,000,000 in Liberty Bonds were purchased by Indians, and 12,000 served as soldiers. The oil lands are chiefly in the hands of the Osage and the five civilized tribes of Oklahoma, the per capita return of the former amounting to about \$12,000 per annum. To 1924 the total received by all these tribes reached the sum of \$150,000,000.

While most Indians live in houses built by themselves, there were still twenty tribes living in primitive dwellings: 11 in Arizona, three

in California and New Mexico, and one each in California and New Mexico, and one each in Colorado, Florida, and Nevada. Housing is closely correlated to health. The prevailing diseases are tuberculosis and trachoma; of the former there are 25,000 cases, of the latter 30,000. The insanity rate is very low, about 0.5 per thousand. One asylum is maintained where 106 were treated in 1922. About a dozen additional cases are scattered among State institutions. The Indian Bureau has a staff of 150 regular physicians on full duty at reservations and schools and 50 contract physicians on part time; 80 nurses and 70 field matrons are employed. There are 78 hospitals with a combined capacity of 2400 beds. Twenty thousand Indians were treated in these hospitals in 1922.

Education is provided in three classes of schools, boarding schools, government day schools, and the nearest public schools. Of government boarding schools on the reservations there were 51; off the reservations, 25. These had a combined attendance of about 18,000. In addition there were 36 private or mission schools enrolling more than 5000 children. The day schools numbered 181. In the local public schools adjacent to reservations were enrolled 34,301 Indian children for whom the government paid in tuition about \$250,000 per year. In general, there were 91,968 Indian children, 6279 of whom were ineligible for school attendance, but 20,746 children were without school facilities of any kind. The total appropriation for the education of the Indians was \$5,000,000, but this did not include the amounts expended by missions. See also ETHNOGRAPHY.

INDUSTRIAL ARBITRATION AND CONCILIATION. See LABOR ARBITRATION.

INDUSTRIAL CHEMISTRY. See CHEMISTRY, ORGANIC.

INDUSTRIAL DEMOCRACY. The theory of industrial democracy and its partial application in a number of cases was almost entirely a development of the decade 1914-24. Although vague ideas of this sort had manifested themselves before the War, it was the War and the resulting industrial conditions which brought forth the fully developed theory. It derived its chief elements from socialism and syndicalism (q.v.) and found its best expression in the philosophy of the British guild socialists. In its strict sense industrial democracy stands for the elimination of the capitalist employer, the introduction of democratic principles in industry, and the control of the means of production by the producers. It aims at the substitution of the motive of service to society for that of private profit in production and claims that thus all productive activities would be placed on a higher ethical level. The producers in the shop and single industry would exercise full control over everything relating to production. The basis of organization would be the shop and the industrial union, and the ultimate form would be a system of modified syndicalism rather than of socialism. In this sense industrial democracy still remained a theory or a philosophy. Where its application had been attempted, as in Russia, it had been a failure, although this was perhaps not entirely due to defects inherent in its theory. In the wider sense, the term industrial democracy had come to stand for a number of schemes involving partial application of its principles and the sharing of the worker in the control of in-

dustry. These schemes ranged from plans for full control to profit-sharing arrangements. Foremost in this respect were the shop stewards, the Whitley councils, and the builders' guilds in Great Britain, the shop councils in Germany, and the Plumb Plan in the United States.

Shop Stewards. This movement grew out of the hostility of the rank and file during the War to the trade union officials who under the Treasury Agreement of 1915 had abrogated the trade union rights and were therefore powerless to act as the spokesmen of the workers in serious labor disputes. It was, moreover, a revolt against the division of British trade union organization into local branches based on residence rather than on shop and industry. Because of the inactivity of the regular trade union officials under these conditions, energetic and aggressive men among the workers in various shops began early in the War to assume the leadership in their particular shops and thus to set aside the regular union officials. These shop stewards, as they were called after an analogous system long established in the mining industry, represented their fellow workers, though without official authority, in all disputes over hours, wages, and shop conditions. They soon became the accepted leaders of the men in their shops. The shop steward system prevailed primarily in the engineering trades. Its underlying principles were industrial unionism and the control of the shop by the workers. It was essentially syndicalist in nature. Aside from arbitrating ordinary disputes, they, and especially the more revolutionary among them, led all the strikes in the munitions industries. With the disappearance of war conditions the essential principles of the system were taken over by the trades affected and the movement in its revolutionary aspect came to an end. The shop stewards did not proceed very far in gaining control over production, but the system contained potentially all the essential elements of workers' control.

Whitley Councils, or Joint Industrial Councils. These councils were also a development of war conditions. The Whitley Committee, appointed in 1916, recommended joint, standing, and industrial councils as the means for adjusting relations between employers and workers. The councils were to represent employers and workers alike, were to have permanency to guarantee regular discussion, and were to be formed along industrial rather than craft lines. The system was to be provided with a decentralized machinery, comprising district councils and work committees as well as national councils. The British government adopted the report in October, 1917, and in January, 1918, the first Whitley council was formed in the pottery industry. A second report by the Whitley Committee, October, 1918, recommending joint councils for trades where organization was weak or nonexistent, was not wholly adopted by the government. The system spread rapidly till 1920, after which no outstanding developments occurred. There were in existence, in 1924, 72 councils and 11 interim reconstruction committees. The great industries, however, had not adopted the system. The formation of the councils had been mostly along uniform lines. They were composed of equal numbers of manufacturers' representatives and members of trade unions. They considered such questions as wages, hours, working conditions.

health, and sanitation. The councils had not led to any joint control of industry but in many cases had established amicable relations between the employers and workers. They had one important though unintended result, in so far as they stimulated trade union organization in the industries where they were applied. For the builders' guilds, see GUILD SOCIALISM.

Shop Councils. The German shop councils system was an offshoot of the revolutionary Workers' and Soldiers' Councils of 1918 and 1919. The Shop Councils Act of Aug. 18, 1919, was a compromise; yet it went further in establishing workers' control than almost any other system actually applied. It provided for the creation of councils representative of the employees of all industrial establishments employing more than 20 workers. The functions of the councils were "to look after the interests of the workers in relation to the employer and to support the employer in fulfillment of the purpose of the works." The councils had the right to appoint one or two members of the board of directors to represent the workers in regard to organization. They might also demand from the employers information on such matters as affect the workers, as well as a quarterly report and an annual balance sheet. The councils became an integral part of the German trade union organization, which exerted a moderating influence on them. After 1919, the employers' organizations succeeded in curtailing materially their powers, but from the latter part of 1923, the shop councils had become more aggressive and of greater importance in the German labor movement.

Plumb Plan. This plan, named after its author, Glenn E. Plumb, general counsel for the railway brotherhoods of the United States, was merely a proposal which had not been given realization. It is remarkable, however, for its features and for the support which it received. The plan proposed government purchase of the railways and ownership by a national railways operating corporation, the board of directors of which was to consist of 15 members, five chosen by the workers, five by the officials of the railways, and five by the government. Rates would be fixed by the Interstate Commerce Commission and wages by a wages board appointed by the directors. Profits would be divided between the government and the corporation. Those of the latter would be paid out as dividends to the employees. When the net profits exceeded 10 per cent of the gross working capital, the rates would be correspondingly reduced. The plan, although sharply criticized by the English guild socialists for its tameness, would go far in establishing workers' control. The railroad brotherhoods sponsored the plan, and the railroad bloc in the American Federation of Labor obtained the endorsement of that organization for the plan and for a programme of industrial democracy, in the conventions of the Federation in 1920 and 1921.

Individual employers in the United States had established various systems whereby the workers were given some sort of share in the industry. These ranged from simple profit-sharing schemes like that of the United States Steel Corporation to actual participation in the control of the industry. Remarkable was the system set up in the clothing industry in Chicago, which provided for a trade board of five, of which two were representatives of the manu-

facturers, two were members of the Amalgamated Clothing Workers, and the fifth was an impartial chairman. The board dealt with wages, hours, working conditions, health, sanitation, and similar matters. In reality, the impartial chairman decided practically all disputes.

INDUSTRIAL WORKERS OF THE WORLD. A labor organization founded in Chicago, in 1905, by a group of radicals who were discontented with the conservative policies of the trade unions. It is based on so-called "industrial union principles," and on the theory of syndicalism. In the first years of the decade 1914-24, the organization took a conspicuous part in strikes.

In 1917 disorders were created in the copper mines in Bisbee, Ariz. The sheriff of the county deported over 1100 members over the line into New Mexico. There was much suffering as a result of lack of food and the Federal government intervened and supplied them with necessities until they were able to remove elsewhere. The headquarters of the organization were raided on Sept. 5, 1917, by Federal officers. The avowed purpose was to check an alleged country-wide conspiracy to hamper the government in the prosecution of the War. William D. Haywood (q.v.), General Secretary, and 167 associates, were arrested. Their trial was begun on Mar. 3, 1918. Ninety-five were found guilty. William D. Haywood and others were sentenced to serve twenty years in the Federal prison or to pay \$20,000 fine each. During 1919 the development of the so-called "one big union" movement gained considerable headway. In principle it signifies a strike in all industries in sympathy with strikes in any single industry. The movement met with great sympathy in the I. W. W. On November 11, 1919, during a parade of overseas veterans in Centralia, Wash., firing took place from an I. W. W. hall and six of the paraders were wounded, three of whom later died. The leaders of the organization in Centralia were at once arrested and a general round-up of members was made. The "one big union" movement continued to develop in 1920. The affiliation of the I. W. W. with the Communist political doctrines grew steadily closer in the years following the War, and by 1922 it had practically become identified with the Communist party. Delegates were sent to the meeting of the Third International, and political action supplemented the industrial activities of the organization. The Communist element dominated the convention of the Farmer-Labor party in May, 1924, and succeeded in nominating Duncan MacDonald as candidate for president. The National committee, a few days later, withdrew these names and endorsed the Workers' Party candidate. This party comprises the organized communists of the country. William Z. Foster and Benjamin Gitlow were nominated as president and vice-president, respectively. Several of the States, notably California and Washington, passed measures against syndicalism in an effort to suppress the aggressive activities of the organization. A number of members who were imprisoned on charges of treason and sedition, were released in 1924. See SYNDICALISM.

INFANTILE PARALYSIS. In 1921 a new serum treatment for this disease was announced by Dr. Rosenow of the Mayo Foundation. This was obtained by injecting horses with cultures of a bacterium known as *streptococcus poly-*

morphus. The good effects of this serum had been known as far back as 1917. During the interval it had been tested on 259 children between the ages of five and seven years. In 60 of the patients the injections could be made at the inception of the disease, before the super-vention of the paralysis, which means during the first 36 hours; and in this series not a single death or paralysis took place, showing 100 per cent control of the disease. In 61 other cases, paralysis had already set in, and the injections could not be given until 48 hours of the disease had elapsed. Nevertheless the results were almost as good as in the first series, for no deaths and but one case of permanent paralysis resulted. In the third series of 125 cases, treatment could not be begun until the fifth or sixth day of the disease; and in this series eight deaths occurred and 30 children were left paralyzed, the balance making clean recoveries. In order to appreciate the value of this treatment it should be remembered that the average death rate is 4 per cent and that the number of children left crippled varies from 29 to 68 per cent of those attacked. The serum is injected into the muscles or veins; nothing is gained by injections into the spinal canal.

INFANTRY. See ARMIES AND ARMY ORGANIZATION; STRATEGY AND TACTICS.

INFLATION. See FINANCE AND BANKING.

INFLUENZA. The pandemic of 1918 wrote a new and significant chapter in the history of this contagious disease. Up to that period it had been regarded commonly as an airborne affection, proof against isolation and quarantine; its spread by personal contact is now acknowledged by health authorities. Before the pandemic, influenza had been generally viewed as a relatively harmless but very annoying malady, dangerous chiefly to weaklings and through occasional complications. It is now known to be, potentially at least, the most pernicious of all diseases which attain pandemic diffusion, deadlier even than the pneumonic plague, which in some ways it strikingly resembles. When influenza is deadly it is because of the complication of pneumonia, and so prevalent was this complication in the pandemic that some clinicians came to regard the disease as essentially pneumonic, although under ordinary circumstances this feature is quite latent or suppressed. The custom of keeping the influenza patient in bed for a week, despite the insignificance of the symptoms, is due very largely to the belief that every case of influenza is a potential pneumonia and that the latter is apt to assert itself if the patient is up and about. Of great importance is the relationship between pandemic influenza and ordinary seasonal winter grippé. The latter in most localities has been regarded as a legacy of the older pandemic of 1890, although winter grippé is known to have existed in certain localities, Minnesota, for example, long before that year. There are notable differences in epidemicity, for while winter grippé, as the term implies, is an affection peculiar to cold weather, true influenza appears just as readily in the spring, summer, and autumn as in winter. Winter grippé is not highly contagious, although in the cold months there are better opportunities for the spread of a disease. In regard to the bacterial cause of winter grippé, four or five separate germs have been accused at different times, notably Pfeiffer's bacillus, the pneumococcus, strep-

tococcus, micrococcus, catarrhalis, etc. That is, each of these organisms seems capable at times of setting up a relatively benign epidemic catarrh without any special tendency to dangerous complications.

In pandemic influenza none of the above organisms can be associated with the contagion of the disease, although the deadliness was due to the special virulence of the pneumo- and streptococcus, responsible for the peculiar type of fatal pneumonia so often seen. To explain the pandemic we must invoke the existence of a highly diffusible contagious principle which in addition to smiting the great majority of those exposed further lowers the resistance to the ordinary ubiquitous disease-bearing germs, so that under the circumstances these acquire unusual virulence. This statement at once provokes the question, "Why have so many pandemics and extensive epidemics of influenza in the past pursued so mild a course, with hardly any mortality?" The answer to this query is in part as follows. The pandemic of 1918 lasted from May of that year to May, 1919. During this period there were at least three distinct waves. The first, which occurred in late spring and early summer, was distinctly mild. The second wave, in late summer and early fall, was very severe, decidedly malignant. The third wave, in the winter of 1919, was also malignant, masking the ordinary seasonal grippé. Hence, judging from analogy, the virulence of the disease, at first mild, gathered force during the second and third outbreaks, as a result of continuous passage through human bodies. This law of increasing virulence is familiar in experimental and clinical pathology. To return to the subject of the cause of pandemic influenza, this lies between Pfeiffer's bacillus and the so-called *bacillus pneumosintes*, studied at the Rockefeller Institute. Since the pandemic entirely disappeared, leaving us in the presence of only the ordinary seasonal grippé, we can only study the relationship of this organism to future pandemics and to respiratory catarrhal affections in general.

An attempt may be made here to reply to a few pertinent questions which are often asked or which concern popular delusions. Did the pandemic of 1918 originate in Spain? There is no evidence to support this belief. Influenza was common in fighting troops during 1917; in the United States Army alone, more than 40,000 men were attacked, both at home and in France. Influenza of decidedly virulent type was seen again in March, 1918, in widely different parts of the world, America, France, and the Far East. The disease gradually gathered force and chanced to break out in Spain during May on a huge scale. No doubt this Spanish outbreak did much to spread the disease to Africa and South America, but it played no part in communicating the disease to the North American continent; on the contrary, the weight of evidence favors the belief that the scattered episodes in the United States early in 1918 played a major rôle in causing the European outbreak through the crossing of our soldiers at this period. We know that contagious diseases flourish when foreign troops are moved about. No doubt a part of our pandemic in the early fall could be traced to Europe, but by no means all, for the disease appeared among us in more than one focus. Another question concerns immunity. Is seasonal grippé a pre-

ventive of epidemic influenza? There is every reason to believe that there is no decided immunity in influenza of whatever form. In fact, one attack often paves the way for another, which suggests that different microorganisms may induce the same clinical behavior. A third question refers to the apparent contradiction in mortalities. Influenza was often likened to the plague in deadliness, but this result is apparent only in nation-wide figures. Influenza may attack nearly every one, but the death rate does not usually exceed 2 per cent of those attacked. Plague pneumonia attacks relatively few, but its mortality is very high—almost or quite 100 per cent. See BUBONIC PLAGUE.

INGE, WILLIAM RALPH (1860-). A British prelate and man of letters (see Vol. XII). He has been dean of St. Paul's (London) since 1911. In the front rank of contemporary British essayists, he is known, on account of his vigorous criticism of certain modern tendencies, as "the gloom" dean." His later writings, which continued to appeal strongly to a discriminating public in the United States as well as his own country, were: *Types of Christian Saintliness* (1915); *The Philosophy of Platinus* (1918); *Outspoken Essays* (1919; 2d series, 1922); *The Idea of Progress* (1920); *The Victorian Age* (1922); and *Personal Religion and the Life of Devotion* (1924). Of these, *Outspoken Essays* were perhaps the most widely appreciated in the United States.

INGERSOLL, GEORGE PRATT (1861-). An American diplomat, born at New Haven, Conn., and educated at Trinity College and the Yale Law School. For several years he practiced law in Stamford, Conn., and New York City. After serving on several official boards in Connecticut, he became minister to Siam (1917-18). On his return to the United States he engaged again in the practice of law. He was delegate to the International Peace Conference in Washington in 1910. His published addresses include *The Measure of Success, Our Connecticut Heritage, and Diplomatic Life in Siam*.

INGLIS, ALEXANDER JAMES (1879-). An educator and author of educational books; born at Middletown, Conn., and educated at Wesleyan University (Conn.). He became assistant professor of education in 1914, and in 1919, professor of education, at Harvard University. During the War and later he was engaged as expert in important educational investigations and surveys for both the Federal and State governments. Besides text books for Latin courses, he wrote *Rise of the High School in Massachusetts* (1911); *Principles of Secondary Education* (1918); *Virginia Public Schools* (1919); and *Intelligence Quotient Values* (1921). He also edited a series of books on the theory and practice of education.

INHERITANCE TAX. See TAXATION IN THE UNITED STATES.

INJUNCTION. When Congress in 1914 passed the Clayton Act, greatly restricting the use of injunctions in labor disputes, its action was hailed by labor as an important victory in its long fight to curtail the use of injunctions. In the years immediately following, encouragement was also given to labor in State legislation. In 1917 an interesting tendency was disclosed in the Northwest to free strikes from injunctions and at the same time to punish violence severely. Minnesota forbade the issu-

ance of injunctions in trade disputes except to prevent irreparable injury to property and prohibit their issuance to prevent termination of employment. The act does not curtail the power of the courts if irreparable injury to business or property is threatened by violence or unlawful acts or acts involving criminal syndicalism. Utah passed a law similar to the Minnesota act, adding that injunctions must not interfere with "peaceful persuading." In 1919 legislation was passed in Iowa, North Dakota, Oregon, Washington, and Wisconsin to limit the use of injunctions. Nevertheless, the courts, both Federal and State, continued to issue injunctions in labor disputes in ever increasing numbers and in terms more and more strict. While it is the established law in the United States that laborers may under no circumstances be enjoined from quitting work, still in some injunctions "conspiring to quit" was enjoined. The courts resorted generally to the conspiracy theory in issuing injunctions against acts not in themselves unlawful in labor disputes. In some notable injunctions union officers were prohibited from advising or ordering workmen to go on strike or from paying strike benefits. A notable injunction of this type which aroused widespread interest was secured by the Federal government during the bituminous coal mine dispute of 1919.

More injunctions were issued in connection with labor disputes in 1922 than in any previous year. At least twice as many were issued by the Federal courts in this year as in the entire 10 years preceding. Included among the 1922 injunctions was a judicial order which prevented the officers of the Brotherhood of Railway Station Employees from calling a strike sanctioned by a referendum vote. Another was a judicial order, subsequently materially modified by a higher court, which enjoined the United Mine Workers from attempting to unionize a West Virginia coal district. But overshadowing all others was the injunction which the Attorney General of the United States secured from a Federal judge in Chicago against the railway shop crafts. This injunction, which aroused a storm of public discussion, was so broad that it practically forbade the strikers from doing anything, peaceful or otherwise, toward winning the strike. The use of injunctions in labor disputes which labor maintains is an abuse was increasing to such an extent that by 1924 it had become a political issue of considerable importance. The American labor movement endorsed the independent candidacy of Senator Robert M. LaFollette, whose platform declared vigorously in favor of abolishing the use of injunctions in labor disputes. Both the Republican and Democratic party platforms ignored the injunction issue, an issue on which the American Federation of Labor had made a 30 years' fight. See PICKETING.

INMAN, SAMUEL GUY (1877-). A clergyman and writer on South American topics, born at Trinity, Texas, and educated at Columbia University. He engaged in educational and missionary work in Mexico in 1906, and after 1915 was secretary of the Committee on Coöperation in Latin America. He wrote *Christian Coöperation in Latin America* (1917); *Intervention in Mexico* (1919); *Through Santo Domingo and Haiti* (1919); *South America Today* (1921); *Problems in Pan-Americanism*

(1921), and other works on Latin America; and founded and directed the monthly magazine, *La Nueva Democracia*.

INSANITY. Insanity, to judge from reports of various localities, during the period 1914-24, was increasing more rapidly in the United States than the population, and the housing shortage cannot explain the overcrowding of institutions and the use of property intended for other purposes to shelter the insane. As foretold by the late Dr. P. Bailey and others, prohibition has not produced any material lessening of the disease as a whole. Bleuler, the eminent Swiss alienist, found that the so-called chronic alcoholic insane are all original victims of *dementia præcox*, of which their alcoholism is merely a symptom or surface phenomenon. It is probable that the number of cases of transient alcoholic insanity has lessened, although not in some of the large centres of population, where the prohibition laws are flouted and commitments to the municipal institutions are numerous. The teaching of psychiatry is undergoing a constant shifting, and the two principal types of insanity which are of obscure origin, i.e. early dementia and manic-melancholic insanity, seem to be regarded more and more as symptoms rather than as independent affections. Their autonomy has never been admitted by alienists of the Latin races, and such diseases are not even described in their treatises on psychiatry. German authors seem to be receding from this standpoint, as originally taught by Kräpelin and widely endorsed in the United States. Kretschmer has written to show that the individual who develops precocious dementia and he who becomes a victim of manic-melancholic insanity have opposite types of mind, a duality which is shared by all mankind. All men, in other words, have schizoid or cycloid characters. Others have taken up this teaching with modifications, notably Bleuler and Jung. A large literature on temperament and character has sprung up. It is important that the two be not confused, for while temperament is of physical origin, character is much deeper. Temperament is due to the rate of production of internal secretions and to the rapidity of metabolism, while character is bound up with introspection and extrospection, or as they are technically termed, extroversion and introversion. A man of temperament is usually extroverted, lives wholly in the external world, is eminently active and social, but has in him no tendency to advance. He is not a reflective man and never looks within himself. The introverted man divides his attention between the outer and inner worlds, reflects much, and is apt to dwell on past events; this brooding gives him certain character traits.

This distinction agrees in a measure with the sanguine and bilious temperaments of the ancients. Most of the evolutionary progress of the race of man is due to the introvert. Most of the disagreements between individuals and groups and the impossibility of compromise is based on fundamental differences in character. Neither side is capable of understanding the viewpoint of the other, and each is apt to regard the other as inhuman. In the young introvert the outer and inner life may become so dissociated that dementia is the consequence. Alienists agree that it is often impossible to draw a line between an ordinary unadjusted adolescent and a victim of beginning *dementia præcox*. On the other hand, when the tempera-

ment which underlies the extrovert is present in an extreme degree the subject develops maniacal tendencies or at the other extreme melancholic tendencies. A general increase in insanity means an increase in these basic forms, and as we have no practical knowledge of causal factors which can be influenced by treatment, the outlook is discouraging. Bleuler states that a child may sometimes be seen to pass from extroverted to introverted and vice versa, and it should be possible to place a normally introverted child or youth in an environment in which extroversion is favored. It is also conceivable that an extroverted child could be placed in such a dull environment that it would become introverted. Thus an extroverted individual sometimes becomes introverted after a long illness or confinement in prison. The world needs plenty of individuals of both types.

Of great significance is the work of Dr. Henry Cotton of the State Hospital for the Insane at Trenton, N. J., begun about 1918 and founded on the belief that much insanity is of toxic origin and due to absorption of pus from small dépôts in the teeth and other foci. Those eligible for treatment based on necessary surgical intervention belong to the so-called functional insanities. As a result of this pioneer work, an insane asylum for custodial care has for the first time been transformed into a hospital in which patients are treated and often cured. The percentage of cases of functional insanity which respond to treatment sufficiently to permit of discharge from the institution was at last accounts no less than 86. This means that from 1919 to 1924, the State was saved the sum of \$400,000. In all the insane, the tonsils should be removed and all purulent foci in the teeth and jaws, as shown by X-ray diagnosis, should be removed. Next to the mouth the pelvis is the chief source of mischief in these cases, especially in women. Thus far the Trenton Hospital appears to be the only institution in which this doctrine of surgical intervention has been carried out. Should these findings be corroborated, it is evident that surgery can be of still more importance in the prevention of functional insanity.

INSECT CONTROL. See ENTOMOLOGY, ECONOMIC.

INSECT PESTS. See ENTOMOLOGY, ECONOMIC.

INSTINCT. As used in psychology, the term indicates an inherited psychophysical disposition on the part of the human organism which serves as a determinant of future activity. As defined by McDougall, an instinct is purposive in character; that is, it goes out to accomplish a definite biological end. It is therefore distinct from the motor mechanism, which serves simply as a means for the accomplishment of the biological purpose. Under such a definition, there would naturally be as many instincts as there are specific hereditary purposes. In McDougall's *Outline of Psychology* (1923) is given a list of 14 major instincts and a half dozen minor instinctive responses so mechanical in their nature that they are not accompanied by any display of emotion. In addition to these specific dispositions of the mind, McDougall postulates nonspecific tendencies and faculties. Included among these are intelligence, defined as "the capacity to improve on native tendency in the light of past experience," sympathy, etc. It is evident that the nonspecific dispositions serve as the link to bind up the

isolated instinctive responses into the unified activity of the organism, much as the general staff of an army directs the movements of the specific arms and branches. Indeed, Professor McDougall takes the analogy of the army command rather seriously, as is evident from the monadology he exposed in his Presidential Address to the British Society for Psychological Research (1920). Here he frankly conceives of the human personality as organized on an imperialistic basis, with superior monads controlling the activities of the lower orders.

Professor McDougall first formulated his general theory of instincts in 1908, in his classic *Social Psychology*. At that time the only rival conception was that of Thorndike, who in his *Educational Psychology* conceived the instinct as a chain of reflexes, a very complicated chain of reflexes, but withal a mechanical system. Professor McDougall says of an instinct that "when brought into play, it generates an impulse, an urge, or a desire for some change in the situation that evoked it, an impulse which keeps the organism uneasy, restless, striving in this way and that so long as it is not inhibited by a stronger impulse or satisfied by the attainment of its natural goal, the changed situation of a specific kind." To Professor Thorndike, on the other hand, such a view smacks of "magic potency." He prefers to describe the operation of a particular instinct as a series of situations and responses. These responses, because they are determined, are predictable in the same way that the reactions of chemical elements are predictable. No room is left for potentialities, for changes in fundamental reactions, or for profiting by experience in the way that Professor McDougall allows. Nevertheless the Thorndike conception has for its advantage, or for what may be claimed as an advantage, its scientific disinterestedness from morality, purpose and value. The dichotomy between these two rival conceptions is the dichotomy that is presumed to separate disinterested science from practical morality and religion. As far as this dichotomy applies to psychology, it may be dramatically studied in Paul Bourget's novel, *The Disciple*. The author makes the hero commit a revolting crime as a consequence of his adherence to a deterministic psychology, under which the study of moral values is taboo. The proponent of these psychological doctrines, who had had no notion of the immoral ends for which such principles might be used by his disciples, is made at the end of the book to see the folly of his scientific positivism, and to speculate on the mysteries of religion.

Strange to say, the violent polemical discussions of the problem of instincts during the decade and a half following the publication of the *Social Psychology* were never able to get beyond the popular antithesis of mechanistic science and practical morality. On the mechanistic side positions have been put forward even more radical than those of Professor Thorndike. Among these might be cited as typical the point of view of Z. Y. Kuo. Refusing to accept even the Thorndike conception of instinct as an integrated series of reflexes, he would explain all human activity on the basis of nonspecific "units of reaction." "The reaction units are what we find in the child's spontaneous activities and random acts. . . . Such spontaneous and random acts are all that we can credit to the native endowment of man. These are nonspecific instincts, for they are reflexes in char-

acter and involve few, if any, complex neural patterns." In his emphasis on reflexes, Mr. Kuo was following the lead of Watson and the Behavioristic movement, but even Professor Watson assumed that beyond the mere random reflexes there exists a group of innate reactions or instincts. Those who have attacked McDougall's conception of instinct have attempted to assimilate it to the notion of "innate ideas," thereby hoping to bring on instinct the discredit that has fallen on the so-called Cartesian rationalism. The value of such tactics is questionable, inasmuch as the problem of "innate ideas" and the problem of instincts are at bottom one and the same. The doctrine of "innate ideas" is, properly speaking, a caricature of Cartesianism prepared by its opponents, the British empiricists; but the general issue as defined by the opposing stands of Descartes and Locke is still one of the central questions of philosophy.

Regardless, however, of the relation of instincts to the doctrine of innate ideas, the conception of McDougall is a difficult one to employ in a scientific scheme modeled on a positivistic or rather a materialistic interpretation of physics and chemistry. It is a conception that fits in better with a practical system of moral conduct, preferably of the conservative sort.

Proof of the latter fact may be had in the embarrassment of Prof. John Dewey in his handling of the instinct problem. Addressing the American Psychological Association in December, 1916, he hailed the work of McDougall and Thorndike, between whose theories he drew no distinction, as laying the basis of a new social science. "Henceforth," he said, "our social psychology is placed on the sure ground of observation of instinctive behavior." Scarcely two years later in his Princeton lectures of 1918, published in book form under the title of *Human Nature and Conduct* (1921), he expressly repudiated McDougall's theory in the interest of his own belief of social radicalism and did not see fit to adopt the Thorndike conception of reflexes. The view which he did elaborate, while admitting the probable existence of instinctive roots for human conduct, tried to explain this conduct on the basis of a succession of impulses and habits. The instinctive part of our habits, he appeared to maintain, does not come into being until the habits are formed under the stress of environment. In this manner he avoided committing himself to McDougall's fixed classification of instincts, which had been the subject of much attacking, without offering any other classification. The artifice of placing the chapter on instinct after the chapter on habit is open to criticism, inasmuch as in mechanistically determined systems potentialities are treated as fixed quantities long before they pass into the active state. The beauty of physical science lies in the fact that potential energy may be measured just as accurately as kinetic energy, or energy in motion.

One of the unfortunate aspects of the list of instincts propounded by McDougall is that while the units are presumed to function specifically they are yet denominated by the vaguest terminology. The list, including their synonyms, is as follows: instinct of escape (of self-preservation, of avoidance; danger instinct); combat (aggression, pugnacity); Repulsion (repugnance); parental (protective); appeal; pairing (mating, reproduction, sex-

ual); curiosity (inquiry, discovery, investigation); submission (self-abasement); assertion (self-display); social or gregarious instinct; food-seeking (hunting); acquisition (hoarding instinct); construction; laughter. Around these major instincts are grouped the corresponding primary emotions (such as fear, anger, disgust, etc.), and in this way a certain air of system is given to the treatment of the affective life which is lacking in most other psychological textbooks. It is this air of system which is, however, responsible for a great deal if not most of the controversy. The notion that there exists any fixed entity as an acquisitive instinct naturally irritated those who had hoped to find in social psychology a support for their radical views on social progress, and at the same time it seemed to lend "scientific" color to the eternal necessity of a capitalistic order. The instinct of pugnacity, if taken with the same seriousness as the laws of mechanics, automatically condemns pacifism. Many similar difficulties arise in connection with the other instinctive concepts. For a long time sociologists and social psychologists were in turmoil over the question whether there really existed any such instinct as the instinct for imitation, around which the French psychologist, Gabriel Tarde, had built up by a tour de force the entire scheme of social movement. And great was the relief when both Thorndike and McDougall legislated this instinct out of existence, McDougall preferring to explain the phenomena of imitation by the concurrence of intelligence with the specific instincts.

Almost any philosophy of instincts tends to undermine the prestige of the intellect and intelligence. A theory of mechanical reflexes tends of course to abolish intelligence altogether, but under the conception of fixed instincts the intelligence is reduced to the rôle of a helpless mediator between the imperious inborn tendencies of human nature. The notion of the sublimation of instincts, which has been so extensively used by the psychoanalysts and psychopathologists, consecrates anti-intellectualism into a dogma. It might be said that the metaphor of sublimation was invented in order that it might be misinterpreted. At any rate it owes its popularity to the ease with which it lends itself to distortion. When the highest intellectual achievements of humanity are defined as mere sublimations of primitive instincts, it is only a short step in the popular mind to de-throning these achievements altogether and preferring "self-expression" via the so-called instinctive urges. In this respect the genius of modern social psychology works directly opposite to the genius of dogmatic religion, which, while adopting an almost identical hierarchical division of human nature into instincts and faculties, regards the instincts as the domain of the devil and "sublimations" as the striving for divine perfection. In this day and age it is not possible to write of human nature in the fashion of a sermon, but the question may well be asked whether the end of science is in any way served by pointing a moral in reverse. To sum up the present situation in the doctrine of instincts, we should say that there exist two dogmatic positions, the theory of specific instincts and the theory of mechanical reflexes. Of these two, the instinct is the more flexible and could be converted at will into a dogmatism for morality or into a dogmatism against good morals. Perhaps the larger number of present-

day psychologists might be regarded as skeptics, vacillating between the acceptance of teleological instincts and the apparently more scientific concept of reflexes. If we are to find a way out of this dilemma, we must seek it in a philosophic re-interpretation of scientific experience.

The lines of this re-interpretation can be only briefly suggested here. To begin with, the accepted notion of predeterminism in physical science must be subjected to analysis. And when this is done, it is found that the so-called pre-established laws of nature are discovered in the course of human history, or rather are organized as an objective test of experience through the constructive mathematical genius of man. And it is also seen that the physical laws are presumed for reasons of convenience to have preëxisted their discovery by man. The late Henri Poincaré showed clearly that we cannot ask ourselves the question whether the laws of physical nature have ever undergone change, inasmuch as our notions of geology and astronomy, the history of the earth and of the heavens, are based on the assumption that the laws are constant. While we are able to predict the revolutions of the stars on the basis of our present scientific laws, nobody can pretend to predict the revolutions in the science of astronomy, precisely because of the unpredictable nature of the "human equation." The so-called mechanism of physical science, invented by human intelligence, cannot be used as a club to prevent the progress of human intelligence. Indeed, the notion of intellectual progress or evolution was recognized long before man had the audacity to apply that very fruitful idea to biology. But the essence of evolution or progress is the notion of genuine change or novelty occurring within time. As regards the physical world, we may say with the French proverb, *plus ça change, plus c'est la même chose*; the more things change, the more they remain the same. But while we often apply the same idea to human affairs, we do so satirically, and as regards biological phenomena, we have definitely postulated the notion of growth in the unifying principle of evolution. There can be no mechanical theory of evolution for the reason that the formula is a logical contradiction. The general principle of mechanism undertakes to explain change in physical phenomena by attributing it to preëxistent conditions, while the principle of evolution undertakes to explain the variety of living species as a genuine development in time. The two principles contradict each other only when we attempt to apply them to the same set of phenomena, but in their formal nature they both reflect the mathematical idea of continuity.

If we should admit, then, the contingency of the laws of physical science, their contingency, that is, on the state of our ever changing knowledge of nature, there need be no opposition in the spirit of scientific inquiry between natural science and the biological and social sciences. Phenomena in the latter domain are obviously not as predictable as purely physical phenomena are. The proper analogy for the biological series is geology, a science in which we attempt to predict the spatial configurations of the earth's crust before we are able to see them. In the same empirical fashion we predict economic phenomena, but the accuracy of our predictions is dependent on the nonintervention of new factors. Philosophically speaking, the theory of teleological instincts and the notion of reflexes can both be conciliated into the scheme

of science if we throw out on the one hand the prejudice of purpose and on the other the prejudice of mechanical predetermination. Neither of these has a place in a descriptive science. The instinct becomes the larger unit, and for that reason harder to measure; the reflex is the smaller unit and more accurately determined, but it is too small for social computation. It is as if we were to try to formulate the principle of the pulley in terms of electronic vibrations. While the notion of purpose and inner striving is thus excluded from descriptive psychology, it need by no means be banished from the world of thought as a delusion and a fraud. It finds its place in those disciplines which aim to cultivate inner development: art; religion; the philosophy of religion. It is not necessary for the science of man to be religious in order to cooperate with the religious striving, just as it is not necessary for the science of physiology to be healthy in order to further the interests of health.

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INSTITUTE OF INTERNATIONAL EDUCATION. See EDUCATION IN THE UNITED STATES.

INSTITUTE OF POLITICS. See POLITICS, INSTITUTE OF.

INSULIN. See DIABETES; DIET; FOOD AND NUTRITION.

INSURANCE. Since insurance, although an independent business activity, is a financial tool for the furtherance of the more fundamental economic processes, its development may be expected to follow closely the outstanding developments in those processes. The history of the business during 1912-24 illustrates this tendency. Its volume increased with the rise in prices and the extension of general business activity. New forms of coverage were originated and old forms adjusted to changes in the need for protection. Within the insurance business, there was considerable activity in the organization of new companies and in the combination of old companies, particularly in the property insurance field, where individual insurance interests aimed to offer as wide a variety of coverages as practicable. The feature of the period which was most far-reaching in its influence on insurance, was the War with its effects on prices of securities and property. Fortunately the insurance companies were able to adjust the valuation of their investments on the basis largely of intrinsic worth and thus avoided in some measure the unfortunate effects of market fluctuation. The increase in prices brought about a corresponding increase in the amount of insurance required to cover the risk of loss of property and of other values. The War also had a marked effect on the moral hazard; it tended, in general, to decrease the losses of insurance companies where property was covered whose loss would result in the cessation of large profits to business men. With

the close of the War, however, and the following period of adverse conditions in business, the preservation of property was less a matter of concern to its owners; consequently there was an increase in insurance losses, which must also be attributed, in large measure, to the moral hazard. Governmental regulation of insurance steadily increased in scope and effectiveness. The National Convention of Insurance Commissioners, through its committees and general meetings, succeeded in offsetting in considerable degree the disadvantages of regulation by the individual States. It put State regulation on a higher plane and brought about, unofficially, a relatively high degree of uniformity of laws; but much remained to be accomplished in this direction, for the companies were still embarrassed by diverse systems of regulation.

Life Insurance. On Dec. 31, 1922, there were in force 14,875,540 life insurance policies, as compared with 7,452,154 on Dec. 31, 1913, an increase of 100 per cent. These figures are for companies reporting to the Insurance Department of New York State. All figures in this statement are from the same source unless otherwise noted. Insurance in force amounted to \$33,460,718,184 as compared with \$14,304,638,791, an increase of 134 per cent. In the same period, gross assets increased by 72 per cent and surplus by 79 per cent. A comparison of the new business written in 1922 with that written in 1913 shows an increase of 224 per cent, from \$1,792,342,656 to \$5,805,342,709. This increase is highly significant and is a better measure of the increasing importance of life insurance than are the other figures given, since these other figures are affected, in large measure, by totals continued from previous years. Aside from the unexampled activity of insurance companies and their agents, the principal reasons for this increase in new business are found in the inflation of prices during the period, necessitating the purchase of larger policies to insure a given standard of living to dependents; in increased ability of policy holders to pay premiums of considerable size; and in the discovery of many new uses for the application of life insurance both to personal and to business affairs. The rate of mortality of the general population as well as that among life insurance policyholders showed a tendency to decrease. This tendency was interrupted by the epidemic of Spanish influenza which was at its worst during 1918-19. Fortunately the life insurance companies were sufficiently well prepared financially to meet this catastrophe without impairing their solvency. The only loss to policyholders was represented by a slightly increased cost of insurance for a brief period. War activities as such had little direct effect on the mortality among policyholders of life insurance companies. The short time during which the United States was active in the War and the relatively small amount of insurance in force on the lives of actual combatants explain this fact. The war mortality was largely borne by the war risk insurance scheme organized by the United States government for the purpose of writing insurance on the lives of soldiers and sailors.

It has long been recognized that the American Experience Table of Mortality, on which the calculations of life insurance companies are largely based, is not accurate. An investiga-

tion of 60 of the principal insurance companies of the United States and Canada showed that the mortality among insured lives was considerably below that indicated by the American Experience table prior to the age of 50, although this table is approximately accurate beyond that age. The most important new development in the life insurance field was the insurance of employees of private business enterprises under contracts of group insurance, the premium for which was usually paid in full by the employer and the proceeds payable to the designated beneficiaries of the workers. From a small beginning in 1911 this business increased so rapidly that at the end of the year 1922 there were in force nearly 7000 policies of insurance. The period was further marked by the general adoption and liberalization of the disability clause in all types of contract with individuals and in the somewhat less general adoption of clauses providing for double or even triple indemnity in the event of the occurrence of accidental death. The unsound financial condition of many fraternal life insurance organizations had long been a problem for the authorities of the various States. There were, however, in effect in 1924 regulations under which the fraternal were required, if they were not already in a sound financial condition, to improve gradually until they reached a condition of solvency. Several important life insurance companies which were formerly operated as nonparticipating stock companies adopted the mutual principle.

Fire Insurance. Increase in the amount of property insured and increase in property values in terms of money resulted in an increase of 137 per cent in the insurance in force in fire insurance organizations, from \$51,202,402,351 on Dec. 31, 1912, to \$121,552,779,774 on Dec. 31, 1922. Premiums increased by 147 per cent, from \$454,943,419 in 1912 to \$1,124,869,302 in 1922; losses paid, by 119 per cent, from \$157,923,447 to \$345,951,143. Total estimated fire losses in the United States increased by 113 per cent, from \$206,438,900 to \$440,000,000 (*Insurance Year Book*, 1923). The ratio of fire insurance losses to premiums as calculated by the National Board of Fire Underwriters was unusually favorable during the decade and reached a point above the average for the years 1860-1923 in only two years, 1914 and 1921. In 1919, it reached the lowest point since 1863, when it touched approximately 40 per cent. In 1922, the ratio was approximately 56 per cent, the average ratio for the 63 years. In 1918, the New York Standard Policy, long the accepted standard in a large number of States, was revised to adjust it to modern conditions. An event of great importance in the regulation of fire insurance was the agreement between the National Board of Fire Underwriters and the National Convention of Insurance Commissioners that 5 per cent of earned premiums represented a reasonable profit for fire insurance carriers.

Marine Insurance. For the year 1918 the total net premiums received for marine insurance within the United States were estimated at slightly less than \$110,000,000 by Dr. E. S. Huebner. *The Insurance Year Book* presented a figure of \$63,040,443 for 1922, probably an underestimate. Ocean shipping during the War was subject to new hazards, partly due to enemy activities. The extent and even the nature

of these hazards were unpredictable, and they could be assumed by insurance companies only to a limited extent. Governmental bureaus were established in this country and in foreign countries to insure shippers against losses from war hazards. Without such aid shipping by private interests would have been, in large part, necessarily discontinued. Increased activity in foreign commerce during and after the War led to the organization of many new marine insurance companies and to the development of marine insurance by older companies. The business was written, however, to a considerable extent on an unsound basis, and after a period of feverish activity, most of the new organizations disappeared, and the business resumed its orderly course. In 1919, Congress became concerned with the preponderance of alien interests in the marine insurance business. An investigation was made, as a result of which a model marine insurance law, designed for the encouragement of American marine insurance, was adopted for the District of Columbia. With the cooperation of the companies and of Congress, three syndicates were organized for the purpose of increasing marine insurance facilities, in the interest, largely, of American carriers.

Miscellaneous Insurance. Among other forms of insurance, those covering the obligation of employers under workmen's compensation acts and the hazards incident to the ownership and use of automobiles became of greatest financial importance; each of these was responsible for the collection of, roughly, \$200,000,000 in premiums during the year 1922. Many new varieties of coverage were developed, all directed to the end of more completely meeting the needs of individuals and business for the assumption of risk. See FIRE PROTECTION, OLD AGE PENSIONS, SOCIAL INSURANCE, AND WORKMEN'S COMPENSATION.

INTELLIGENCE TESTS. See MENTAL MEASUREMENT; RACE PROBLEMS; UNIVERSITIES AND COLLEGES, ADMISSION REQUIREMENTS.

INTERMEDIATE CREDIT BANKS. See AGRICULTURAL CREDIT.

INTERNAL-COMBUSTION ENGINES. It has been stated, from investigations made by the United States Department of Agriculture, that 68 per cent of all tractor engine troubles occur in the accessories essential to the operation of high-speed automobile power plants operating on the internal-combustion principle. These difficulties occur in magnetos, battery ignition parts such as the timer and induction coil, spark plugs, wiring and carburetors. Troubles due to mechanical failure in parts such as bearings, cylinders, pistons, rings, valves and springs and lubricating systems account for only 32 per cent of the stoppages. The fuel efficiency of engines using carburetors is considered satisfactory if they return in power one-fifth of the fuel energy present in the fuel supplied, and four-fifths of the fuel energy is wasted in automotive power plants used in small motor boats, motor vehicles, and airplanes. The fuel employed must be a particularly high grade liquid which must meet certain requirements of volatility and viscosity. In all forms of motor vehicles, the weight of the fuel must be transported by engine power. In all aerial craft especially, high fuel consumption means a serious reduction in cruising ability in cargo vessels and vehicles, a reduction in

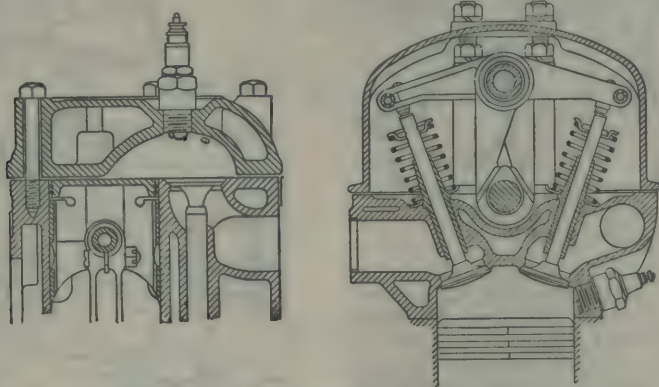
available space that might produce revenue. For this reason, scientists are seeking to find means of utilizing fuels more efficiently, and considerable research work is being carried on to secure greater fuel economy in engines requiring high grade fuel as well as in the development of power plants that may utilize low grade and cheaper fuels economically.

Considering first what may be done with combustion in confined spaces or in those forms of engines using the explosive process as introduced by Otto, we find that the usual form of automotive engine using special ignition devices is much less efficient, if we consider heat utilization other than types of engines such as the Diesel, which have extremely high compression ratios, compressing only air and then injecting the fuel in the heated air; in such engines, heat utilization as high as 36 per cent has been reached. The heat utilization of the usual form of automotive engine is from 20 to 25 per cent. To increase the heat utilization of the present type of engine is a problem which was being attacked in two ways. The attempt was made to develop fuels allowing use of higher compression pressures without pre-ignition. The addition of a small amount of tetraethyl lead to gasoline is said to permit of using twice the accepted compression pressure without pre-ignition and "knocking." This means that for a given piston displacement, the power can be doubled without using any more fuel, because the higher compression pressure which is possible doubles the force of the explosion. Again, some engineers were working on the problem of perfecting the combustion process. It was stated that with the fuels available commercially and the engine speeds and carburetion and ignition systems used, the combustion in automobile engines continues during the entire duration of the expansion stroke, and from 20 to 30 per cent of the fuel passes out of the cylinder unburned.

permit of as heavy charges being inspired, because of the throttling effect of the passages through which the gas must pass in reaching the cylinder interior on the suction stroke.

Injection Engines. While it is generally believed that injection engines are best suited to applications where a heavy-duty constant-speed power plant is needed, which precludes their use in most forms of automotive vehicles, excluding boats, a very startling development in this form of engine is the adaptation of the German Junkers engine to aeronautic purposes. This is a two-cycle type using two pistons per cylinder, working in opposite directions and uncovering two sets of ports open at the end of the stroke. Air under pressure is admitted through one set of ports for scavenging purposes, and this air pushes the exhaust gases out of the other. The only valves in the engine are the fuel injection valves, but it is in the development of this part that the designer of injection engines experiences the greatest difficulty. At high operating speeds and with engines of comparatively small dimensions, such as are needed in automotive vehicles, the injection valve becomes small and consequently is subject to mechanical troubles. Then again, in those forms of injection engines where the air is not compressed to high pressures, the shape of valve necessary to produce a good spray can be determined only by experimentation. It is also difficult to secure complete combustion of a fuel injected in the liquid state at high speeds; so the speed of injection engines and their flexibility cannot be compared with those forms receiving their fuel mixture from a carburetor.

Explosion Turbine. Some engineers believe that the explosion turbine offers possibilities for future development, because one of the drawbacks of reciprocating piston engines, i.e. the inefficiency due to incomplete expansion after ignition, is not inherently present. In some forms of explosion turbines, the mixture is



FORMS OF AUTOMOTIVE ENGINE COMBUSTION CHAMBERS AND TYPICAL VALVE PLACING

At left: Head with side valve head and combustion chamber to promote turbulence. At right: Overhead valves to permit quick charging and exhaust of gases.

One of the best methods of increasing or accelerating combustion in automotive engines is by designs of cylinder heads to produce combustion chambers that will promote turbulence. A violent turbulence means a more thorough mixing of the liquid particles and the air stream, and engines employing this principle give better combustion, though in some cases they do not

drawn or forced into a special combustion chamber where it is exploded, and the pressure thus produced causes the gas to escape through a nozzle and impinge upon a turbine wheel. A sectional view of an internal combustion turbine built and operated in Germany by Holzwarth is shown. The design is ingenious, as the turbine is directly connected with a gener-

ator. Owing to the possibility of expanding the gas to atmospheric pressure, this turbine would have a theoretical energy utilization about 67 per cent if the combustion and fuel supply processes were the same as in a reciprocating piston engine.

One of the weaknesses of turbine design is that the compression of the charge prior to ignition does not take place in the explosion chamber but must be furnished by an outside compressor. Owing to the inefficiency of the

der. An explosion turbine is not a true internal combustion engine, and its low efficiency makes its commercial prospects not particularly bright. It requires a compressor, pump, or other device to supply the gas that is entirely distinct from the rotor element delivering the power and the combustion chamber where the charge is exploded, and it is more complex than a reciprocating engine. It is stated that an external combustion or steam power plant will deliver an efficiency as high as 20 per cent when running on coal; this is 5 per cent greater than can be expected from the most efficient form of explosion turbine yet developed.

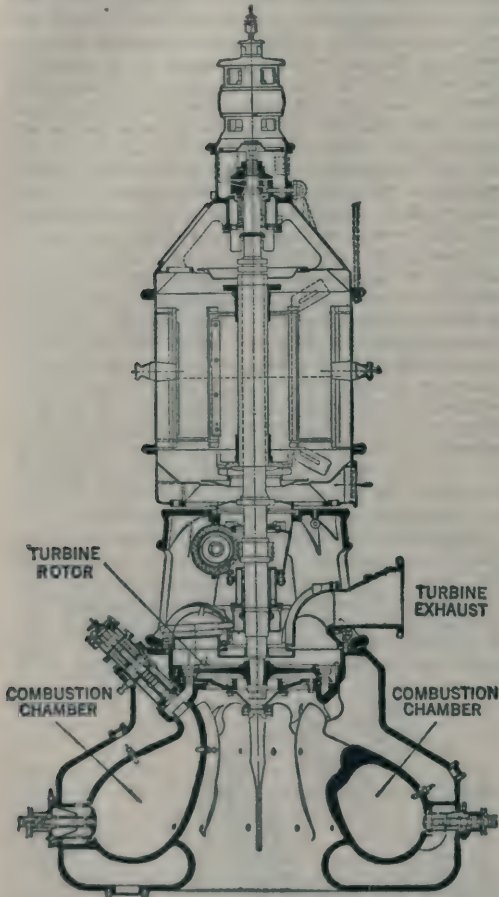
Diesel Engine. Many designs of Diesel engine were built for ship propulsion and received practical application during and after the War. In a discussion before the Society of Automotive Engineers, Inc., an authority on motor ship power plants stated that more than 50 different forms of engines for ship propulsion were on the market. These designs were stated to include:

Two-cycle, with:

- Air injection.
- Airless injection.
- Scavenge valves.
- No scavenge valves.
- Combined scavenging and injection valves.
- Scavenging pumps driven by cranks at the end of the engine.
- Scavenging pumps operated by rocking levers from the crossheads.
- Stepped scavenging pistons.
- Separate electrically driven scavenging blowers.

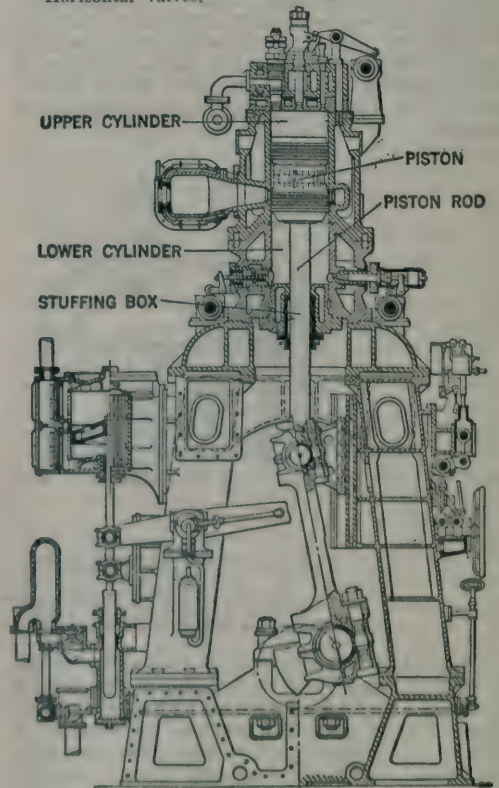
Four-cycle, with:

- Air injection.
- Airless injection.
- Vertical inlet and exhaust valves.
- Horizontal valves.



SECTIONAL ELEVATION OF THE HOLZWARTH VERTICAL EXPLOSION TURBINE

compressors and the fact that a turbine rotor actuated by a gas with constantly falling pressure cannot be more than 60 per cent efficient, the theoretical thermal efficiency of a turbine drops from 67 per cent to a practically realized efficiency of but 13.8 per cent, or considerably less than that of the usual forms of reciprocating piston engines. Several inventors have tried to do away with compressors in gas turbines, or, if a compressor was used, to drive it by steam raised by the exhaust of the turbine. One of the advantages of the reciprocating type of engine is that the piston serves as a pump to draw in the gas; then as a compressor to compact the charge before ignition; then as a power element when forced down by the pressure of the exploded, expanding gas; and lastly as a scavenging medium, when it pushes the inert or exhaust gas out of the working cylinder.



A THREE-CYLINDER DOUBLE-ACTING TWO-CYCLE 850 BRAKE HORSE POWER ENGINE

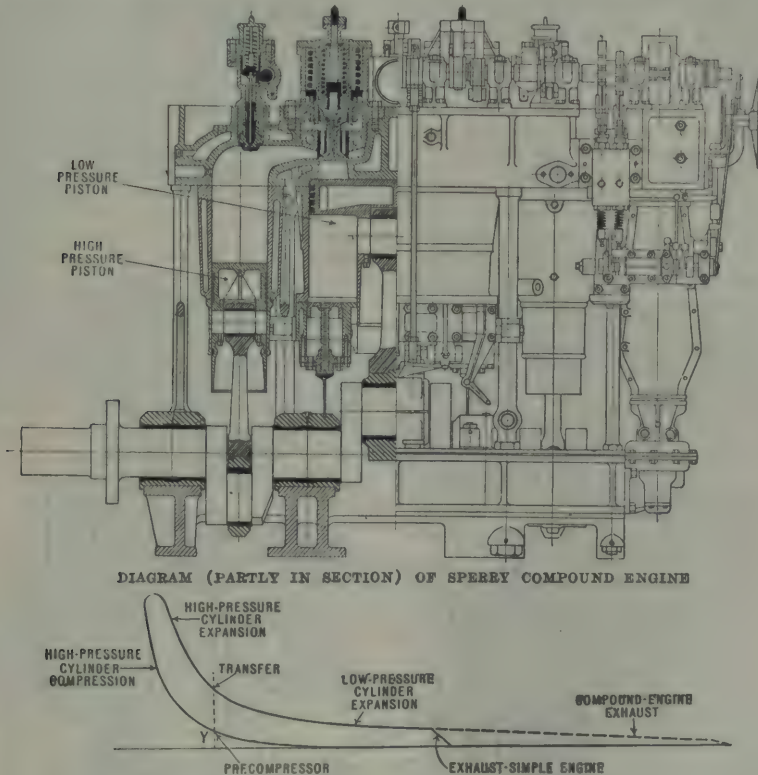
Variations, inclusive of:

Trunk piston.
 Crosshead.
 Low compression, with auxiliary combustion-starting system.
 Medium compression, with or without steam-heated cylinders.
 Medium compression with electric or red-hot point starting devices.
 Diesel combustion on one side and steam pressure on the other side of the piston.
 Single acting.
 Double acting.
 Opposed piston, and variations of this particular design.
 Use of cylinder liners.
 Nonuse of cylinder liners.
 Detachable cylinder heads.
 Cylinder heads cast integrally with the cylinders.
 Heavy cast-iron frames.
 Steel columns and no cast-iron frame.
 Both frames and columns of cast iron.
 Cylinders cast separately.
 Cylinders cast in block.
 V-type cylinders.
 Compound engines.

All of these have variations in their reversing mechanisms. Some have fresh- or salt-water-cooled pistons, others have oil-cooled pistons, and some have no cooling medium other than the atmosphere. Finally, there are advocates of the Diesel electric drive and of the Diesel reduction-gear drive as opposed to direct drive.

double-acting two-cycle engine. This power plant has a cylinder bore of $17\frac{23}{32}$ inches and a stroke of $27\frac{31}{32}$ inches and delivers 850 horse power at 120 revolutions per minute. The problem of packing the piston rod against the explosion pressure is met by a very ingenious and carefully worked-out stuffing-box which permits the piston rod to reciprocate through the head of the lower cylinder. The stuffing-box is very deep and contains 11 sections of metallic packing; grooved rings divide them, to facilitate the distribution of lubricating oil. Each section consists of two rings split in halves which fit closely around the rod without springs, but they are kept close to the rod by a spring clip ring carried in a retaining ring clear of the rod. These 11 sections are entered into the stuffing-box and held in position by the gland ring.

The Sperry compound oil engine, also illustrated, shows a great difference from the usual forms. The sturdy construction necessary for an engine of its speed is indicated by the size of the crankshaft, which is considerably greater in diameter than that of any other combustion engine and approaches the bore of the combustion cylinders themselves. The large clearance



TYPICAL INDICATOR CARD OF SPERRY COMPOUND ENGINE

The fuel consumption of motor ship engines ranges from a minimum of 0.29 pound per indicated horse power hour to 0.5 pound per horse power hour. The average is about 0.40 pound per horse power hour.

As an example of novel designing, the accompanying illustration gives a sectional elevation through one of the cylinders of a three-cylinder

dome, which forms the combustion-chamber of the compound, stands out in marked contrast to standard Diesel practice. This dome is large and forms an upward extension of the combustion cylinder; it extends also to the right in a large sweep and surrounds the transfer valve that seals the transfer port. The sleeve-like induction valve is seated on top of the transfer

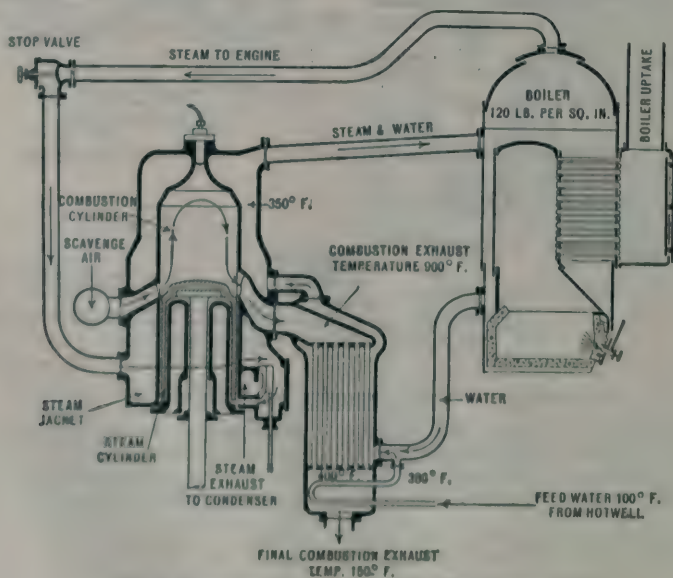
valve and is controlled by the cam-operated fork. The first-stage annular compression-pump, surrounding the trunk piston below the low-pressure piston proper, delivers its air to a small receiver which, in turn, discharges to the cored port surrounding the induction sleeve. The small balancing cylinder maintains a permanent connection with the low-pressure cylinder. The solid-injection fuel-valve and nozzle are placed approximately over the centre of gravity of the large masses of air in the clearance dome.

The compound principle as applied in this engine is an attempt to produce a light and compact internal-combustion engine using a wide range of fuels with ignition by the heat of the compression. The arrangement of the engine consists of two high-pressure four-cycle cylinders and a simple low-pressure cylinder. The high-pressure pistons are of plain trunk type. The low-pressure piston has an extension of smaller diameter than the main piston. The annular space between this extension and the main piston serves as an air pump. The pump compresses air from atmospheric to a moderate pressure into a small receiver. On the down or inlet stroke of the high-pressure pistons, air under pressure from the receiver passes through the inlet-valve sleeve and cools it, until the pistons are at the end of the stroke. The air is then compressed on the up-stroke to about 500 pounds per square inch when fuel is injected. The resulting combustion and expansion of the gases drive down the high-pressure piston to the end of its stroke, when the low-pressure piston, which is on the beginning of its working stroke, receives the gases from the high-pressure cylinder through the transfer port that has been opened by lifting the transfer valve from its seat into a water-jacket cavity so that only its lower surface is washed by the passing gases. To prevent any serious drop in pressure between the high- and low-pressure cylinders when the transfer takes place, the exhaust-valve is closed somewhat before the low-pressure top centre and the gases are cushioned to a pressure equal to that being transferred from the high-

pressure cylinder. The cranks of the two high-pressure cylinders are set together and 180° from the low-pressure crank. The high-pressure cylinders fire and transfer alternately into the low-pressure cylinder, so that every down-stroke of that cylinder is a working stroke.

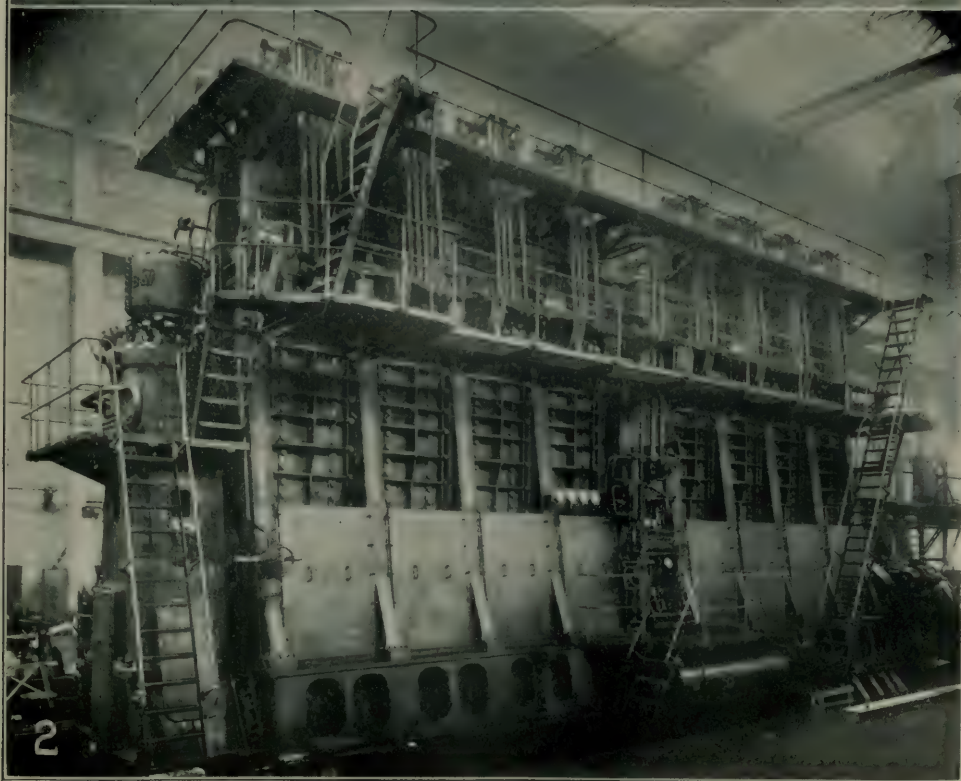
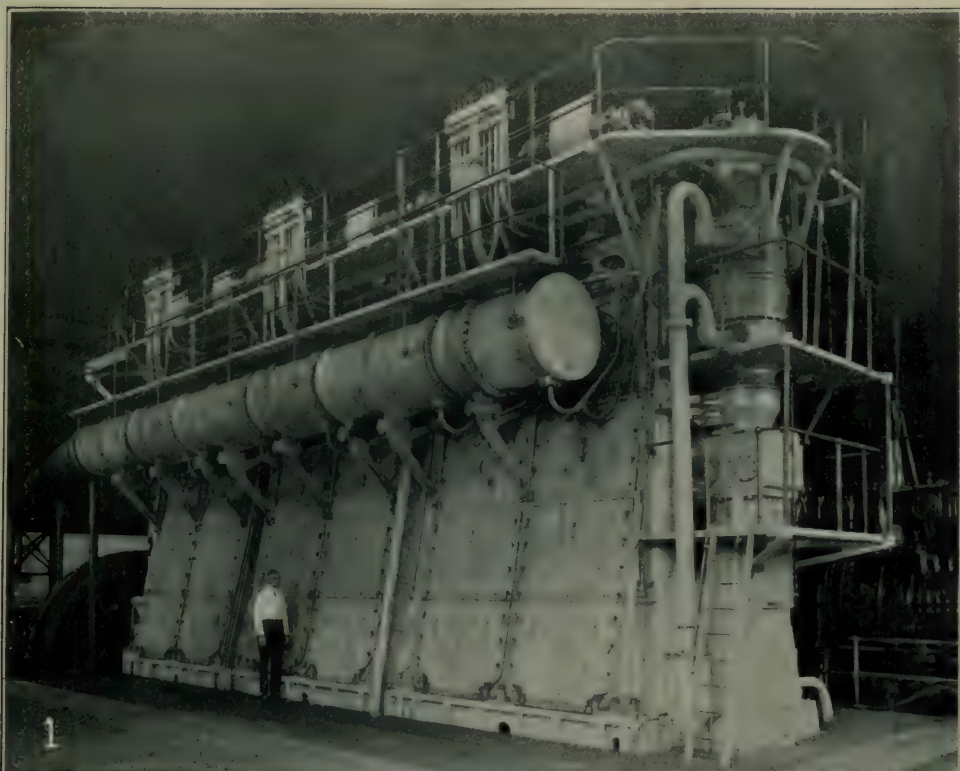
In internal-combustion engines of either the constant volume or constant pressure type, the combined heat losses in radiation, cooling water, and exhaust gases range between 65 and 75 per cent. It will be evident that any practical attempt to utilize the waste heat will increase the thermal efficiency. Heat losses due to the cooling water or radiation cannot be reduced beyond a certain minimum value; so the point where the greatest gain can be made is in the fuller utilization of the exhaust gases. In the various forms of compound engines which have been evolved and described, with two high-pressure cylinders exhausted in one low pressure and further power derived from the exhaust gas, the reduced pressure is compensated for by the increased area of the low-pressure piston top. An attempt to utilize the waste heat of the exhaust gas is the Still engine, which combines steam and explosion power so advantageously that the brake thermal efficiency of such an engine may go as high as 44 per cent.

Still Engine. The still engine is an engine capable of using, in its main working cylinder, any form of liquid or gaseous fuel hitherto employed; it makes use of the recoverable heat which passes through the surfaces of the combustion cylinder as well as into the exhaust gases, for the evaporation of steam, which is expanded in the combustion cylinder itself on one side of the main piston, the combustion stroke acting on the other side. It increases the power of the engine and reduces the consumption of the fuel per horse power developed. Its primary object is not to use the waste heat for raising steam, but first to use it in improving the thermal conditions of the working cylinder and so to insure the maximum efficiency from the fuel burnt within it and to diminish, as a consequence, the heat lost in that operation. Since the maximum efficiency is obtained



STILL COMBUSTION AND STEAM ENGINE ACTION

MOTOR VESSELS—ENGINES



COURTESY OF "MOTORSHIP", NEW YORK

1. TWO-CYCLE DIESEL ENGINE of 3000 horse power built by Bethlehem Steel Corporation, Ltd., for American motor vessel.
2. FOUR-CYCLE DIESEL ENGINE of 3000 horse power built by Burmeister & Wain, Copenhagen, Denmark.

TYPICAL MARINE DIESEL ENGINES

by combustion of the fuel in the cylinder, and the minimum by the evaporation of the water in the steam generator, it is evident that the larger the quantity of steam which can be generated per horse power developed by the combustion cycle, the lower must be the heat efficiency of the whole machine. Internal-combustion engines are kept cool by the circulation of cold water around their cylinders; the heat thus absorbed causes a rise in temperature of the water as it travels through the jacket, so that the cylinder is subjected to temperature differences and heat stresses, which are an abiding source of trouble and difficulty to the designer.

In the Still engine the jacket and cooling water form part of the circulating system of a steam generator, which may be an integral part of the engine or external to it. The cooling water therefore enters and leaves the jacket at a constant temperature, regulated by the pressure of the steam; the cooling is effected by converting the water into steam without raising its temperature. Excluding the radiation losses, which are kept low by lagging, all the heat which passes through the walls is thus usefully recovered in the water as steam. The temperature of the cylinder wall is uniform over the whole of its exterior surface, and the heat lost to the cooling water at each stage of the cycle, compression, combustion, and expansion, is diminished. During compression, because of the walls' being at steam temperature, the incoming charge picks up heat instead of losing it, during the greater part of the stroke. This is an advantage of the greatest value to the heavy-oil types of Still engine, where an air charge is taken in at the full out-stroke and is compressed to a pressure where its increased temperature insures the certain ignition and combustion of the fuel which is injected into it. During combustion and expansion, the uniform and higher mean temperature of the wall reduces the heat lost to the jacket water. Some of the heat thus economized adds to the useful work on the piston, the remainder passing out in the exhaust gases for recovery. The steam developed is directed to a special steam cylinder, and as it has some pressure, this is exerted against the bottom portion of the main piston which extends into the steam cylinder. Power at normal loads is developed by combustion and steam from waste heat alone, with an efficiency from 20 to 25 per cent greater than any known combustion engine of the same size. It is believed that there is a future for the combination of the steam and combustion cycles.

High Speed Engines. Engineers who are working on the development of high speed engines such as are used for automobiles and aircraft are not concerned so much with combustion efficiency as with securing as much power as possible out of a given cylinder volume; one of the mechanical aids to secure this result is the supercharger. While this device had not in 1924 been generally applied to passenger cars, it had been used on racing automobile engines and on airplane motors. Its function is to force a charge of more density into the cylinder than would be drawn in by the pumping action of the piston on the suction stroke.

Superchargers. Superchargers are especially valuable on aircraft operating at high altitudes. As the engine reaches altitudes where the air is lighter, the weight of the charge decreases and the power is correspondingly re-

duced. This loss of power is stated to be very great in engines not equipped with superchargers. A Liberty airplane engine that will develop 400 horse power at sea level will deliver but 200 horse power at 15,000 feet and not quite 90 horse power at 25,000 feet. While reciprocating

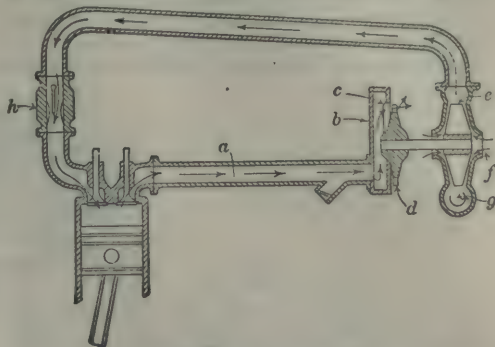


DIAGRAM ILLUSTRATING THE OPERATION OF A TURBO-SUPERCHARGER

The Exhaust Gas from the Engine is Led through a Manifold, *a*, into the Nozzle Box *b*, containing a Series of Nozzles, *c*, through Which the Gas Expands and Attains a High Velocity before Entering the Buckets of the Turbine Wheel *d*, Which It Drives at High Speed. Air Enters the Impeller *e* through the Inlet *f* at the Center and is Thrown by Centrifugal Force to the Tips of the Blades where a Series of Vanes Convert the Velocity of the Air into Pressure and Guide It in a Spiral Path, as Shown at *g*, to the Supercharger Outlet and Finally to the Intake of the Carburetor *h*.

cating, rotary, and centrifugal air-pumps have been suggested and experimented with, the centrifugal type is best adapted for aircraft motors because of its simplicity, lightness, and freedom from pulsation. The supercharger may be gear-driven by the engine to which it is attached, or it may be driven by a gas turbine using exhaust gas which would otherwise be wasted by discharging it directly into the air. The gas turbine-driven supercharger had been most successful to date.

The diagram herewith shows clearly the way such a supercharger operates. The exhaust gas from the engine is led through a manifold *A* into a nozzle box *B* containing a series of nozzles *C*. Through these nozzles the gas expands and reaches a high velocity before entering the buckets of the turbine wheel *D*, which it drives at high speed. Air enters the impeller *E* through inlets *F* at the centre and is thrown by centrifugal force to the tips of the blades. At this point, a series of vanes surrounding the impeller converts the velocity of the air into pressure and guides it in a spiral path to the supercharger outlet and then through the air-cooler into the carburetor intake.

Vehicle and Aircraft Engines. In 1924, vehicle and aircraft engine design principles were to a very great degree based on the experience gained during the War in securing extreme care as to details. Airplane, car, truck, tractor, and tank were all developed by the severe tests of war. Engine speed is not limited by considerations of piston temperature, and improvements in design enable the designer to adopt large-bore cylinders in aircraft engines if he so desires. A British six-cylinder engine with cylinders of 7 inches bore and 11 inches stroke develops 700 horse power at a speed of 1200 revolutions per minute. Aluminum pistons had been used commercially for some time,

but the use of forged duralumin connecting-rods was comparatively recent.

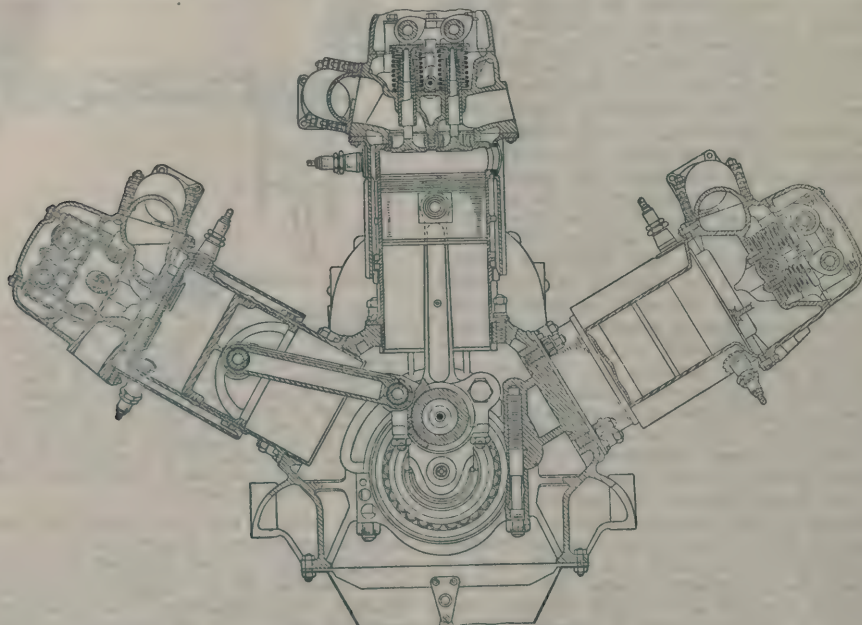
Motor Car Engines. The marked development of aeronautic engines focused the attention of the public on light engines. In the case of such power plants, lightness is obtained mainly by machining out low-stressed portions of the various engine members and by making highly stressed parts of alloy steels carefully heat-treated so that less weight is required to

RICULTURE. See AGRICULTURE, INTERNATIONAL INSTITUTE OF.

INTERNATIONAL LABOR OFFICE. See LABOR ORGANIZATION, INTERNATIONAL.

INTERNATIONAL LABOR ORGANIZATION. See LABOR ORGANIZATION, INTERNATIONAL.

INTERNATIONAL LANGUAGE. The initiative in establishing a sort of clearing house for all questions connected with the prob-



ARRANGEMENT OF CYLINDERS IN AVIATION ENGINE TO SECURE COMPACTNESS OF DESIGN IN MULTIPLE CYLINDER FORMS

attain the necessary structural strength. In order to secure the required power output in a compact and light engine, the usual tandem arrangement favored in automobile engines is replaced by radial placing of cylinders in which they are mounted on all sides of the crank-case, some engines having 2 and even 3 banks of 9 cylinders each. The V-cylinder placing is favored for 8 and 12 cylinder engines, and in some cases, the angle between the inclined cylinders is large enough so that another set of vertical cylinders can be placed between them. By such arrangements of cylinders, engines developing from 500 to 600 horse power have been built, weighing only 1.80 pounds per horse power. Air-cooled aeronautic engines have been built, weighing but 1.5 pounds per horse power. Speeds of crankshaft rotation on airplane engines are not as high as in automobiles, since the propeller efficiency limits the speed when directly connected to the crankshaft to about 1350 revolutions per minute, and with geared-down drive to 2000 revolutions per minute. Racing automobile and motorcycle engines have attained speeds in excess of 4000 revolutions per minute. See MOTOR VEHICLES and AERONAUTICS.

INTERNAL WATERWAYS. See CANALS, INTERNATIONAL. See COMMUNISM; SOCIALISM.

INTERNATIONAL AERONAUTIC FEDERATION. See AERONAUTICS.

INTERNATIONAL INSTITUTE OF AG-

lem of a world language belongs to the International Research Council. They created a Committee on International Auxiliary Language, located in Washington, D. C., under the direction of Dr. Nichols and Dr. Cottrell, which undertook to send out information generously to any serious inquirer. In 1924 the two chief solutions were an arrangement that would favor living languages, and an artificial language. The basis for discussion of an established living language to be used as an international language remained the "Projet Chappelier," suggesting an agreement between English and French speaking countries, that the first require in all their schools the teaching of French, and the second the teaching of English. This would force other nations to teach at least one of the two, and thus the goal would be reached. Famous men gave their support to the idea, among them Wells, Richet, and the great linguist Breal. The best explanation of the plan is found in Dauzat's *Le Français et l'Anglais, Langues Internationales* (1910). It is unfortunate that Dauzat hurt his cause considerably by indulging in very unintelligent criticism of other solutions of the problem; nobody can see in him an impartial student. The plan was from 1915 endorsed by the well known critic, Ernest Charles, and by the American philosopher, Mark Baldwin. For some details and references see the various *New International Year Books*.

There were, of course, many projects of arti-

ficial languages before the public, but three really counted: Esperanto (for information in America, address Esperanto Association, Boston, Mass.); Ido (American headquarters in Pittsburgh); and Esperantido (Washington, D. C.). In 1922, the Institute of International Education launched a movement in favor of a modernized Latin, not so much, it seems, because of belief in it, but rather out of fear that an auxiliary language might otherwise triumph. From the first weeks of the War, Esperanto rendered extremely valuable service both in the Red Cross divisions, and in the work of the prisoners' camps. At the same time the Germans took advantage of Esperanto to spread much propaganda among neutrals, which naturally hurt the cause of Esperanto in the eyes of the Allies (who were slow at hitting back with the same arm). In 1916 the "Chappelier plan" was seriously revived, and Dauzat suggested some interesting modifications to it. In some quarters the end of the War was expected for the end of 1916 or beginning of 1917; in view of this the Board of Trade of London favored the study of the question of an international language to help business to pick up rapidly. At the same time, the Germans, seeing things take a favorable turn for them, began to talk about German as an international language, and spoke of a "Welt-deutsch," a natural organ for Pan-Germanism. But the War went on, and remarkable headway was made in 1917 and 1918 by artificial languages, especially Esperanto, in the Far East. Then, as the War ended, a lively race began between the chief rivals, Esperanto and Ido. Esperanto seemed to see a chance for victory in winning to its cause the exploited classes and even the Russian Soviets, while the Idists seem to prefer to win the intellectuals. Lord Northcliffe, in England, and the philologist Meillet, in France, agreed that as a language Ido was superior to Esperanto. This discussion of actual *linguistic* superiority prompted Dr. René de Saussure, of Bern, Switzerland, to offer his system, combining, he maintained, the excellent points of both Esperanto and Ido, and which he called Esperantido. The plan of a simplified Latin, proposed that same year by Professor Peano of the University of Turin, had a moderate following.

Together, these groups tried to bring the question before the Peace Council in Paris, and having elicited a note of "interest" from Wilson, worked with more vigor than ever. After the Peace Council, the League of Nations was approached several times. In 1921, the League delegated Dr. Nitobe to the Congress of Esperanto that was to be held in Prague, August 29 to September 6. The report, made on September 12, brought about the nomination of a committee to investigate the matter. The problem was finally turned over to the Committee on Intellectual Coöperation, of which such persons as Bergson, Einstein, and Mme. Curie were members; and these finally decided, in a report of Aug. 1, 1923, not to recommend an artificial language. Meanwhile, the International Research Council, which had met in Brussels in 1919, appointed a committee to investigate the matter of an artificial language "of the type of Esperanto" and which would be "placed under scientific control." After that time the Committee on International Auxiliary Language, at Washington, became active. They

asked the Philological Association and the Modern Language Association to appoint committees. Both made cool replies, but Washington went on. The question was brought up and discussed at the meeting of the American Association for Advancement of Science at Toronto, in December, 1922, and again at their meeting at Cincinnati in December, 1923. The study of the problem was endorsed. Some meetings in New York, April, 1923, with a view to fostering the cause, and counting among their supporters several names famous in the scientific world, must also be recalled. The most interesting bibliographical material bearing at least partly on this problem are the very suggestive book of A. Meillet, of the Collège de France, *Les Langues de l'Europe Nouvelle* (1918), last chapter; and A. L. Guérard, *Short History of the International Language Movement* (London and New York, 1922). See PHILOLOGY, MODERN.

INTERNATIONAL LAW. See BLOCKADE.

INTERNATIONAL TRADE UNIONISM. See TRADE UNIONISM.

INTERSTATE COMMERCE COMMISSION. See RAILWAYS.

IODINE. See CHEMISTRY; FOOD AND NUTRITION; and GOITRE.

IONIZATION. See CHEMISTRY, PHYSICAL.

IOWA. Iowa is the twenty-fourth State in size (56,147 square miles), and the sixteenth in population; capital, Des Moines. The population increased from 2,224,771 in 1910 to 2,404,021 in 1920, a gain of 8.1 per cent. The white population rose from 2,209,191 to 2,384,181; Negro, from 14,973 to 19,005; native white, from 1,935,707 to 2,158,534. The foreign-born white population showed a decrease, from 273,484 to 225,647. The urban population mounted from 680,054 to 875,495, while the rural fell from 1,544,717 to 1,528,526. The population of the principal cities increased, during the decade, as follows: Des Moines (q.v.), 86,368 to 126,468; Sioux City, 47,828 to 71,227; Davenport, 43,028 to 56,727; Cedar Rapids, 32,811 to 45,566.

Agriculture. As Iowa is one of the chief agricultural States, conditions during the decade 1910-20 were affected by the general fluctuations in production and values which resulted from conditions of the war and post-war period. See AGRICULTURE, CORN, and WHEAT. While the population of the State increased 8.1 per cent in the decade 1910-20, the number of farms decreased 1.7 per cent (from 217,044 to 213,439); the acreage from 33,930,688 to 33,474,896, or 1.3 per cent; and the improved land in farms from 29,491,199 acres to 28,606,951, or 3 per cent. The total value of farm property showed an apparent increase, from \$3,745,860,544 in 1910 to \$8,524,870,956 in 1920, or 127.6 per cent; the average value per farm from \$17,259 to \$39,941. Prices of farm land increased greatly, stimulated by wartime prices of products. In interpreting these values, however, and, indeed, any statement of comparative values in the decade 1914-24, the inflation of the currency in the latter part of that period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of land used for agricultural purposes decreased from 95.4 in 1910 to 94.1 in 1920; and the percentage of improved land in farms from 82.9 to 80.4. Of the total of 213,-

439 farms in 1920, 121,888 were operated by owners, 2487 by managers, and 89,064 by tenants. The corresponding figures for 1910 were 133,003, 1926, and 82,115. The white farmers in 1920 numbered 213,330, compared with 216,843 in 1910; colored farmers 109, compared with 201. Farms free from mortgage in 1920 numbered 45,807; those under mortgage, 66,096; while in 1910 the mortgaged farms numbered 63,234, and those free from mortgage, 68,045. The total number of cattle in 1920 was 4,557,708, compared with 4,448,006 in 1910; dairy cattle, 1,519,510, compared with 1,406,792; hogs, 7,864,304, compared with 7,545,853; sheep, 1,092,095, compared with 1,145,549. The estimated production of the principal farm crops in 1923 was as follows: corn, 422,241,000 bushels; spring wheat, 756,000; winter wheat, 13,708,000; oats, 195,689,000; barley, 4,208,000; potatoes, 7,618,000; sweet potatoes, 378,000; and hay, 4,416,000 tons. Comparative figures for 1913 are corn, 338,300,000 bushels; wheat, 16,395,000; oats, 168,360,000; barley, 10,000,000; potatoes, 7,200,000; and hay, 4,440,000 tons.

Mining. The principal mineral products of Iowa are coal, cement, clay products, and gypsum. There is practically no metal mining in the State. The coal production during the decade 1914-24 showed considerable fluctuation, as will be noted from the following comparative figures: 1914, 7,451,022 short tons, valued at \$13,364,070; 1915, 7,614,143, \$13,577,608; 1916, 7,260,800, \$13,530,383; 1917, 8,965,830, \$21,096,408; 1918, 8,192,195, \$24,703,237; 1919, 5,624,692, \$17,352,620; 1920, 7,813,916, \$30,794,000; 1921, 4,531,392, \$17,256,800; 1922, 4,335,161. The decrease in 1921 and 1922 was due largely to the protracted coal miners' strike which affected all the Middle Western coal fields. Shipments of cement were practically constant during the decade. They ranged from 4,224,076 barrels in 1914 to 3,188,669 in 1918 to 4,421,783 in 1920 and 4,151,439 in 1921. The value, however, practically doubled in the last three years of the decade because of the decreased purchasing power of money and the consequent higher prices. Clay products fluctuated from the value of \$6,401,745 in 1914 to \$5,313,394 in 1918 and \$5,711,583 in 1921. Gypsum is one of the most important mineral products: there were produced in 1914, 480,404 short tons; 1918, 327,927; 1920, 571,895; and 1921, 350,247. In addition to the minerals noted, the State produces mineral waters, sand, and gravel. The total value of the mineral products in 1921 was \$35,639,505, compared with \$57,250,480 in 1920; \$37,882,183 in 1919; \$38,742,009 in 1918; and \$26,287,115 in 1914.

Manufactures. Although Iowa is not one of the most prominent of the manufacturing States, it is of considerable industrial importance. There are 18 cities having a population of more than 10,000. These form 25.1 per cent of the total population of the State, and in 1910 they reported 78.4 per cent of the total value of its manufactured products. There were in the State, in 1909, 5528 manufacturing establishments; in 1914, 5614; and in 1919, 5683. The persons engaged in manufacture numbered 78,360, 82,631, and 105,439; and the capital invested amounted to \$171,218,604, \$233,128,542, and \$403,205,513, in those years. The value of the products in 1909 was \$259,237,937; in 1914, \$310,749,974, and in 1919, \$745,472,697. The chief industry in point of

value of product is that connected with slaughtering and meat packing, with a value of \$59,045,000 in 1909; \$74,289,700 in 1914, and \$226,865,000 in 1919. The manufacture of butter, cheese, and condensed milk ranks second: in 1919, \$25,850,000; in 1914, \$27,606,000, and in 1919, \$57,800,000. Car construction and repair, in third place, had products valued in 1909 at \$10,269,000; in 1914, \$11,434,000, and in 1919, \$33,099,000. Flour and gristmill products were valued, in 1909, at \$12,871,000; 1914, \$14,337,000, and 1919, \$21,325,000. The large increase in value of products is due largely to changes in industrial conditions brought about by the War, and therefore cannot properly be used to measure the growth of manufactures during the census period, 1914-19. The increase, however, in the number of wage earners indicates a decided growth in the manufacturing activities of the State. The chief manufacturing cities are Cedar Rapids and Des Moines. There were in Des Moines, in 1909, 387 establishments, with a product valued at \$23,585,000; 1914, 384, with \$23,747,000; and 1919, 379, with \$59,831,000. In Cedar Rapids there were 153 establishments in 1909, with a product of \$24,824,000; 170, in 1914, with \$34,989,000; and 208, in 1919, with \$92,118,000. Other important manufacturing cities are Council Bluffs, Dubuque, Fort Dodge, and Muscatine.

Education. No State has devoted more attention to education than has Iowa. The result of this is indicated by the fact that it is lowest in percentage of illiteracy and that although the enrollment in the public schools decreased since 1900, the State losing in population during the two decades from 1900 to 1921, the average daily attendance showed a large increase. Particular attention was given to rural school problems, and in the supervision of these schools great improvement was shown. The General Assembly established the Standard School as a means of taking care of children and teachers in the rural schools, the Evans-Smith Law making an appropriation of \$100,000 annually to help the one-room school. The consolidated school had been in operation in the State for about 15 years but only latterly had rapid development begun in it. From 1918 to 1922 the number of consolidated schools practically doubled. Vocational education was introduced as a part of the educational system, and work started in agriculture, trades and industry, home economics, and teacher training; and in connection with this work civilian rehabilitation was carried on. In 1922 courses in vocational agriculture were given in 43 high schools. A law enacted by the 38th General Assembly requires that the subject of American citizenship shall be taught in all public and private schools in the State. In 1900 there were enrolled in the public schools 566,223, and in 1922, 543,430. However, with 22,793 fewer enrollments than in 1900, the average daily attendance in 1922 was 62,886 greater. The total attendance in all the schools in 1922 was 537,880, of whom 72,681 were enrolled in the high schools. Total receipts for educational purposes in 1921-22 were \$53,280,104. The percentage of illiteracy decreased from 2.2 in 1910 to 1.4 in 1920; among the foreign-born white from 10.3 per cent to 10.2; among the Negro from 15.0 to 11.2.

Finance. See STATE FINANCES.

Political and Other Events. The decade

1914-24 was not lacking in events of political interest in Iowa. As the chief interest in the State is agriculture, which was greatly affected by conditions following the War, the radical wing of the party which demanded legislation for the benefit of the farmers developed great power. It succeeded in electing its candidates for United States Senator and other offices. In 1914 there were elections for members of the House of Representatives, United States senator and governor. Henry Vollmer, a Democrat, was elected to the House, and George W. Clarke, the Republican candidate, was elected governor. Senator Albert B. Cummins was reelected. The Supreme Court in 1914 declared unconstitutional a "blue sky" law, regulating investment companies, passed by the Legislature of 1913. The political campaign in 1916 was particularly bitter, and local interest, to a large extent, superseded interest in the presidential election. W. L. Harding, the Republican candidate for governor, was elected, together with the entire State Republican ticket. For president, the vote was 280,499 for Hughes and 221,669 for President Wilson. In 1918, W. L. Harding was reelected governor. In 1920 elections were held for governor and other State officers and for United States senator. Albert B. Cummins was reelected to the Senate, and N. E. Kendall, Republican, was elected governor. In the presidential voting of this year, W. G. Harding received 634,674 votes and J. M. Cox 227,921. In 1922, William S. Kenyon, United States senator, resigned to become Federal judge, and Charles A. Rawson was appointed by Governor Kendall to succeed him. In the Republican primaries of June 5 of that year, Smith W. Brookhart, the candidate of the radical Republicans, won the nomination for senator against five opponents. In the election he was successful over the Democratic candidate, Clyde L. Herring. Governor Kendall was reelected for a second term. The people at this election voted in favor of the soldiers' bonus. In 1923 a special election was held to fill a vacancy in the House of Representatives. Hiram K. Evans, Republican, was the successful candidate in this election.

Legislation. The most important acts of the Legislature in the decade 1914-24 are noted below. The Legislature of 1915 passed several measures relating to liquor reform and liquor regulation. The so-called "muley liquor law" was repealed. A bill providing for the submission of the question of prohibition to the people was passed, and also a measure providing for the submission of a woman suffrage amendment in 1917. The Legislature also enacted a stringent child labor law and abolished the contract prison labor system. In 1916 the Legislature provided a moratorium for men in the military and naval service and referred to the next session a constitutional amendment providing for woman suffrage. The Federal prohibition amendment was adopted by the Legislature of 1919, on January 15, and on July 2, the legislators ratified the woman suffrage amendment. The Legislature of 1919 passed special provisions permitting women to vote for president; it also passed statutes defining and punishing criminal syndicalism and sabotage. The Legislature of 1921 enacted no measures of special importance. A mandate of the people for a constitutional convention was not carried out. In 1923 the Legislature passed a measure

making a crime of the possession of drugs illegally obtained. It also enacted a law assembling activities relating to crime into a single department and a measure making the sale of narcotics a felony and abolished distinctions in voting between men and women. The law against the sale of cigarettes was modified by permitting the sale of cigarettes to adults in the State.

IOWA, UNIVERSITY OF. A coeducational State institution at Iowa City, Iowa, founded in 1847. The university expanded greatly during the decade 1914-24, with 7250 students enrolled in the year 1923-24, nearly three times the enrollment of 1913-14; a faculty of 500, as compared with 275 in 1914, and library facilities of 322,400 volumes, as compared with 174,000. Many buildings were put up during the period and new activities begun. The dentistry building was erected in 1917; a men's dormitory in 1919; the Children's Hospital, the Psychopathic Hospital, and a nurses' home were completed in 1921; a chemistry building was completed in 1923. In the latter year the restoration of the first statehouse of Iowa, the university's administration building, was nearing completion, and a large recitation hall of Bedford limestone was begun. Additions to the campus in this period increased its area from 50 to nearly 300 acres. By gifts of the General Education Board and the Rockefeller Foundation, matched by equal amounts appropriated by the State Legislature, the sum of \$4,500,000 became available in 1922 for the extension and reconstruction of the plant of the medical school. With these funds, in the succeeding five years, a new medical laboratory was to be constructed, the floor space of the Children's Hospital doubled, new nurses' homes constructed, and a large general hospital built, making a total hospital clinic of 1200 beds. In 1917, the Iowa Child Welfare Research Station was established for the scientific study of normal children, and in 1921 the School of Commerce was reorganized as the College of Commerce. Thomas H. Macbride, Ph.D., LL.D., retired from the presidency in 1916 and was succeeded by Walter Albert Jessup, Ph.D., LL.D.

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS. A coeducational State institution at Ames, Iowa, established in 1858. The total number in attendance, including short-course students, rose from 3458 in 1914 to 7766 in 1923, and the faculty from 217 to 567; the library expanded from 45,000 to 103,639 volumes. The total value of all college property increased from \$3,000,000 to \$6,500,000, and the annual income from \$349,407 to \$3,250,000 (estimated). The following buildings were erected during the period: four women's dormitories, plant propagation building and greenhouse, science building, hospital, armory, animal husbandry laboratory, agricultural engineering building, poultry laboratory, dairy judging pavilion, and sheep, horse, hog, and dairy barns. A library of 250,000 volumes' capacity, a home economics building, and a dormitory for women were under construction in 1924. President, Raymond Allen Pearson.

IRAK, or IRAQ. See MESOPOTAMIA.

IRELAND. An island of the British Isles with an area of 32,586 square miles. The population in 1911 was 4,390,219. No census was taken in 1921. By the Government of Ireland

Act (1920), as amended by the Irish Free State Act (1922), Ireland was divided politically into two parts, Northern Ireland and the Irish Free State. The former remains in the United Kingdom; the latter has constitutional status as a dominion. For discussion of matters pertaining to the population, agriculture, industry, commerce, finance, etc., of Ireland as a whole, see GREAT BRITAIN.

History. On the eve of the War, which was destined to affect the fortunes of Ireland no less decisively than those of Europe, three-quarters of the Irish population were solidly backing Redmond's Nationalist party in its agitation for Home Rule, while the rest, defiantly Unionist, were ready to take up arms against the British government, if need be, rather than permit that government to include Protestant Ulster in an autonomous Ireland. For loyal support of Asquith's Liberal cabinet, the 84 Irish Nationalists in the Commons had been rewarded with the introduction, by the Premier himself, of a Government of Ireland Bill (the famous "Home Rule Bill"), Apr. 11, 1912, which had been passed by the Commons twice, twice rejected by the peers, and passed a third time by the Commons in the spring of 1914. Under the terms of the Parliament Act, this bill could now be promulgated by the Crown as law, notwithstanding the Lords' veto, but the Prime Minister, moved doubtless by either the threats or the entreaties of the Unionists, decided with characteristic indecision to compromise on a "middle course." Accordingly, he introduced an Amending Bill, which would permit the Ulster counties, at their option, to exclude themselves provisionally, for six years, from the proposed Irish government. Feeling ran high, in Parliament and above all in Ireland. The Ulster Protestants had taken a solemn oath or "Covenant" to defend at all costs their cherished position of equal citizenship in the United Kingdom; they had set up a provisional government with the firebrand, Sir Edward Carson, at its head; they had organized an army of 100,000 Ulster Volunteers, for which guns and ammunition were smuggled in from Germany and elsewhere. The Nationalists had countered by drilling a force of National Volunteers, for which they also practiced "gun-running." An attempt of British troops to interfere with the gun-running by the Nationalists at Dublin led on July 26, 1914, to the "Bachelors' Walk Massacre" of Irish civilians by a volley from British soldiers. Ireland, obviously, was on the verge of civil war. Then came the international crisis and the War, early in August.

After the English declaration of war on Germany, the Nationalists vied with Ulster Unionists in protestations of loyalty. But when in September, 1914, Premier Asquith decided to put the Home Rule Bill on the statute books, and simultaneously to pass a Suspending Act to suspend it for 12 months, or until the termination of the war, he at once angered Ulster and weakened Redmond's control over the extremists in his party. The organization, known as Sinn Féin ("we ourselves"), led by Arthur Griffith and originally designed to promote a nationalist cultural risorgimento, but now republican in aim, organized a separate body of "Irish Volunteers," captured the Gaelic League, spread its anti-British propaganda through hamlet and heath, and prepared for the day of independence. Sinn Féin, however, was still

but an active minority when in April, 1916, the Easter Rebellion occurred in Dublin. Members of Irish Volunteers and the "Citizen Army" seized the Post Office, the Four-Courts, and other buildings in the heart of the city, and proclaimed Ireland a republic. British machine guns and field artillery soon compelled the republicans to surrender. Swift and heavy was England's vengeance. Some 3400 men and 79 women were arrested as suspects; Padraic Pearse, Thomas Macdonagh, and 13 others were condemned by court-martial and summarily executed; and about 100 were sentenced to imprisonment, while over 1800 were "interned." Sir Roger Casement, who was landed on the Irish coast from a German submarine on the eve of the rising, was tried for high treason and hanged on August 3. The executions, far from settling the matter, aroused such a storm of indignation on both sides of the Irish Sea that Premier Asquith promised to investigate conditions in Ireland personally. A few days' visit convinced him that the government there had completely broken down, and he accordingly delegated Lloyd George to arrange for the immediate application of the Home Rule Act of 1914. But the negotiations begun by Lloyd George met shipwreck when it became known that the government had promised Sir Edward Carson the definite exclusion of the six Ulster counties from the act.

When Lloyd George became Premier of Great Britain in December, 1916, he announced that he could not force home rule on any part of Ireland to which it was repugnant, but in May, 1917, he offered either to grant immediate home rule excluding five Ulster counties for five years or to summon an Irish Convention to propose a solution. As the former alternative was unpopular, he proceeded with the second, although Sinn Féin repudiated it in advance. The Convention was composed partly of elected delegates and partly of Catholic and Protestant clergy, merchants, labor leaders, representatives of Irish parties, and two Irish peers, nominated by the British government; it was to be an inclusive rather than a democratic body. During its protracted deliberations, from July 25, 1917, to April 5, 1918, the economic reasons for Ulster's intransigence figured even more prominently than religious or political factors; and the final report, recommending a united parliament for Ireland, without control of excise and customs taxes, was passed only by 44 to 29 votes, with Ulster and several Nationalists in the opposition. This report was of course disregarded. For its part, the British government in April, 1918, extended the conscription law to Ireland, heedless of warnings. Thereupon the Nationalists, led by John Dillon, successor of John Redmond, who died in March, walked out of the Westminster Parliament and joined Sinn Féin in a protest against the draft. Sinn Féin, by this time, had become a puissant organization; at its convention in October, 1917, representing 12,000 Sinn Féin clubs with 250,000 members, it had voted a republican constitution for Ireland and elected as president Eamonn De Valera, the only surviving leader of the Easter rebellion. De Valera was imprisoned in May, 1918, escaped in February, 1919, and spent the years 1919-21 in America, where he won sympathy and raised funds for the "Irish Republic." In the general election of December, 1918, Sinn Féin won 73 out of the 105

seats in the British House of Commons, while the almost defunct Nationalist party retained only 6, and Unionists filled 26. Considering this victory as a plebiscite for Irish independence, the Sinn Féin M. P.'s, instead of proceeding to Westminster, met at Dublin as the "Dail Eireann" (Irish Assembly), adopted a formal Declaration of Independence in January, 1919, and nominated delegates to the Paris Peace Conference. The refusal of the Peace Conference to recognize these delegates, and Wilson's unwillingness to demand their admission, turned Irish and Irish-American sentiment against Wilson, the Peace, and the League, and led disappointed Sinn Féiners in Ireland to resort to violence as their one remaining weapon. With increasing frequency, attacks were made on the Royal Irish Constabulary, the British troops, and British officials, while British troops began wrecking shops and burning villages by way of "reprisal."

Under such disquieting circumstances, Premier Lloyd George persuaded his Parliament to enact, in December, 1920, a new Home Rule Bill, creating separate parliaments and ministries for the six Ulster counties of Northern Ireland and the remainder, inaccurately styled Southern Ireland, with a joint Council of Ireland to harmonize the two. Neither parliament was to have power to control customs and excise duties, army and navy, treaties, titles, external trade, cables, coinage, trademarks, or religion. Ulster accepted the law forthwith, elected its parliament in May, 1921, organized its cabinet under Sir James Craig, and was congratulated by King George in person. Southern Ireland likewise held elections in May, but the Sinn Féiners elected by all constituencies except Dublin University were pledged not to accept mere home rule. Encouraged, Sinn Féin intensified the irregular warfare it had been waging against the British and especially against the "black-and-tans," ex-service men enrolled as auxiliary police and clad in khaki with black hats and black arm-bands. The shooting of British soldiers and constables and seizures of arms by Sinn Féin troops increased, and the burning and pillaging of Irish towns and villages by the British grew more frequent. Sinn Féin courts and police were organized, and "Castle" government, the British government, ceased to have any real functions of administration.

At length Premier Lloyd George in desperation invited the Sinn Féiners, hitherto regarded as "rebels," to negotiate with him. Through the mediation of General Smuts, a "truce" was signed, July 10, 1921. England's offer of "Dominion status," at first rejected by De Valera and the Dail Eireann, was ultimately accepted in principle as the basis for a tripartite conference of Sinn Féin, Ulster, and British delegates, October to December, and incorporated in a definite treaty dated Dec. 6, 1921. Article 1 conferred on the Irish Free State the same constitutional status as that of Canada and other dominions. Ireland was to have its own parliament and an executive responsible to it (Article 1), its own army (Article 8), and, in short, the almost complete independence of a dominion (see BRITISH EMPIRE), but with a strict proviso against religious discrimination (Article 16) and transitional fiscal and naval restrictions (Article 5-6 and 10). Ulster was permitted either to accept inclusion in the Free

State, with local autonomy, or to continue as a part of Great Britain with the Northern Ireland Parliament retaining the rights granted by the Home Rule Act of 1920. Naturally Ulster chose the second alternative, and the government of Northern Ireland remained precisely as established in 1921. The provisions of the 1920 Act regarding a joint Council for Ireland also remained in force, as a result of Ulster's choice (Article 12).

This treaty, liberal as it was, compared with earlier British offers, failed to placate President De Valera and other Sinn Féin irreconcilables, who still cherished the ideal of a united independent republic, and bitterly assailed Article 4 of the treaty, requiring members of the Free State Parliament to swear allegiance to King George. On the other hand, Arthur Griffith, Michael Collins, and other Sinn Féin leaders who had signed the treaty believed it to be as much as could practically be obtained, and persuaded the Dail Eireann to accept it by 64 to 57 votes. De Valera indignantly resigned from the presidency, to which Griffith naturally fell heir, in January, 1922, and the southern Irish parliament formally ratified the treaty. As Great Britain had also ratified, the Free State came into being on January 16; its provisional government, with Michael Collins as premier, took over Dublin Castle from the British administration and joyfully watched 60,000 British soldiers depart from Ireland. Soon, however, De Valera's uncompromising republican adherents took up arms against the Provisional government, and Ireland was once more in the throes of guerilla warfare. The death of President Griffith on August 12 and the killing of Premier Collins on August 22 by republicans might well have discouraged the Free State forces, but the latter event seemed to have the contrary effect of arousing indignation against the republicans. William T. Cosgrave succeeded Collins as head of the government. Meanwhile, a provisional parliament favorable to the treaty had been elected in June, and in the autumn this body adopted a constitution on October 11, making Gaelic the official language of the Free State, guaranteeing personal and religious liberty, and creating a bicameral Free State parliament (Oireachtas) with an Executive Council or cabinet of ministers responsible to the lower house. The House of Representatives (Dail Eireann) of 153 members was to be elected, for four years, unless dissolved, by universal suffrage of men and women over 21, with proportional representation. The Senate (Seanad Eireann) of 60 members was to be chosen, one-fourth every three years, by a vote of citizens aged 30 and over, with proportional representation, from a list of prominent citizens nominated by the Irish Parliament. The constitution was confirmed by the British Parliament early in December, 1922, and the new government was at once established; the provisional parliament now became the first House of Representatives, and the first Senate was chosen, half by the House and half by the president of the Executive Council. Cosgrave became president of the Executive Council, and Timothy Healy was appointed by the Crown as Governor-general, an almost purely honorary post.

The republicans, meanwhile, had proclaimed a rival government, and though obviously in a minority, refused to abandon their irregular

warfare against the Free State until thousands had been killed or wounded, 15,000 republicans imprisoned, and scores executed in reprisal for republican deeds of violence. In April, 1923, De Valera ordered a truce, in view of approaching elections; he was, however, arrested on August 14, to be, however, released in the July following. Though large numbers of republicans were released in course of time, several thousand were held in jail regardless of hunger strikes. By 1924 the country was fairly well pacified, and the Free State government was functioning in an orderly fashion. Elections for the House held on Aug. 27, 1923, had given the Cosgrave government 63 seats; Republicans, 44; Labor, 15; Farmers, 15; Independents, 16. As the 44 republicans absented themselves when the new Parliament met in September the government had a working majority and addressed itself earnestly to the difficult tasks of extending peasant proprietorship and balancing an unbalanced budget. With the Northern government, the Free State made a futile effort in February, 1924, to agree on the disputed Ulster boundary. On Sept. 10, 1923, the Irish Free State was admitted to the League of Nations, and the once despised Gaelic tongue was heard as a national language in the assembly of nations at Geneva.

IRELAND, JOHN (1879-). An English composer, born at Inglewood, Bowdon, Cheshire. He was a pupil in composition of Stanford at the Royal College of Music. From 1901 to 1909 he wrote several choral works with orchestra, orchestral works in the larger forms, and much chamber music, all of which he later discarded. His principal works, published after 1909, include a prelude for orchestra, *The Forgotten Rite*, two piano trios, two violin-sonatas, pieces for piano, and songs.

IRELAND, NORTHERN. The official name of that part of Ireland remaining in the United Kingdom of Great Britain and Ireland. It is made up of the following counties and county boroughs: Antrim, Armagh, Belfast (County borough), Down, Fermanagh, Londonderry, Londonderry (County borough), Tyrone. Its area is 3,351,970 square miles; its population in 1911, 1,250,531; on June 30, 1922 (estimated), 1,284,000. See GREAT BRITAIN; IRELAND.

IRISH FREE STATE. A dominion of the British Empire, with an area of 17,019,155 square miles and a population, in 1911, of 3,139,688. The estimated population of the Irish Free State on June 30, 1923, was 3,165,000. See GREAT BRITAIN; IRELAND.

IRON AND STEEL. During the decade of 1914-24, the iron and steel industry of the world furnished a notable illustration of the intimate relation of the development of natural resources and modern industrial activity to the maintenance of conditions of civilization even under the extensive dislocations effected by the War and the inevitable readjustment following it. Of course it was obvious that iron and steel manufactures were essential to twentieth century civilization and that they ranked high in commerce, but if any further proof was needed it was found in the demands made on these industries in the great struggle. The warring powers were compelled to mobilize their iron and steel industries and operate them on a war basis, and the possession of raw materials for these industries was naturally an important military asset. Accordingly, when the

Central Powers were defeated and Germany was deprived of a large portion of her mineral lands, it was indeed a serious blow, and the return to France of Alsace-Lorraine carried with it mines whose acquisition in part compensated for the ruthless destruction of mines and steel plants by the Germans during their invasion.

During the War, in all of the combatant nations the production of munitions and ship-building materials was pushed to the uttermost, and there was considerable coöperation on the part of the Allies. After the Armistice, France secured the return of the valuable iron basin in Lorraine, and with it a certain amount of manufacturing facilities became available immediately. In the Briey region, while the Germans had ruined the open hearth furnaces, they had left the blast furnaces intact, so that having acquired the ore deposits in the Longwy-Briey-Nancy fields of Alsace-Lorraine, France was put in a position to double her production of iron ore, and Germany suffered correspondingly. It was stated that before the War, Germany, exclusive of Luxemburg, had derived 74 per cent of her iron ore from the annexed portion of Lorraine, or upward of 21,000,000 tons annually. As this ore had an iron content of about 33 per cent, there was roughly an annual loss of 7,000,000 tons of pig iron and a reduction of Germany's annual steel output of from 6,000,000 to 7,000,000 tons. The result of these changed conditions was appreciated immediately in Germany, for with the scarcity of coal and iron ore inevitable to the readjustment there was a heavy demand for iron and steel products of which importations from Sweden, on a reduced scale, and a smaller amount received from France, were unable to take care.

The industry in Germany was in some ways on a more promising basis than in Belgium and France, where there had been systematic and complete destruction by the Germans at many manufacturing centres. Accordingly, in 1919, both Belgium and France were endeavoring to readjust themselves to the new conditions and to put their plants in order by repairs or rebuilding, with new equipment to take care of the business destined to come their way. In Great Britain, on the other hand, during 1919 there was a considerable demand for iron and steel products in excess of the supply, and high prices and large profits prevailed, though there was a marked decline in the exports of pig iron as well as of iron and steel. The supply was inadequate for the demands on account of lack of coal, ore, and cars and because of a shortened working day, together with the railway strike, all of which served to cut down the output, although the productive capacity certainly existed. The state subsidy on pig iron and government control of prices which had been imposed during the War was terminated on Apr. 30, 1919. There developed during this and the succeeding year a boom in the British iron and steel industry which reached a high-water mark in the early autumn of 1921 and recalled a similar condition following the War of 1870, after which there was a recession of prices. In 1920 the Belgian steel industry was being put in fairly efficient condition. The same was true in even greater measure for France, while in Germany there was marked activity for the iron and steel plants, most of which considered the year one of prosperity, notwithstanding

many adverse conditions. At this time were organized several big trusts by which it was hoped to establish economies of operation to compensate for the loss of the large efficient plants in Lorraine and Luxemburg, along with the ore fields. Germany was compelled to import ore and was active with export business. New steel works were under construction, and efforts were made at various metallurgical developments which in part came in connection with the War. The German export business continued into 1921, and the profits of the industry increased rather than diminished, though the finances of the country and the political situation did not make for the maximum of effort.

In Great Britain during 1921 an acute depression prevailed which was compared to that of 1879, said to be the most disastrous period that British iron and steel interests had ever faced. Prices collapsed, and foreign customers were unable to take their normal proportion of British exports, while both foreign and home markets were being invaded by France, Belgium, and Germany. Exports sold more cheaply than British manufacturers could turn out the product. By 1922, however, there was a general improvement in conditions, and while the pig iron production of the world was only about 67.7 per cent of what it was in 1913, yet the steel production was very close to that of the earlier year, and the five great producing nations of the world were increasing their exports, although those of the United States were less than in 1912 and 1913. The production capacity of Germany had been reduced approximately 40 per cent by the War, and in 1922 it had fallen to about 75 per cent. In France, on the other hand, there was in 1922 a greater output of pig iron than in any year since the War; it amounted to an estimated total of 4,878,000 gross tons, as compared with 4,620,000 in 1913; but even at this time a number of the French steel mills had not been entirely restored. Belgium, as will appear from the accompanying table, was increasing its production as well as its exports, and its iron and steel industries were becoming well organized; in the following year it was able to export more steel than any other nation except Great Britain, while its increase of production of both pig iron and steel was remarkable. In 1923 Belgium was using coal and coke imported from Great Britain in place of coal and coke from the Ruhr, and Great Britain also supplied large quantities of iron ore and pig iron which were handled in Belgian plants.

The end of the year 1922 marked a turning point in the German iron and steel trade, for

with the occupation of the Ruhr by the French on Jan. 11, 1923, the industry in that region practically ceased, and financial and economic conditions were such as to prevent either domestic or export business on any considerable scale. Previously there had been considerable promise for German iron and steel, but in 1923 political and industrial conditions were such that only a limited output could be made. In France the total production of iron and steel in 1922 and 1923 exceeded the pre-war output, but it must be recalled that the Peace Treaty gave France important German steel producing districts. France was able to have an increased coke supply, both from the North and from abroad, as well as from the Ruhr, and in 1923 there was little unemployment and but few strikes. The French occupation of the Ruhr was an advantage to the British iron and steel industry as it cut down to a large degree the German output, and handicapped, at least in the early part of the year, the production of both France and Belgium. The iron and steel industry of Great Britain was able to show a considerable improvement in 1923 (see accompanying table).

BRITISH IRON AND STEEL OUTPUT AND EXPORTS DURING PEACE YEARS (In Gross Tons)

	Pig Iron	Steel	Exports
1912	8,748,000	6,792,000	4,807,200
1913	10,260,000	7,688,000	4,969,200
1919	7,404,000	7,896,000	2,223,200
1920	8,034,000	9,067,200	3,250,800
1921	2,611,200	3,625,200	1,706,400
1922	4,899,600	5,880,600	3,400,800
1923	*7,408,000	*8,585,000	*4,407,400

* December estimated.

United States Iron and Steel Industry. In the United States the iron and steel industry so improved its organization in the decade 1913-23 that it was able not only to meet the demands of the War but also to adjust itself to the conditions incident to deflation and the increased calls on it by various industries. This industry involved ore mining, the production of pig iron and steel ingots, the finishing of the crude metal into various products and

UNITED STATES PRODUCTION OF PIG IRON AND STEEL 1916-23

	Pig iron Gross tons	Steel ingots and castings Gross tons
1916	39,432,797	42,773,680
1917	38,621,216	45,060,607
1918	39,054,641	44,462,132
1919	31,015,364	34,671,232
1920	36,925,987	42,132,934
1921	16,688,126	19,783,797
1922	27,219,904	35,602,926
1923	40,019,129	44,943,696

UNITED STATES PRODUCTION OF STEEL INGOTS AND CASTINGS

(BY PROCESSES)

Years	Basic	Open-hearth Acid	Total	Bessemer	Crucible	Electric	Miscellaneous	Total Gross Tons
1914	16,271,129	903,555	17,174,684	6,220,846	89,869	24,009	3,622	23,513,030
1915	22,308,725	1,370,377	23,679,102	8,287,213	113,782	69,412	1,527	32,151,036
1916	29,616,658	1,798,769	31,415,427	11,059,039	129,692	168,918	604	42,773,680
1917	32,087,507	2,061,286	34,148,893	10,479,960	126,716	304,543	495	45,060,607
1918	32,476,571	1,982,820	34,459,391	9,376,236	115,112	511,364	329	44,462,132
1919	25,719,312	1,229,382	26,948,694	7,271,562	63,572	384,452	2,952	34,671,232
1920	31,375,723	1,296,172	32,671,895	8,883,087	72,265	502,152	3,535	42,132,934
1921	15,082,564	507,238	15,589,802	4,015,938	7,613	169,499	945	19,783,797
1922	28,887,171	921,812	29,808,983	5,919,298	28,606	346,039	....	35,602,926
1923	34,665,021	1,234,636	35,899,657	8,484,088	44,079	515,872	....	44,943,696

UNITED STATES PRODUCTION OF STEEL INGOTS

Years	Basic	Open-hearth Acid	Total	Bessemer	Crucible	Electric	Miscella- neous	Total Gross tons
1914	15,936,985	633,382	16,570,367	6,154,964	78,683	15,458	312	22,819,784
1915	21,975,622	968,148	22,943,770	8,194,737	99,026	46,348	331	31,284,212
1916	29,011,146	1,227,832	30,238,978	10,916,248	120,341	126,048	302	41,401,917
1917	31,528,939	1,406,798	32,935,737	10,320,688	122,882	239,632	261	43,619,200
1918	31,970,691	1,347,870	33,318,561	9,215,392	113,782	403,068	219	43,051,022
1919	25,405,347	780,827	26,186,174	7,172,743	62,563	272,942	373	33,694,795
1920	30,926,393	759,102	31,685,495	8,778,107	70,536	346,956	298	40,881,392
1921	14,864,607	290,750	15,155,357	3,977,129	6,877	84,404	317	19,224,084
1922	27,961,190	517,045	28,478,235	5,871,565	27,561	191,057	....	34,568,418
1923	34,098,711	653,387	34,747,048	8,416,576	42,127	279,914	....	43,485,665

UNITED STATES PRODUCTION OF STEEL CASTINGS

Years	Basic	Open-hearth Acid	Total	Bessemer	Crucible	Electric	Miscella- neous	Total Gross tons
1914	334,144	270,173	604,317	65,882	11,186	8,551	3,310	693,246
1915	333,103	402,229	735,332	92,476	14,756	23,064	1,196	866,824
1916	605,512	570,937	1,176,449	142,791	9,351	42,870	302	1,371,763
1917	558,568	654,588	1,213,156	159,272	3,834	64,911	234	1,441,407
1918	505,880	634,950	1,140,830	160,844	1,330	108,296	110	1,411,410
1919	313,965	448,555	762,520	98,819	1,009	111,510	2,579	976,437
1920	449,330	537,070	986,400	104,980	1,729	155,196	3,237	1,251,542
1921	217,957	216,488	434,445	38,809	736	85,095	628	559,713
1922	425,981	404,767	830,748	47,733	1,045	154,982	....	1,034,508
1923	571,310	581,299	1,152,609	67,512	1,952	235,958	....	1,458,031

PRODUCTION OF ALLOY-STEEL INGOTS AND CASTINGS

Years	Ingots	Castings	Total
1914	577,107	69,846	646,953
1915	923,251	97,896	1,021,147
1916	1,306,157	56,458	1,362,615
1917	1,576,806	67,529	1,644,335
1918	1,721,367	66,485	1,787,852
1919	1,435,816	45,372	1,481,188
1920	1,591,939	69,353	1,660,298
1921	769,293	40,255	809,548
1922	1,614,392	59,104	1,673,496
1923	2,014,269	92,220	2,106,489

PRODUCTION OF ALLOY-STEEL INGOTS AND CASTINGS BY PROCESSES, GROSS TONS, 1923

	Ingots	Castings	Total
Open-hearth steel—basic	1,612,312	3,786	1,616,098
Open-hearth steel—acid	109,676	38,656	148,332
Bessemer steel	109,851	20,621	130,472
Crucible steel	16,508	103	16,611
Electric steel	165,922	29,054	194,976
Total, gross tons	2,014,269	92,220	2,106,489

In 1923 there were 147 works in 24 States and the District of Columbia which made alloy-steel ingots or castings.

their transportation and marketing; all of these operations were in some instances carried on by a single corporation. In the ordinary and commercial census classifications, the iron and steel industry embraces three primary classes of manufactured products: unfinished iron and steel, i.e. pig iron and steel ingots and castings; semi-finished iron and steel, i.e. billets, blooms, slabs, sheet, bars, tin, brass, and skelp; and finished iron and steel, i.e. bars, plates, sheets, tin plate, structural shapes, fabricated and unfabricated, rails and rail connections and accessories, cast iron pipe, welded and drawn pipe and tubing, iron and iron products, including nails and forgings, and castings. These products, when fabricated, are considered as machinery, construction material, farm implements, etc.

The period 1914-24 opened with a depression in the American iron and steel industry which was quite marked in 1914, but with the outbreak of the War came improvement, and in 1915 domestic business increased, and foreign markets required supplies which Europe was

naturally unable to provide. Accordingly, production was on an extensive scale until 1917, when the United States entered the War, and it was realized that every effort must be made to provide munitions and ships essential to the American military and naval forces and necessary aid to the Allies. By 1918 American iron and steel products were mobilized for maximum production and cooperated with the government in the manufacture of munitions. In fact, the available capacity had been increased nearly 40 per cent, and at the same time the business had been conducted on a basis of fixed prices determined by official action. All of these sufficed admirably for the time of the War, but after the Armistice the steel producers realized that with their increased facilities a reduced volume of business was bound to come, so that the inevitable readjustments were involving many serious difficulties.

An attempt was made to have prices fixed on an equitable basis, though somewhat reduced from the War rates, and such prices held during 1919, although many independent manufacturers availed themselves of the great demand for iron and steel products and secured amounts considerably in excess. In 1919 also the United States steel industry faced a strike which began in September, 1922, involving 268,710 employees scattered throughout the United States, principally in the plants of the United States Steel Corporation. In this struggle were involved the questions of collective bargaining, wages, hours, conditions of labor, and sundry principles advanced by organized labor. Some damage was done and rioting took place throughout Pennsylvania before the strike gradually subsided, but at the end of the year, although it was not actually ended, the mills were in operation and the trouble overcome for the most part. In 1923 the annual pig iron capacity of the United States was more than 52,000,000 tons, and the various furnaces produced steel ingots and castings to 58,500,000 tons. The manufacture of pig iron in 1922 involved the consumption of about 54,000,000 tons of ore, 32,000,000 tons of coal and coke, 24,000,000 bushels of charcoal, and 13,500,000 tons of lime-

TOTAL UNITED STATES PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL
1914-23

Years	Iron and steel rails	Plates and sheets	Nail plate	Wire rods	Structural shapes	All other finished rolled	Total, Gross tons
1914	1,945,095	4,719,246	38,573	2,431,714	2,031,124	7,204,444	18,370,196
1915	2,204,203	6,077,694	31,929	3,095,907	2,437,003	10,546,188	24,392,924
1916	2,854,518	7,453,980	30,088	3,518,746	3,029,964	15,493,093	32,380,389
1917	2,944,161	8,267,616	22,864	3,187,138	3,110,000	15,585,921	33,067,700
1918	2,540,892	8,799,135	18,310	2,562,390	2,849,969	14,385,058	31,155,754
1919	2,203,843	7,372,814	12,832	2,538,476	2,614,036	10,359,543	25,101,544
1920	2,604,116	9,337,680	20,577	3,136,907	3,306,748	13,941,835	32,347,863
1921	2,178,818	4,260,574	14,573	1,564,330	1,272,624	5,483,087	14,774,006
1922	2,171,776	7,968,397	21,969	2,654,741	2,718,768	10,916,353	26,452,004
1923	2,904,516	9,497,717	22,833	3,075,892	3,405,197	14,370,921	33,277,076

UNITED STATES PRODUCTION OF FINISHED ROLLED IRON AND STEEL BY LEADING PRODUCTS, GROSS TONS, 1923

Products	Iron	Steel	Total
Rails		2,904,516	2,904,516
Plates and sheets	6,017	9,491,700	9,497,717
Nail and spike plate	103	22,730	22,833
Wire rods	780	3,075,112	3,075,892
Structural shapes	1,448	3,403,749	3,405,197
Merchant bars	404,730	5,148,066	5,552,796
Bars of reinforced concrete work	368	680,499	680,867
Skelp, flue, and pipe iron or steel	216,846	3,517,490	3,734,336
Hoops		220,835	220,835
Bands and cotton-ties	2,813	345,667	348,480
Long angle splice bars, tie-plate bars, etc.	40,495	709,329	749,824
Rolled sheet piling, not including fabricated		86,716	86,716
Railroad ties		20,167	20,167
Rolled forging blooms, forging billets, etc.	3,181	445,689	448,870
Blooms, billets, sheet bars, etc., for export		781	781
All other finished hot-rolled products, including hot-rolled strips and flats for cold rolling	278,816	2,298,433	2,577,249
Total, Gross tons	955,597	32,321,479	33,277,076

stone, so that the production and transportation of these items is very important and must grow in a normal and efficient way, free from such disturbances as strikes and railway restrictions, in order for the industry to function properly.

ESTIMATED CONSUMPTION OF STEEL BY INDUSTRIES IN THE UNITED STATES, 1923

[Estimates by Iron Age, New York]		
	Per cent of total	Tons
Automobile industry including trucks, tractors, etc.	11	3,470,000
Railroads including cars and locomotives	27	8,590,000
Agriculture	4	1,200,000
Buildings (including bridges and other construction not R. R.)	15 1/2	4,865,000
Shipbuilding	1	310,000
Containers (principally food)	3 1/2	1,100,000
Machinery (electrical, textile, machine tools, etc.)	9	940,000
Oil, gas, water and mining	10 1/2	3,330,000
Exports	6	1,945,000
Miscellaneous	18 1/2	5,830,000
Total		31,580,000

Iron Ore Produced in 1923. In 1923 the iron ore mined in the United States, exclusive of ore containing more than 5.5 per cent of manganese, was estimated by the United States Geological Survey at 70,018,000 gross tons, an increase of 49 per cent as compared with that mined in 1922. The ore shipped from the mines in 1923 was estimated at 70,433,000 gross tons, valued at \$244,749,000, an increase of 39 per cent in quantity and 55 per cent in value as compared with the figures for 1922. The average value of the ore per gross ton at the mines in 1923 was estimated at \$3.47; in 1922 it was \$3.12. The production for 1923 appears to be the third highest in the history of iron mining; it was exceeded only by 75,288,851 tons in 1917 and 75,167,672 tons in 1916. The accom-

panying-table shows the estimated quantity and value of the iron ore mined and shipped in the United States by the principal producing States in 1923.

ESTIMATES OF IRON ORE MINED AND SHIPPED IN THE UNITED STATES IN 1923

District	Ore shipped Gross tons	Value
LAKE SUPERIOR		
Michigan	14,219,000	\$55,128,000
Minnesota	44,611,000	161,995,000
Wisconsin	1,179,000	3,587,000
	60,009,000	\$220,710,000
SOUTHEASTERN STATES		
Alabama	6,968,000	\$14,451,000
Georgia	133,000	310,000
Missouri	60,000	292,000
North Carolina	60,000	152,000
Tennessee	293,000	879,000
Virginia	202,000	694,000
	7,716,000	\$16,778,000
NORTHEASTERN STATES		
Massachusetts		
New Jersey	350,000	\$1,435,000
New York	708,000	3,131,000
Pennsylvania	971,000	1,159,000
	2,029,000	\$5,725,000
WESTERN STATES	679,000	1,536,000
Grand total	70,433,000	\$244,749,000

About 85 per cent of the iron ore shipped in 1923 came from the Lake Superior district, in which 59,976,000 gross tons were mined and 60,009,000 tons shipped. The ore shipped in 1923 was valued at \$220,710,000. These totals include the ore from the Mayville and Baraboo mines in Wisconsin and ore shipped by rail as well as by water from all mines, but exclude manganiferous ores containing more than 5.5 per cent manganese. The ore is chiefly hema-

tite. The average value of the ore at the mines in the Lake Superior district in 1923 per gross ton was \$3.68; in 1922, \$3.33. The mines in Minnesota furnished 74 per cent of the total iron ore shipped from the Lake Superior district in 1923 and 63 per cent of the total of the United States. The mines in Michigan fur-

are then rehandled by the rolling mills, forges and presses by which various products, such as rails, sheets, pipe, etc., are derived. In fact the extent and variety of the iron and steel industry, as listed above, is reported in the Census of Manufactures for 1921 in the accompanying table.

IRON AND STEEL INDUSTRY, 1921 *

Classes	Estab- lish- ments	Wage earners	Cost of material	Value added by manu- facture	Value of products
Iron and steel blast furnaces	134	18,698	\$361,049,521	\$58,721,723	\$419,771,244
Steel works and rolling mills, including tin plate	498	235,967	1,010,290,351	477,787,027	1,488,077,378
Cast-iron pipe	70	12,496	23,897,020	20,424,528	44,321,548
Steam fittings and steam and hot-water heating apparatus	274	30,808	50,212,922	77,153,965	127,366,887
Wrought pipe	57	8,728	37,093,041	19,569,237	56,662,278
Wire and wirework (not included in wire depart- ments of rolling mills)	474	26,317	99,744,248	66,585,873	166,330,121
Forgings, including springs and horseshoes	378	22,305	61,298,673	55,534,638	116,833,311
Nails and spikes, wire, cut and wrought	56	2,412	5,670,025	5,306,282	10,976,307
Tanks, barrels, doors, and shutters	76	3,795	13,556,018	13,435,693	26,991,711
Structural ironwork	1,021	32,897	151,011,215	99,074,231	250,085,446
Bolts, nuts, screws, washers, and rivets	293	18,801	28,586,981	32,970,204	61,557,185
Total	3,331	413,224	1,842,410,015	926,563,401	2,768,973,416

* Includes only those industries listed in the three primary classes of manufactured products mentioned above.

nished 24 per cent of the Lake shipments and 20 per cent of the grand total. The southeastern States, which constitute the second largest iron ore producing area, including the Birmingham and Chattanooga districts, mined 7,533,000 gross tons in 1923. The shipments of ore from these States to blast furnaces in 1923 amounted to 7,716,000 gross tons, valued at \$16,778,000. The ore consists mainly of hematite, with brown ore and magnetite next in order. The average value of the ore produced in these States in 1923 per gross ton was \$2.17; in 1922, \$1.74. The northeastern States, which include the Adirondack district, New York, and the Cornwall district of Pennsylvania, in 1923 mined 1,823,000 gross tons of iron ore and shipped 2,029,000 gross tons. The average value of the ore in these States in 1923 per gross ton was \$2.82; in 1922, \$2.33. Most of this ore is magnetite. The western States which ordinarily produced iron ore, named in the order of their importance, are Wyoming, New Mexico, Utah, Montana, California, and Colorado; occasionally Idaho and Nevada contribute small quantities. The ore from Wyoming, New Mexico, and Colorado is used for the manufacture of iron at Pueblo, Colo., but much of the remainder of the output is used as a flux in smelting copper and the precious metals. It is estimated that the western States mined 677,000 gross tons of iron ore and shipped 679,000 gross tons, valued at \$1,536,000, in 1923. The ore comprises hematite, magnetite, and brown ore.

As is generally known, the ore after being mined is transported to blast furnaces where it is made into pig iron. The 1923 production of pig iron, excluding charcoal iron and including blast-furnace ferro-alloys, according to the *Iron Trade Review*, was 40,019,129 gross tons. This was the largest annual output yet made, exceeding the high record of 1916 by 1,000,000 tons. A part of the pig iron is utilized in the production of rolled and wrought iron products, and for the manufacture of castings in iron foundries. The greater part, however, is utilized in the making of steel by the open hearth Bessemer electric and crucible processes which produce ingots, blooms, billets, bars and slabs which

Naturally these industries do not embrace all of the various shipments of the industry of iron and steel and their products. Those in the table are estimated as one-fifth of the total number of shipments. The aggregate employed a daily average of 1,030,248 persons, and the value of their product was \$5,592,204,380. In the United States the greatest amount of business was handled by the United States Steel Corporation, but during the decade under consideration other consolidations were formed in the interest of greater efficiency and economy, and still further consolidations would doubtless have been effected except for the opposition of the Attorney General and the Federal Trade Commission. Nevertheless the Bethlehem Steel Corporation acquired in May, 1922, the Lackawanna Steel Company; in November the Midvale Steel and Ordnance Company was also purchased, with the result that the enlarged Bethlehem Company was given an annual capacity of 7,500,000 tons of steel ingots. Another important consolidation was that of the Youngstown Sheet and Tube Company with the Brier Hill Steel Company, a combination which later absorbed the Steel and Tube Company of America.

United States Imports and Exports. The imports of iron ore for 1923 amounted to 2,768,430 gross tons, valued at \$11,308,503, or \$4.08 a ton. The imports for the year 1922 were 1,135,156 gross tons, valued at \$4,916,294, or \$4.33 a ton. The exports of iron ore for 1923 amounted to 1,116,932 gross tons, valued at \$5,305,365, or \$4.75 a ton, as compared with exports for the year 1922 of 602,194 gross tons, valued at \$2,770,878, or \$4.60 a ton. The foreign trade of the United States is often quite uneven, as American manufacturers of iron and steel seek to satisfy domestic demands, and when there are large calls for iron and steel at home, the export trade suffers. The accompanying table indicates the exports of iron and steel for significant years during the period under review. Likewise, the major iron and steel imports are also indicated in a table, though this business naturally depends on special conditions, as may be seen by the difference of imports in the years 1921 and 1922.

UNITED STATES EXPORTS OF IRON AND STEEL
Articles

	1913	1921	1922 *
	Tons	Tons	Tons
Pig iron and ferro-alloys	287,022	28,307	33,021
Steel ingots, blooms, billets, etc.	230,728	10,171	107,240
Iron and steel bars and rods, other than wire.	254,050	200,802	185,283
Wire rods	74,823	18,953	40,424
Scrap	102,201	37,592	63,770
Bolts, nuts, rivets, and washers, except track	21,633	24,231	18,096
Hoops, bands, and strip steel	18,312	20,274	34,511
Horseshoes	1,158	615	987
Wire nails	54,526	28,109	55,020
Nails, other than wire, including tacks	9,015	5,785	8,406
Pipes and fittings	282,230	393,800	206,542
Rails	452,545	321,822	279,865
Galvanized sheets	114,650	56,085	109,318
Plates and sheets	428,259	541,713	327,604
Structural iron and steel	366,654	306,532	184,515
Tin plate, terneplate, etc.	73,376	107,715	76,608
Barbed wire	87,528	29,976	70,800
Other wire	137,795	69,336	112,551
Total	2,996,505	2,201,878	1,914,561

* Figures for 1913 are for the fiscal year; for 1921 and 1922, calendar years. For 1922 such articles as wire rope, woven-wire fencing, wire cloth and screenings and other wire manufactures, castings, forgings, machine screws, car wheels and axles, and track accessories have been omitted to afford a better comparison with 1913 and 1921, when these items were not included in the above classifications. Sheet bars and skelp are included under "Iron and steel bars and rods other than wire" for 1913 and 1921, and under "Steel ingots, blooms, billets, etc." for 1922.

UNITED STATES IMPORTS OF IRON AND STEEL
Articles

	1913 *	1921	1922
Pig iron and ferro-alloys	155,169	44,842	455,456
Scrap	41,163	41,469	142,969
Steel ingots, blooms, billets, bars, etc.	20,869	10,024	27,720
Structural shapes	8,005	777	7,823
Bar iron	30,168	1,913	8,091
Rails	5,024	22,048	26,629
Tin plate, terneplate, etc.	12,654	455	2,682
Wire rods	17,143	916	1,726
Sheets and plates	3,724	1,976	1,947
Total	293,919	124,420	675,043

* Figures for 1913 are for the fiscal year; for 1921 and 1922, calendar years. From the 1922 statistics such commodities as wire rope, castings and forgings, strip steel, tubular products, nails, screws, bolts, nuts, etc., have been omitted in order to make the basis of comparison with the earlier years as uniform as possible.

Electric Steel. The American electric steel industry from 1913 to 1923 increased more than twenty-fivefold. In 1913 electric steel castings constituted less than 1 per cent of the total output. In 1923, 235,958 gross tons of steel castings came from electric furnaces; this was 53 per cent above the best previous record, that of 1920. The alloy steel castings made in electric furnaces in 1923 amounted to 29,054 tons, against 17,760 tons in 1922. This increase of 64 per cent emphasized the tendency of heat-treated steel alloy castings to replace forgings. In 1923 the electric steel ingot production was 279,914 tons, or 0.64 per cent of all steel ingots, in comparison with 0.93 per cent in 1918. Taking the electric steel industry as a whole, the 1923 production of ingots and castings amounted to 515,872 tons, as compared with the wartime production of 511,364 tons in 1918.

Working Conditions. The long hours which had prevailed in the iron and steel industry for certain classes of labor for some time had been

the object of considerable criticism from social workers and others. They were defended by the management of the steel works as essential to the economical conduct of the industry. Therefore it was a somewhat radical step which was proposed in 1923 when there was abolished the 12-hour day for certain classes of labor at plants producing about 80 per cent of the total amount of steel of the United States. This was so successful and so general that at the end of the year 1923 there were but few companies that had not adopted the change. On May 18, 1922, President Harding had called a conference at the White House to discuss the abolition of the 12 hour day, in which some 40 members of the American Iron and Steel Institute participated. As a result, on May 26, 1922, Judge Elbert H. Gary, president of the Institute, appointed a committee of nine to make a "careful and scientific investigation and to report to the steel industry conclusions and recommendations regarding the 12 hour day." This committee took the subject under discussion, and on May 25, 1923, the American Iron and Steel Institute Committee reported that "if labor should become sufficient to permit, the members of this committee would favor entirely abolishing the 12 hour day, providing the purchasing public would be satisfied with selling prices that justified it." President Harding's interest in the matter was unflagging; on June 18, 1923, he wrote Judge Gary, earnestly urging the abolition of the two-shift system. On June 27, the directors of the American Iron and Steel Institute assured President Harding that the 12 hour shift would be abolished at the earliest moment practicable, and the first positive step was taken towards complete abolition on Aug. 16, 1923, when the Carnegie Steel Company inaugurated the establishment of an 8 hour day, and other companies rapidly followed. By the end of the year all of the employees of the United States Steel Corporation and about 70 per cent of the independent plants in the Pittsburgh district were working less than 12 hours, while in the Chicago district the long day had almost entirely disappeared. It was estimated that the new work day added from \$2 to \$3 a ton to the cost of a ton of steel, this extra expense being mainly in the steel works and rolling mills, as at the blast furnaces in many cases the cost of the change was surprisingly small. Both operators and employers believed that the shorter day was working out successfully, and the many adjustments required were made with care and skill. The year, however, was favorable for making the change, as most of the plants were working reasonably full; and while there was a shortage of labor, it was not a preponderating condition in the industry.

IRRIGATION. See DAMS; and RECLAMATION.

IRWIN, WALLACE (1876-). An American humorous writer, born at Oneida, N. Y., brother of William Henry Irwin (Will Irwin). He studied at Leland Stanford Junior University, 1896-99, and became editor of the *Overland Monthly Magazine* in 1902. As a writer of burlesques and topical verse he drew wide attention, especially by *The Love Sonnets of a Hoodlum* (1902). Other successes soon followed, including *Nautical Tales of a Landsman* and *At the Sign of the Dollar* (1904) and *Chinatown Ballads* (1905); but the most widely cited of his writings was the humorous series

of papers dealing with an imaginary Japanese youth called Togo and collected as *Letters of a Japanese Schoolboy* (1909) and *Mr. Togo, Maid of All Work* (1913). Among his later books may be mentioned: *Pilgrims into Folly* (1917); *Venus in the East* (1918); *The Blooming Angel* (1919); *Suffering Husband* (1920); *Seed of the Sun* (1921); and *More Letters of a Japanese Schoolboy* (1923).

IRWIN, WILLIAM HENRY (WILL IRWIN) (1873-). An author and war correspondent, born at Oneida, N. Y., brother of Wallace Irwin. He graduated at Leland Stanford Junior University in 1899 and was on the staff of the *San Francisco Chronicle* in 1901-04, and of the *New York Sun*, 1904-06, and managing editor of *McClure's Magazine*, 1906-07. After 1908 he was mainly engaged in writing for the magazines. During the War he was with the Allied armies as correspondent for the various American periodicals, 1914-15, and for the *Saturday Evening Post*, 1916-18. Among his books may be mentioned: *The Hamadryads* (verse, 1904); *The City That Was* (1907); *Old Chinatown* (1908); *Confessions of a Con Man* (1909); *Warrior the Untamed* (1909); *The House of Mystery* (1910); *The Readjustment* (1910); *The Red Button* (1912); *Where the Heart Is* (1912); *Men, Women and War* (1915); *Latins at War* (1916); *The Thirteenth Chair*, a play, with Bayard Veiller (1916); *A Reporter at Armageddon* (1918); *The Next War* (1921); *Columbine Time* (1921); and *Christ or Mars?* (1923).

ISHERWOOD SYSTEM. See SHIPBUILDING.

ISMET PASHA. See CALIPHATE.

ISONZO RIVER. See WAR IN EUROPE, *Italian Front.*

ISOPROPYL ALCOHOL. See CHEMISTRY, ORGANIC.

ISOTASY. See GEOLOGY.

ISOTOPES. See CHEMISTRY; PHYSICS.

ISTRIA. See FIUME-ADRIATIC CONTROVERSY.

ITALIAN LITERATURE. If the first 15 years of the twentieth century in Italian literature were distinguished by the development of Crocean thought, we may say that the years 1914 to 1924 were dominated by Benedetto Croce and by the men, such as Giovanni Gentile, who either continued and perfected his philosophy or reacted against it. Croce's most novel and influential ideas were in the field of aesthetics, which, furthermore, he approached from the angle of literary criticism. By the close of the decade the *Philosophy of the Spirit* had had the effect of making virtually all educated Italians under 45 years of age amateur philosophers and professional literary critics. At any rate, the balance of literary production had been shifted in the later years in the direction of "thought" and away from what might be called "creation."

The typical Italian experience had been that of Giovanni Papini as portrayed in his autobiographical confessions, *Un Uomo finito* (The Failure). This is a record of a strenuous philosophical life. The problem of the young man is to find his place in the universe, acquire a satisfactory solution of the questions that life puts to him. The mood is one of passionate research, with ups and downs of exalted hope and anguished disillusionment. What distinguishes the European mind in general and the Italian in particular from a common American outlook

on life is the sense of individual impotence before the weight of tradition, the feeling of being caught in an unescapable fixity. The young Italians had made and were making a frontal attack on this situation. The yearning for freedom, in Papini among others, takes on violent and almost incoherent forms; and it furnishes the motive for much of that thinking of a neo-idealistic character which, inspired by Croce and perfected by Gentile, is fashionably known as "activism."

This is one characteristic that tends to separate the young from the old, the new from the old, in Italian literature; a gap, or rather a rift more or less perceptible, of which the War is made to serve as an unsatisfactory marker. The men who came forward in the decade proclaimed their denial of the "three crowns" of the generation preceding: of Carducci, of Pascoli, of D'Annunzio—we may even add Fogazzaro. It is a denial, one must understand, not so much of these masters themselves, as of their followers and imitators, and of the influence, tending to express itself in precept, which they exert on the future.

The spirit of revolt is variously formulated. The young poets (conveniently presented in Olindo Gibboni's anthology *Le più belle pagine dei poeti d'oggi*—The Poets of Today) raise the standard of "pure art"—an art that is pure impression, pure image, pure "intuition" (to use a Crocean phrase), as distinguished from the art of Carducci, which is thought of as "parasitically exploiting" various practical emotions engendered by the liberal and national Risorgimento. Carducci, in fact, expresses in poetical form an ideal of Italian citizenship; and he glorifies the Italian past to sustain that ideal of citizenship. How much of his fame does the poet owe, therefore, to his morality and how much to his poetry? The indictment of Carducci was drawn, curiously enough, by a critic who had stood aloof from the Crocean tradition and had even been scorned by the young men for his fogginess: by Enrico Thovez, a Piedmontese writer, author of *Mimi dei moderni* (Mimes of the Moderns), *Il pastore, il gregge e la zampogna* (The Shepherd, the Flock, and the Reed), *Il viandante e la sua orma* (The Trail of the Wayfarer), *L'arco d'Ulisse* (The Bow and Quiver of Ulysses), and various volumes of verse. The poets who may be taken as objectifying this reaction are, among others, Sergio Corazzini (1887-1907), author of *Liriche* (Lyrics); Ettore Cozzani, author of *Orazione ai giovani* (An Address to Youth), *La siepe di emeraldo* (The Emerald Hedge), *Le sette lampade accese* (The Seven Lighted Lamps), and other things; Aldo Palazzeschi, author of *I cavalli bianchi* (The White Horses), *Lanterna* (The Lantern), *L'incendiario* (The Incendiary), and a famous whimsical romance, *Il codice di Perelà* (The Code of Perelà); Corrado Govoni, author of 11 volumes of verse, and in the later years of novels and short stories; Luciano Folgore, a futurist, and Guido Gozzano (1883-1916), who, with Corazzini, was regarded as among the greatest of these. No review of Italian poetry could, of course, omit Filippo Tommaso Marinetti, author of *Mazurka*, of a play, *Il tamburo di fuoco* (The Fiery Drum), and various manifestos of Italian futurism of which he was founder and publicity agent.

In prose writing "activism" expressed itself

as a kind of anti-D'Annunzianism—a preference for “substance” as against “rhetoric,” for “things” as against “words,” D'Annunzio being taken as a symbol for “rhetoric” and “words.” A keen Neapolitan critic (in 1924 living in Rome), Adriano Tilgher, had pointed out that D'Annunzio's sensual dilettantism, with its passionate affirmation of the autonomy of the individual spirit, is really closer to the new moods of the Crocean era than had been supposed. In fact, D'Annunzio is the man who connects this later period with its roots in the old romanticism. However, both the kind of life that D'Annunzio seemed to exemplify, and his florid, splendid, gold-dripping sentence no longer pleased. The young men set up the plain, solid, meaty novels of Giovanni Verga (1840–1922, author of the cycle called *I vinti* (The Vanquished) as a better expression of the Italian literary ideal; just as they leaped over Fogazzaro to go back to Manzoni, to find a congenial expression of a religious ideal. As significant of the changing trend as these “revivals,” are one or two rehabilitations of living men: of Alfredo Panzini (born 1863) who reached maturity in the Carducciian spirit, but won the favor of the young men (his best novel, *Il padrone sono me!*—“The boss? That's me!”); and of Luigi Pirandello, whose *Il fu Mattia Pascal* (Late Mattia Pascal) sold to 2000 copies in 20 years, and to 100,000 in the last five years of the period 1914–24.

Not that the young men produced much that is truly exceptional in the field of the novel. The closest approach to an artistic sensation in the 10 years was the *Filippo Rubé* (Rubé) of the critic-scholar-poet-journalist, G. A. Borgese, who reviewed the pre-Fascisti period of Italian reconstruction in the manner of Stendhal and with something of the sweep of imagination with which Stendhal, a century before, reviewed post-Napoleonic reconstruction. But the promise of *Rubé* was hardly kept in Borgese's subsequent *I vivi e i morti* (Living and Dead). So a temporary excitement welcomed Gino Rocca's *L'Uragano* (Hurricane). Much was expected from Rosso di San Secondo after the collection of tales called *Ponentino* (West Wind); but apart from a certain lubricious perversity in *Le donne senza amore* (Women without Love) and some pretty pages in *La Fuga* (Flight), his novels had proved in no sense as interesting as his plays (see below). Some faithful workers and accomplished technicians came forward in the latter years: Marino Moretti, in, for example, *La voce di dio* (The Voice of God), and *I puri di cuore* (The Pure of Heart); Mario Puccini, in *Dov'è il peccato è dio* (The Miracle); Salvatore Gotta, in *Il figlio inquieto* (The Restless Child); Corrado Govoni, more famous as a poet, in *La terra contro il cielo* (Earth Against Heaven); and Virgilio Brocchi, in *Il posto nel mondo* (His Place in the World). For the rest, the public that reads for amusement continued to depend upon older writers of established reputation who had not indulged to any great extent in poses of novelty: Luciano Zuccoli, in two of his best things, *L'Amore di Loredana* (The Love Affair of Loredana), and *Le cose più grandi di lui* (Things Bigger Than He); Grazia Deledda, in *Il dio dei viventi* (The God of the Living)—Deledda enjoying a real eminence in her declining years; Antonio Beltramelli, whose patient studies among the customs of Romagna gained a certain actuality

from the triumph of Mussolini, a Romagnolo—see *Gli uomini rossi* (The Reds and the Blacks; Annie Vivanti, a woman of international culture—having lived in New York and Wyoming, as well as in Ireland, England and Germany—who continued her gaiety and humor in *Zingaresca*, and in *Gioia* (Joy). Guido da Verona, in spite of everything, has to be regarded (see *La Vita Comincia Domani* (Life Begins To-morrow) as one of the masters of the European novel of large canvas and close worked detail, who, as Tilgher again has said, has expressed certain European states of mind in enduring form and even created moods of life which hosts of people have imitated. Da Verona's vogue was waning, and perhaps his power too; though *La mia vita in un raggio di sole* (My Life in a Ray of Sunshine) is worth reading.

The real discovery of the 10 years in the field of the novel was Federico Tozzi (1890–1920) whose premature death did not prevent the revelation of a great genius in the style of Dostoevski in *Tre Croci* (Three Crosses), *Il podere* (The Farm), *Ad occhi chiusi* (With Eyes Closed), and *Amore* (Love).

In the world of the theatre the “old” and the “new” came into self-conscious conflict, with new authors, new styles, and a new criticism combating old authors, old styles, old conceptions of the drama. The critic who emerged in this connection is Adriano Tilgher (*Studies on the Contemporary Drama*, trans., Dutton, New York), whose works are fundamental for a knowledge of the new tendencies (see also *Riconquiste*—Reconnoissances). Tilgher connects the Italian movement with its romantic origins and with the French drama of Sarment, the Belgian drama of Crommelinck, the German “expressionistic” theatre, the Russian plays of Andréev, and the English work of Synge (*The Playboy of the Western World*).

To strike the contrast: the “old” Italian drama, as represented by Roberto Bracco, Sabatino Lopez, Dario Niccodemi, Marco Praga, Salvatore di Giscomò, etc., was more or less the “bourgeois” drama of Paris, reformed by Ibsen (see especially the works of E. A. Butti, who died in 1907). It accepted the social organization of Europe as a fixed organism and pressed the dramatic emotion from the conflict of the individual with the unbreakable restrictions that hemmed him in: he could evade them—the ever-recurring salacious comedy of the triangle; he could succumb to them—the ever-recurring “drama,” or tragedy, of sentimental motivation. The “new” drama, in keeping with the revival of Hegelian idealism (Croce-Gentile), but also influenced by Bergson (anti-intellectualism and the “dynamic spirit”), by American pragmatism (“the world is what we make it”) and by the forces of which Einstein is at once an interpreter and a creator (relativism), is a philosophical approach to life: What is reality? What is personality? What is morality? Where the “old” drama looked primarily at what is fixed and unchanging, the “new” centres its attention on life's contradictions, incoherences, mutations: life is a flux—therefore reality is never fixed, even people are not to-day what they will be to-morrow and what they were yesterday. We are phantoms labeled with a name: we are, as Pirandello says, “one, no one, a hundred thousand.”

The dramatists of the new tendencies are nu-

merous: Luigi Chiarelli in *La Maschera e il Volto* (The Mask and the Face); Rosso di San Secondo in *Marionette—che passione!* (Love's Puppets) and *La bella addormentata* (The Sleeping Beauty); Fausto Maria Martini, in *Ridi Pagliaccio* (Laugh, Clown, Laugh); Pensuti, *L'uomo di legna e la donna di cera* (The Wooden Man and the Wax Woman); and Cavacchioli, author of a host of plays; but overtopping them all for the power and variety of his production, for success at home and international fame, Luigi Pirandello: *Six Characters in Search of an Author*; *Henry IV*; *The Pleasures of Honesty*; *Right You Are! Naked*; *Each in His Own Way*; *Think it Over, Gimmy*; which are known in every capital of the western world.

Fad or permanent contribution as the "new" theatre might be, it bore witness to an activity which had proved stimulating to all factions of the theatre. Nino Berrini and Giovacchino Forzano came forward in a type of poetic, post-romantic historical drama in which Sem Benelli was still a recognized master, though Benelli had never surpassed his old *La Tignola* (Bookworm), and *Arzigogolo* (The Hour Glass) is inferior to his sensational *La cena delle beffe* (The Jest). One real masterpiece, moreover, distinguished a new type of fantastic classical drama—the *Glauco* of Ercole Luigi Morselli (1881–1921), author also of *Orione*, of three one-act plays and the very readable *Favole per i re d'oggi* (Fables for the Kings of Today). The epigons of *Glauco* are already numerous: let us mention only *La tela di Penelope* (The Return of Ulysses), of Raffaele Calzini.

However, in the Italy of this period we are confronted with a fascinating insurgence of new forces of which the political manifestations astounded everybody in the triumph of Fascismo, and of which the literary manifestations constituted, as was said above, the most distinctive feature of the decade. Aristocracy as against democracy, nationalism as against liberalism and internationalism, discipline and obedience as against the "rights of man"; counter-Reformation as against Reformation, "spirit" as against "stomach," Latinism as against Anglo-Saxon industrialism, materialism, and hygienic "civicism"—such ideas and slogans were being bandied about by young Italians with genius or without genius, in a language full of the strangest and wildest technicalities and in a style taut with straining cerebration. With these youngsters logic is in bad repute. What one must do is "experience." Struggle is the law of life! *Lottiamo!*

If the War helped to individuate these new tendencies and give them distinctness, they go back fully 20 years to self-conscious movements dating from the first lustrum of the century. The first corollary drawn from Crocean idealism by Papini and Giuseppe Prezzolini (founders, in 1903, of the review called *Leonardo*) was that life must be lived or created and not accepted or taken for granted; hence rebellion against passive politics, passive religion, passive culture. Here are to be found the remote origins of Fascism, as indeed the immediate origins of proletarian insurrectionism (the Mussolini of that day), of anti-parliamentarianism (the Mussolini of the present), of Catholic "modernism" (Ernesto Bonaiuti). In this connection also there were "revivals" and rehabilitations: If philosophical thought was influenced

by Croce, political thought found its Old Testament in the *Sociology* of Wilfred Pareto (1844–1923) and its New Testament in *La rivolta ideale* (The Ideal Revolt) of Alfredo Oriani, who lived in the last half of the nineteenth century and who was also the author of *La lotta politica in Italia*, a History of Italian Revolutions and of an influential novel, *La disfatta* (The Defeat). Over against a militant proletariat inspired by Karl Marx there thus developed in Italy a militant middle class which accepted the class struggle in socialistic terms and fought the Socialists on their own grounds with their own weapons.

This mental unrest may be sensed most fully in Papini, as above suggested—read in addition to *The Failure*, *Il crepuscolo della Filosofia* (The Twilight of Philosophy); and *Four and Twenty Minds*, especially if Papini's world-famous *Life of Christ* is to be appraised with any understanding. But hardly less important is the painter-poet Ardengo Soffici, author of *Lemmonio Boreo* (a novel that anticipates Fascism to the letter), of *Arlecchino* and many critical and political essays. Domenico Giulioti, author of a frantic and paradoxical Catholic diatribe—*L'ora di Barabba* (The Hour of Barabbas)—well styles himself the "wild man" in the *Dictionary of a Wild Man* which he wrote in collaboration with Papini. Giulioti's histrionic violence stands out in contrast with another Catholic writer of a real mystic temperament, Giosuè Borsi (1888–1915), author of *Letters from the Front*. Certain characteristic and influential states of mind may be found in Curzio Suckert, *L'Italia vivente* (The Living Italy). Though in this connection we must not forget the speeches and editorials of Mussolini himself now collected in volume forms, with his war diaries.

But when the tumult and the shouting dies, a certain bulk of unquestionably sound and coherent achievement will be left as the permanent record of this Italian period. Already the *Letters* and critical essays of Renato Serra (1881–1915) had acquired an almost classic prestige. Giuseppe Prezzolini (read *La cultura italiana*—Italian Civilization) lived all this life of thought and passion and worked it into a literary product that has judgment and fairness and character as well as brilliancy. Mario Missiroli is a publicist who saves himself many palinodes by thinking before he writes. Gaetano Salvemini entered political and social polemic with the sobriety of the historian and the courage of a warrior. In pure literature, we may mention the work of Massimo Bontempelli, *I sette savi* (The Seven Sages); *La vita intensa* and *La vita laboriosa* (The Strenuous Life and The Laborious Life); the tales of Ferdinando Paolieri (the real successor, perhaps, of Renato Fucini in the Tuscan spirit), the varied work of Enrico Pea, *Spaentacchio* (The Scarecrow) and a play—*Judas*, and the delicate humor of Giuseppe Zucca, *Il morbo della virtù* (The Disease of Virtue). A young critic from whom something was to be expected was Piero Gohetti (see *La frusta teatrale* "The Theatrical Whip").

And now, collecting some loose but important ends, we may add that Trilussa (Carlo Alberto Salustri) was still continuing, in his screamingly funny sonnets in Roman dialect, the more recent traditions of Pasarella (author of *The Discovery of America* and *Villa Gloria*), Augus-

to Sindici, and the immortal Oronzo Marginati (Luigi Lucatelli, a prose "columnist," author, for instance, of *Come ti erudisco er pupo* 'Bringing up the Kid'; and *Così parlarono due imbecilli*—Thus Spake Two Fools,' translated by Maurice Bishop as 'Theodore the Sage'). The great "dime novelists" still remained, Mario Mariani, Pittigrilli, and Carolina Invernizio (1857-1917). Authors of children's books, since the classic *Pinocchio* of Collodi, were Vamba, Beltramelli and Barzini. One of the best works of historical scholarship is Corrado Ricci's *Beatrice Cenci*. The best cook book is that of Artusi. And last but not least among the loose ends is the *Notturmo* (Nocturne) of D'Annunzio.

ITALIAN SOMALILAND. See SOMALILAND.

ITALY. A constitutional monarchy of southern Europe; area before the War, 110,632 square miles; population (census of 1911), 34,671,377; population for the same area by the census of 1921, 37,276,738; population per square mile (1921), 336.9. The annexed territories by the Treaty of St. Germain were: Venezia Tridentina, area 4027 square miles, population (1921) 648,208; Gorizia and Gradisca and districts, area 1138 square miles, population (1921) 310,642; Trieste, area 37 square miles, population (1921) 238,655; Istria, area 2035 square miles, population (1921) 342,979; Zara and islands annexed from Dalmatia, area 113 square miles, population (1921) 18,719. Total area in 1921, 117,982 square miles; total population, 38,835,941. Comparative vital statistics for the period discussed were as follows (figures for 1912 and 1922, based on ratio per 1000 of population and applying only to pre-war boundaries): marriages, 7.6 and 8.74; living births, 32.38 and 28.55; deaths, 18.15 and 16.66. The influenza epidemic of 1918 raised the mortality to 32.97 per 1000 inhabitants (exclusive of war deaths). Emigration, which had reached its peak in 1913 with 872,598, fell off during the war years, dropping to its lowest level in 1918 with 28,311. But by 1921, emigration had once more mounted to 255,166, and in 1922, to 276,964. Whereas in 1913 almost two-thirds of the emigrants had migrated overseas, in 1920 only a few more than one-half did so. In 1922, emigrants overseas totaled 121,410; to Europe, etc., 155,554. This was occasioned by the fact that many Italians sought work in the devastated French areas, although the restriction imposed on immigration into the United States was a contributing cause. Before the War the ratio of immigrants (i.e. returning Italians) to emigrants varied from one-third to one-half. In 1921, 92,212 Italians returned, 71,974 of these being from the United States. This was 36 per cent as large as the number of emigrants. The populations of the large cities in 1921 (1911 figure in parenthesis) were as follows: Naples, 780,220 (678,000); Milan, 718,304 (599,000); Rome, 691,314 (542,000); Turin, 502,274 (427,000); Palermo, 400,348 (341,000); Genoa, 300,784 (272,000); Catania, 255,394 (211,000); Florence, 253,565 (233,000); Bologna, 210,969 (173,000); Messina, 176,794 (127,000); Venice, 171,665 (161,000); Bari, 131,143 (104,000); Leghorn, 114,813 (105,000). Principal cities in the annexed territories were: Trieste, 238,655 (1921); Pola, 49,960; Trento, 35,125; Gorizia, 25,576.

Education. In the period surveyed, the State

applied itself seriously to the problem of illiteracy and in 1919 set up a national institute for the instruction of illiterate adults. Many districts, notably in the provinces of Novara, Turin, Como, and Cuneo, could record the fact that all young people 20 years of age were able to read and write. Under Mussolini, educational legislation, while frequent, took on a reactionary tinge. Compulsory religious education, conducted by teachers receiving the approval of the Church authorities, and the displaying of the crucifix in all schools, were ordered. Limitations were also placed on the number of free students and, to this end, severe competitive examinations were fixed. In all elementary schools, public and private, there were 4,523,183 pupils in attendance in 1915-16. The increase was slight over the previous recorded year, 1907-08, as is indicated by the fact that there were 3,002,168 attending public elementary schools in 1907-08, and 3,167,245 in 1915-16. In all government and private secondary schools the enrollment in 1919-20 was 346,218. The increase in technical schools was particularly noteworthy, attendance in government schools in 1919-20 being 173,296 as compared with 103,118 in 1910-11. The eagerness for higher education was even more marked in the universities, for the attendance increased from 21,615 students in 1911-12 to 41,176 in 1919-20. In 1913-14, the state expended 137,634,000 lire on instruction; in 1922-23, it expended 658,871,000 lire. This, however, cannot be regarded as an increase, for the lira (par 19.3 cents) was quoted at 4.75 cents in 1922. If we consider that the index figure for prices and wages for January, 1923, was 575 (based on 1913 as 100), it is evident that in real money the expenditure was considerably less in 1922-23 than in 1913-14.

Agriculture. Recovery in the field of agriculture was rapid after the War, though government requisitions of crops in 1919 and 1920 made resumption somewhat tardy. The table furnishes a basis for comparison; acreages are given in thousands of acres.

Crop	1914		1923	
	Thousand Acres	Short tons	Thousand Acres	Short tons
Wheat	11,785	5,072,650	11,554	6,745,175
Corn	8,793	2,860,000	8,618	2,351,900
Oats	1,138	428,340	1,191	484,960
Potatoes	727	.....	778	1,416,800
Sugar beets	101	1,540,000	148	1,904,000
Vines	10,673	1,214,400 *	12,108	726,000 *
Olives	5,678	.....	7,042	528,000 *

* Thousands of gallons of wine and oil.

Orchards, yielding large crops of oranges, lemons, chestnuts, pomegranates, quinces, apples, and pears, as well as walnuts and almonds, continued to flourish, though by 1922 the crops had not yet reached pre-war levels. Silk culture, after a period of decline, assumed its pre-war importance in 1923. In the three-year period 1910-12, the silk cocoon crop averaged 41,200 metric tons. In 1922, it was 31,000 tons; but in 1923, 42,580 tons. The decline prior to 1923 was due to the destruction of the mulberry trees in Piedmont, Lombardy, and Venetia—the chief centres. After the War the factory capacity of the silk mills similarly declined, as many plants were sold during the War for their metal. Live stock figures for 1918 revealed

(1908 figure in parentheses): horses, 989,786 (955,878); asses, 949,162 (1,238,060); mules, 496,743 (1,230,060); cattle, 6,239,741 (6,198,861); pigs, 2,338,926 (2,507,928); sheep, 11,753,910 (11,162,926); goats, 3,082,558 (2,714,878). The wool yield maintained an average of 33,000 tons and had to be supplemented by importations.

Mining and Manufacturing. After the War, mining was prosecuted with a renewed intensity. The lack of coal and iron ore necessitated the dependence upon foreign sources, but in sulphur and mercury the output was of great importance. The following figures for 1922 and 1923 indicate how steady the progress was (figures in metric tons): iron ore, 311,214 and 295,450 (603,116 in 1913); iron and cupriferous pyrites, 486,000 and 493,412 (317,334 in 1913); coal, 195,352 and 168,922; lignite, 745,402 and 938,229 (total mineral fuel in 1913, 701,081); metallic mercury 1541 and 1605 (1004 in 1913). The Sicilian sulphur industry, one of the most important in the world, had not recovered by 1923 from the War's effects. The forging ahead of the American industry during 1914-18 had much to do with the general stagnation. In 1911, the production was 2,682,766 metric tons of sulphur ore and 414,161 tons of raw sulphur; in 1922, it was only 167,339 tons of raw sulphur and in 1923, 248,916 tons. In 1923, to aid the Sicilian Sulphur Consortium in carrying its accumulated stocks for a more favorable market, the Italian government guaranteed a bond issue of 100,000,000 lire. By the acquisition of the mercury mines of Idria as a result of the War, Italy became the world's largest producer of mercury. In 1922, the output was 1541 tons of mercurial ore out of about 4000 tons for the whole world. Imports of coal were always heavy. In 1913, imports of coal reached 9,000,000 tons; during the War this fell off considerably; after the War, imports did not average more than 4,000,000 tons annually, but in 1923 they rose to 9,167,269 tons. This, with other conditions, kept the output of metallurgical plants at a low level until 1923 when an improvement occurred. In 1922, 157,498 tons of pig iron were turned out, and in 1923, 247,160 tons; in 1913, the output was 427,000 tons. In 1922, 981,419 tons and in 1923, 1,121,912 tons of steel were produced as compared with 933,000 tons in 1913 and 1,331,000 tons in 1917. In 1923 only 506,000 tons of iron and steel scrap, iron ore, bars, plates, and sheets were imported as compared with 933,000 tons in 1913. The lack of mineral fuel made the development of hydroelectric resources of paramount importance. It was estimated that 5,000,000 horse power were available for exploitation. At the end of 1922, hydroelectric companies represented a total capacity of 2,170,000 horse power, which was an increase of 650,000 horse power since 1915. Consumption figures indicated: 2,312,000 kilowatt hours used in 1913-14; 4,000,000,000 kilowatt hours used in 1920-21. Eight-tenths of this was utilized for industrial purposes, one-tenth for traction, and one-tenth for illumination.

Commerce. Imports in 1913 were valued at \$707,664,101; in 1923, at \$775,026,883. Exports in 1923 were \$497,649,999 as against \$500,241,667. (The 1923 figures are converted from the average exchange rate for the year.) In 1913, countries of origin of Italian imports ranged in order: Germany, Great Britain,

United States, France. In 1923 the order was: United States, Great Britain, France, Germany. Countries taking Italian exports in 1913, in order, were: Germany, Switzerland, United States, France, Austria-Hungary, Great Britain. In 1923 the order was, France, United States, Switzerland, Great Britain, Argentina, Germany. The trade with the United States revealed something of the character of the general commercial status. (See table.) The index figures in the table are based on the value of the average imports and exports for 1910-14.

Average	EXPORTS TO THE UNITED STATES		IMPORTS FROM THE UNITED STATES	
	Millions of dollars	Index No.	Millions of dollars	Index No.
1910-14	51	100	66	100
1920	75	148	372	563
1921	62	122	215	327
1922	46	90	198	300
1923	68	133	208	315

Italian imports continued to be such basic raw materials as wheat, raw cotton, metals and minerals, mineral oils, hides, tobacco, lard and bacon. This dependence on foreign countries for wheat and scrap iron, particularly, continually operated to Italy's disadvantage. The tendency after the War for nations to restrict their exports of important articles or to charge higher prices abroad than those asked at home, accounted for a bitterness of feeling that often was publicly voiced. Leading exports were, in order of value (1920), cotton manufactures, raw silk, silk manufactures, hemp, spun cotton, automobiles, wines, hats, etc. Leading food-stuffs exported were lemons, olive oil, cheese, fruits, vegetables, tomato conserve. In 1914, the Italian merchant marine consisted of 644 steamers of 1,534,738 gross tons and 523 sailing vessels of 237,821 net tons; in 1922, the marine consisted of 868 steamers of 2,539,833 gross tons and 397 sailing vessels of 167,613 gross tons. During the War, Italy's shipping losses were the severest, proportionately, of all the combatant nations. Thus, 677,207 tons were lost by sinkings alone, while in all, 1,076,171 tons were lost, made up of sinkings, sale to foreigners, those broken up for material, etc. However, Italy was compensated by the accretions of Austro-Hungarian ships as well as the active building carried on over the whole of 1915-22. Specifically, 842,529 tons of enemy shipping were seized; 529,214 tons were built in home shipyards; 555,388 tons were built abroad. In 1911, 173,437 vessels of 56,056,306 tons had entered Italian ports; 173,353 vessels of 56,082,448 tons had cleared. Nothing indicates better the tardy commercial recovery than the fact that in 1919 only 98,189 vessels of 24,003,639 tons entered and 98,144 vessels of 24,143,487 tons cleared Italian ports. Recovery was progressing rapidly by 1923; in the first nine months of 1923, 114,744 vessels with a tonnage of 32,314,780 entered and 114,980 with a tonnage of 32,045,878 cleared Italian ports.

Communications. In 1913, there were 11,015 miles of railway; in 1920, 12,900 miles. In 1913, 8540 miles were under government management; in 1920, 10,290 miles. A serious concern after the War was the sad state of disrepair into which the railways had fallen. The loss and depreciation of railway stocks, the overmanning of the entire system (employees had increased 46.6 per cent between 1914 and

1920), the eight-hour day and the lowered efficiency of the workers, all contributed to a general deplorable condition. The deficit of the fiscal year 1920-21 was 1,034,000,000 lire, and of 1921-22 was 966,000,000 lire; this in spite of the continually rising tariffs. (Freight rates from 1915 to 1922 increased 400 per cent.) Electrification of railways was a theme of continual discussion, though the unfavorable financial situation militated against any extensive immediate projects. As a way out, the Mussolini government expressed itself as favoring the resurrection of private management, but, while extensive reforms and reductions of personnel were carried out, no definite move, by 1924, was made toward private operation.

Finance. For 1912-13, revenues were 2,698,620,000 lire and expenditures 2,615,208,000 lire. The revised budget of 1923-24 carried 15,566,000,000 lire for effective revenues (about 5,000,000,000 lire being classified as extraordinary) and 18,182,000,000 lire for effective expenditures (of which half constituted extraordinary expenses). After 1914, the problem of balancing the budget was of utmost importance and the failure of successive governments to do so awakened a real alarm. In 1919-20, the deficit was 9534 millions of lire; in 1920-21, it was 5922 millions; in 1921-22, 5529 millions; in 1922-23, 3100 millions. For 1923-24, even after radical economies were effected, the deficit still showed 2616 millions. However, with the wide powers of the new government, its policy of reducing expenses and increasing revenues through a broadening of the basis of taxation, it was perceptible in 1924 that much was being done to hasten a return to sound conditions. Increases in revenue and economies in expenditure during the fiscal year 1923-24 were so great as to make it likely (as the situation appeared in May, 1924) that the deficit would fall as low as 300,000,000 lire. Under the new government (1923) revenues were increased by the following methods: The direct taxes were concentrated under three large heads, viz., land, buildings, and incomes. Beginning with 1923, a new sales tax became effective. Other changes were higher excise taxes, increased postal rates, abolition of the match monopoly. Italy's pre-war debt was 13,312,000,000 lire. By Mar. 31, 1923, the public debt was 116,975,000,000. War loans totaled 36,042,000,000; floating debt, 34,848,000,000; notes in circulation, 10,272,000,000; foreign debt, 22,081,000,000 gold lire or 88,000,000,000 paper lire at the 1923 exchange. Allowing for this conversion the debt really was 183,000,000,000 lire. The following was the distribution of the foreign debt in 1922 (the figure increases from year to year because of accrued interest charges): to Great Britain, 12,687,173,200 lire; to United States, 8,586,816,383 lire; to United States for dollar bonds sold in the United States, 51,694,069; dollar indebtedness to the Brazilian government, 35,722,000. In 1921 and in 1923, the Italian government gave official assurances that the debt to the United States would be met. However, it was requested that the terms granted to Great Britain be also accorded to Italy. That a general skepticism prevailed in American circles on this point, nevertheless, was indicated by the statements of Senators Borah and Owen in January, 1924, that this debt never would be repaid. Up to 1924, Italy was still leaving the question of interest payments on these obliga-

tions out of its calculations. The internal debt of Italy was, in 1924, being reduced while no increases were being made in the foreign debt except those due to interest accruals. At the end of 1922 there were 19,674,700,000 lire in paper notes in circulation as compared with 2,782,000,000 lire in 1913. Reserves represented 70 per cent of these in 1913 and only 9 per cent in 1923.

Economic Conditions. The lira exchange, at the par of 19.3 cents in 1914, dropped to 11.37 in 1919, 4.97 in 1920, 4.29 in 1921, and recovered only slightly to 4.75 in 1922, with a further slight decline to 4.60 in 1923. The cost of living based on the 1913 wholesale prices as 100, was at 642 in January, 1921, 577 in January, 1922, 575 in January, 1923 and 571 in January, 1924. Wages rose too, though not to an equal proportion. The wage index numbers, on the basis of 100 for 1914, for subsequent years were: 102.4 in 1915; 111.6 in 1916; 146.6 in 1917; 179.7 in 1918; 279.5 in 1919; 408.4 in 1920; 571.7 in 1921. Wage levels did not change greatly after 1921. The return of the soldiers and the increasing intransigency manifested by the laboring population, as the coming of peace brought renewed hardships, made the period 1919-22 one of the most turbulent in Italy's recent history. The government, sensing the unrest, hastily enacted a series of social measures in 1918 and 1919. These included machinery for the payment of unemployment subsidies, a system of unemployment insurance, the eight-hour day in many industries, for agricultural workers, and for state railway employees, compulsory old age and sickness insurance, etc. But nothing could stem the rising tide. The lack of raw materials, high prices for food, unemployment, all those conditions that indicate a population bearing too many oppressive burdens, ushered in a period of revolutionary strikes; that in 1920 threatened a complete upheaval of the existing society. In 1919, strikes were frequent; the red flag was hoisted in Tuscany and Romagna; a general strike was declared in Naples; strikes were called to check the supply trains destined for the Kolchak forces in Siberia. In 1920, disorders broke out with a renewed intensity. Throughout the spring the country was in a continual turmoil as postal employees were followed out by railway workers, to be in turn succeeded by the metal workers. In the summer, city transport workers struck and were accompanied by the electricians. In the fall these movements began to take on all the characteristics of an organized opposition. The slowing up of the important metal works in northern Italy and the attempt to cut wages accounted for a truculent mood that vented itself in frequent displays of sabotage. This, and the lack of raw materials, caused many plants to close their doors to the workers. The result was a wholesale seizure of factories throughout Lombardy and Piedmont and the installation of workers' committees of control. Materials were confiscated and an attempt made to coerce the management to remain at their posts. The General Confederation of Labor gave the movement its official sanction and took over a general supervision of the workers' activities. Only a tardy intervention on the part of the government succeeded in restoring order. On Sept. 19, 1920, representatives of workers and employers patched up a truce whereby a measure of control in opera-

tions and salaries was granted to the men, and a bill embodying this syndicalist principle was promised by the government. Meanwhile the same temper was exhibited by the agrarian workers. Landed estates were seized by peasants throughout the summer and fall, Sicily being the seat of most of the trouble. Associations were formed for the administration of the sequestered areas, and under the coöperatives, collective farming and purchasing were carried on. Many farmers extricated themselves by leasing their lands to these associations. While the outbreaks did not assume general proportions, cases of rioting and bloodshed were frequent. The unrest subsided only slowly. Strikes continued throughout 1921. There was a general strike in Rome in July, a railway strike in November, rioting and bloodshed as a result of ill-feeling between Fascisti and Communists throughout the fall. Unemployment in the metal, textile, and building industries was high. By Dec. 1, 1921, there were 512,000 men out of work. In all, 1045 strikes, affecting 644,564 workmen, accounted for the loss of 7,772,870 working days during 1921 (and these figures were less than half those for 1920). Not until late in 1922 did a return to something like normal conditions begin to manifest itself. Revivals were evident in the metallurgical and mechanical industries and investments in industrial enterprises increased. By September, 1923, unemployment had dropped to 179,000 workers, and labor disputes throughout the whole of 1923 had involved the loss of only 250,000 working days. By the beginning of 1924, observers could report that of all the Continental European countries involved in the War, Italy had made the greatest progress toward regaining its economic and financial stability.

The spread of coöperative societies was particularly noteworthy; 15,000 societies were reported in 1921 as compared with 7500 in 1915. Of the former, 7430 were united in the National League of Coöperative Societies, with a total membership of 1,857,500 and a collective share capital of more than 250,000,000 lire. After 1913, the National Institute of Credit co-ordinated the activities of most of the coöperative savings banks and credit organizations. In 1920, the capital of the Institute was 20,840,000 lire, and its turnover of ordinary current accounts (deposits and withdrawals), 1,592,000,000 lire. After the advent of the Fascisti government, coöperative societies did not receive government support, with the result that many collapsed. The more important, however, continued to thrive; notably the Federation of Agricultural Consortia, which was one of the strongest of its kind in the world.

History. Although Italy had been linked with Germany and Austria-Hungary in the Triple Alliance since 1882, the Italian government, on Aug. 3, 1914, declared its neutrality in the War, on the grounds, first, that since the War had been caused by the aggression of the Central Powers, the *casus fœderis* provided for in the strictly defensive Triple Alliance had not arisen; and, second, that by failing to acquaint Italy, in advance, with the terms of the note to Serbia, Austria-Hungary had disregarded the terms of the Alliance. As a matter of fact, by secret agreements with France (1902) and Russia (1909), Italy had pledged herself not to aid Germany and Austria-Hungary in an aggressive war. That Italians saw no rea-

son for taking their place at Austria's side was plain; and the entrance of Great Britain into the struggle removed all thought of participation against the Entente. The neutralist attitude at first was strongly championed. The low state of the finances and the fact that Italy had not fully recovered from the Libyan war (see LIBYA) together with a belief that hostilities against her erstwhile allies must be contemptuously regarded, were the more important factors contributing to this view. Some measures were taken to relieve the stringency that war conditions brought in their train. Exports of cereals were prohibited; a moratorium was declared; and steps were taken to further a ready importation of raw materials. Meanwhile the war establishment—five classes had been mobilized—necessitated great outlays of money, and a cabinet crisis precipitated over the need for tapping new sources of revenue resulted in the formation of something like a coalition government with Baron Sonnino at the Foreign Office. As the War, however, took on ever-increasing proportions and as the intrigues about the Italian Foreign Office became more numerous, it began to appear that a change had taken place in Italian public opinion, or at any rate, in official opinion. The character of the sentiment, with 1915, took on a more bellicose hue; Italy meant to join the Entente, every one saw, at a price. The recovery of the northern provinces had of course always had a certain appeal to popular sentiment, but that Italy's entry into the War was to be purely a matter of diplomatic arrangements was not to be concealed. Germany, sensing this, sent the astute Prince von Bülow to Rome in order to keep Italy neutral if possible. Austria was urged to satisfy Italian demands for territory as far as she was able. Protracted negotiations were carried on between Austria and Italy but neither of Austria's offers came up to the minimum of Italy's demands. (See TIROL, SOUTH GERMAN.) The result was, Sonnino terminated the conversations and turned to the Entente. On April 26, the secret Treaty of London was signed. By it, for full participation in the War, Italy was to receive the Trentino and South Tirol to the Brenner Pass, the city of Trieste, Gorizia, Istria, Dalmatia as far as Cape Planka, Valona (which had already been occupied on Oct. 30, 1914), the Adriatic islands, and the Dodecanese including Rhodes. Other promises of territory included a sphere of influence in Asia Minor, and grants in Africa. That the anti-war party was still strong was shown when Premier Salandra resigned because of the failure of Giolitti and his followers to approve of his policy. But war demonstrations and the agitations of D'Annunzio had touched the popular temper with the result that Signor Salandra, perceiving in what direction the wind was blowing, once more assumed the reins of office, and boldly asked the Parliament for a war declaration. On May 20, 1915, the Chamber invested the government with complete powers; on May 23, the army was ordered mobilized; and on May 24, war was declared against Austria. Later in the year, Italy declared war on Turkey and Bulgaria, but it was not until August, 1916, that she broke relations with Germany. Loans were floated in July, 1915, for 1100 million lire and in February, 1916, for 3000 million lire. On the outbreak of the War, the railways passed under military control and through 1915 and

1916 other measures were taken to facilitate an undivided war effort. These included: prohibitions on the importation of articles of luxury, the sequestration of property belonging to citizens of the Central Powers, cessation of trade with Germany, etc.

The failure of the Italian armies to make any appreciable advances on the northern frontier, the rising prices, and the delay of the government in declaring war on Germany, served to create an opposition whose operations became increasingly embarrassing to the government. The great success which met the Austrian offensive in the Trentino in May, 1916, turned the scales against the ministry with the result that a defeat in the Chamber on June 10 forced its resignation. Not until June 19 was Signor Boselli able to form a cabinet. On it, Sonnino and Orlando were retained and Signor Bissolati, leader of the Interventionists, was given a place. Up to 1917, the conduct of the war received undivided attention and met with no organized opposition. The occupation of Gorizia on Aug. 15, 1916, and the decision to participate with the Allied troops in the Macedonia offensive, as well as to extend the Albanian operations, together with the early victories reported from these fronts, united in distracting attention from affairs in the Trentino. But the terrible loss of life on the Carso-Isonzo front, the discomforts the soldiers were suffering, the failure to provide the simple amenities that might have made their position more tolerable, and, with the collapse of Russia, the realization that Austria was now free to turn her undivided attention to Italy, all served to give strength to a defeatist agitation that took on volume as the year 1917 progressed. The opposition in the Parliament continually gained new accretions. In 1917, internal disagreements caused a cabinet crisis and Signor Boselli was compelled to reconstruct his cabinet. This merely presaged the larger events of the fall of the year. The disasters that met the Italian armies beginning with October at Caporetto, on the Asiago plateau, and in the Udine and Bel-luno provinces, and the loss of 300,000 men as prisoners, together with great army stores, threw the Italian people into a fright that bordered on frenzy. It seemed that only a miracle could save Italy from being completely crushed. But the army resistance strengthened, and the people, in the face of danger, took new heart, so that, after a change of ministries, the war was carried on. Signor Orlando headed the new cabinet and General Cadorna was removed to be supplanted by General Diaz. The French and British sent contingents to the Italian front, and with the reorganization of the military machine and a greater industrial effort, it was possible for the government to prosecute its activities with a renewed vigor. The year 1918, however, tried the Italian people most severely. The lack of bread and coal and the very small rations of foodstuffs doled out added to the privations of the population. The peace discussions of the year, too, contributed to the general uneasiness; President Wilson's "Fourteen Points" which seemed to indicate opposition to the ambitious territorial desires of Italian nationalists, and the propaganda of the Jugo-Slavs for a recognition of their racial boundaries, which had the adhesion of Signor Bissolati and other reformist Socialists, were contributing factors. The successful defense of

the Piave and the checking of the Austrian offensive, in the spring of the year, on the Asiago plateau, relieved the situation somewhat, but it was not until the great victories that marked the battle of Vittorio Veneto (October 24–November 3) and ended in the crushing defeat of the Austrian army, that Italians could breathe easily once more. An armistice immediately followed by which Austrian troops evacuated not only Italian territories but the lands also promised to Italy by the secret Treaty of London. Italian forces were sent into the Trentino, and Dalmatia, as well as Trieste and Fiume, so that by the time hostilities were concluded, Italy was in complete possession of all the territories to which she had laid claim. The end of the War saw Italian forces engaged on six fronts, viz., Italy, Albania, Macedonia, Palestine, Libya, France. In all, 5,615,000 men had been called out, of whom 496,920 had been killed and 949,000 wounded, 220,000 of these being permanently incapacitated.

In the discussions of the peace, Italian public opinion centred not only in the necessity for the rectification of the northern frontier line (in spite of a preponderance of alien populations in some sections) but also in the need for retaining Fiume. On this matter the hostility of the Jugo-Slavs was encountered so that the settlement of the question continued to absorb Italian attention for the next three years. Italy's representatives at the Peace Conference were Orlando, Sonnino, Salandra, Barzilai, and Salvago-Raggi. These readily acquiesced to the partition of the German Africa colonies between France and Great Britain, accepting, by way of compensation for Italy only promises of slight additions to Libya and the Italian Somaliland, but on the questions of Dalmatia and Fiume they stood firm. Jugo-Slavia, however, had gained a friend in President Wilson. On Apr. 23, 1919, after protracted conversations among the Big Four had yielded no results, President Wilson issued a public statement to the Italian people in which he counseled renunciation of Fiume and Dalmatia. Instead of having the desired result, President Wilson's action only served to solidify all branches of opinion. The matter immediately became a *cause célèbre*. Orlando, having withdrawn from the Peace Conference, received an overwhelming vote of confidence in the Chamber, even the Socialists and the Laborites giving him their support. The failure, however, of the delegates to gain any concessions on this point resulted in a negative vote of confidence in the ministry with the result that Orlando was compelled to resign on June 19, 1919. Signor Nitti accepted the premiership. The increasing difficulties at home because of the lack of raw materials and the ever-recurring labor disturbances only added to the trials of the government. But interest, in large part, was diverted by the Adriatic question. The failure of the Peace Conference to bring out a settlement that could be acceptable to Italian opinion strengthened the hand of the irreconcilables, with the result that D'Annunzio, on September 12, entered Fiume at the head of a small force and confronted the peacemakers with a *fait accompli*. Public support rallied to him at once. In spite of Nitti's official disavowal, the heated protests of the Peace Conference, and the frequent clashes between Jugo-Slavs and Italians, D'Annunzio stayed on. Even the very favorable treaty with

Austria, signed at St. Germain on September 10, by which Italy gained her northern frontier, elicited no real enthusiasm. Fiume was the question of the day.

On Nov. 16, 1919, the new elections were held. The results marked the entry of a new force into Italy's political life, for 103 members were elected who belonged to the (Catholic) Popular party. For the first time since 1870, therefore, the Catholics as an official body took their place in the country's political activities. Their programme resembled in large part the typical proposals of the Centrist and Christian Socialist parties with which Continental Europe already was familiar. The Socialists were the only other well-integrated force, and succeeded in electing 160 members. Their stand was frankly revolutionary: they looked to Russia for inspiration, and the economic chaos of the moment gave them strength. The opening session of the Parliament was a noisy one, and the King's speech from the throne was greeted with derision. But in spite of the weaknesses of the constitutional parties, Nitti, by maintaining a precarious balance of power, continued in office. The year 1920 was characterized by an intensification of the same problems. The question of the Fiume settlement was no nearer a solution. The hard feeling engendered by President Wilson's insistence upon his scheme of a Fiume Free State and the fact that Italy's counter-proposal, though acceptable to the Supreme Council, was wholly rejected by Jugo-Slavia, were elements that made the tangle more and more snarled. Also, the revolutionary disorders of the year, accompanied by rioting and anarchistic outbreaks, and the mounting cost of living, indicated that Italy was living on a volcanic crater. These uncertainties were reflected in the political life. A cabinet crisis in the spring forced a reconstruction of the Nitti government; on May 12, the premier was compelled to resign, and after several unsuccessful manoeuvres, was supplanted by Signor Giolitti. The entrance of the Albanian question into the limelight involved Italy in another international controversy. In 1917, Italy had proclaimed Albania her protectorate but the status had been refused recognition by her allies. Up to 1920, an army had been maintained in the country to the general dissatisfaction of the populace, with the result that fighting broke out between Albanians and Italians in the summer. The universal attention given to the controversy, together with the support the Albanian cause found among the Italian Socialists, forced Giolitti to open negotiations with the Albanians. The result was the evacuation of the country; Valona, which had been held since 1914, being given up on Sept. 2, 1920. It was not until late in the year that the settlement of the Adriatic dispute appeared a possibility. The disappearance of President Wilson from the scene, and the realization by both Italy and Jugo-Slavia that an understanding could more easily be reached by agreement between themselves, led to the signing of the Treaty of Rapallo (Nov. 12, 1920). By it, Italy gave up Dalmatia and restored to Jugo-Slavia two small territories lying to the southeast of Istria; but received the town of Zara. On their part, the Jugo-Slavs agreed to an Italian frontier enclosing all of Istria and extending as far as Monte Nevoso. Fiume was made a Free State and was connected with Italy on the

west by a territorial corridor along the sea. It was also stipulated that the city of Susak (together with the small Baros Basin) was to be joined to Jugo-Slavia. Ratification immediately followed. It was necessary to apply force before D'Annunzio could be dislodged. In September, he had established at Fiume the "Italian Regency of Quarnero" and had promulgated a constitution which contained some rather ludicrous provisions. His refusal to accept the treaty compelled the Italian government to order a blockade against him, and this failing of any results, the ships in the harbor were given the order to open fire. From December 3 to 29, a virtual state of war existed, but on the 30th the local officials capitulated. A provisional government was set up and on Jan. 18, 1921, D'Annunzio left Fiume. In June, 1921, Italy and Jugo-Slavia signed an agreement for the creation of a port board to regulate the commerce of Fiume and other harbors in the territory. (For the ultimate solution of this dispute see FIUME-ADRIATIC CONTROVERSY.) There were other foreign problems which occupied the attention of the government in 1920 and 1921. Italy in August, 1920, signed the later discredited Treaty of Sèvres with Turkey by which Italy received important concessions in Anatolia and the right to exploit the Heraclea coal mines. In turn, Italy, by a separate understanding, agreed to relinquish the Dodecanese to Greece, except that Rhodes and two others were to be held for 15 years. A plebiscite was to determine their disposition later. In 1921, a commercial agreement was signed with Soviet Russia and the Ukraine and treaties were also concluded with Germany, Czecho-Slovakia, and Poland. Between Italy and France an ever-widening breach, not surprising in the light of the old hostility, was becoming perceptible. A French decree which denied Italian citizenship to the many Italians residing in Tunis was bitterly resented, the ill feeling manifesting itself in the attacks on the French military mission which visited Italy in October, 1921. These matters, naturally, were overshadowed by the grave internal situation in 1920. (See *supra*, *Economic Conditions*). Throughout the whole of the year, Italy was in the grip of disputes that took on the character of civil war: the seizure of the factories, the agrarian uprisings, the street fighting and the local disturbances, that, in Bologna in particular, took on all the familiar forms of a people torn by internal dissension, contributed to the general feeling of uncertainty. In the light of these happenings it was inevitable that a violent form of dissidence should manifest itself. Armed bands, strongly nationalistic in spirit, and bearing the name Fascisti, appeared in the industrial centres of the centre and north and openly attacked Socialist and Labor halls and assemblies. In Bologna, where Socialists controlled the local government, hostile attacks destroyed the labor exchange and forced into flight the Socialist officials. The same events took place at Modena, Ferrara, and elsewhere. Fascisti were meeting Socialists on their own ground, with the result that blood was frequently spilled. The reaction made itself felt in the internal policies of the Socialist party. In January, 1921, the reformist Socialists and the Communists parted company, the points of disagreement being adherence to Russia and the espousal of violent means. The Communists

and the Fascisti now came into conflict at Florence, Palermo, and Spezia. There was fighting in Rome in July and again in November, but everywhere it began to appear that Fascisti and not Communists were gaining the upper hand. The events of the next year were being foreshadowed with remarkable clearness.

Meanwhile the government was in difficulties. The price of bread, still fixed by the government, which was compelled to make purchases abroad at great losses, was the greatest cause for dissension. This, and the feeling that Parliament no longer represented the country, hastened Giolitti's decision to dissolve the Chamber. The new election, held on May 15, 1921, did not produce any startling results. Of the 535 members, 107 returned were Catholics, 122 were Socialists, 16 Communists, and 275 Constitutionalists of various shades. In the new Parliament the government's foreign policy met with the sharpest criticism, with the result that Giolitti resigned. Signor Bonomi now constituted a cabinet that represented all parties except the Socialist. His stay was not long, for criticisms appeared from all quarters. The failure to secure participation in the Four Power Treaty, the inability to cope with the economic problems and the ever-present lawlessness of Communists and Fascisti, and the antagonism that greeted what seemed a too friendly attitude toward Catholicism, precipitated a crisis. On Feb. 2, 1922, Bonomi resigned and only with difficulty could a new ministry be formed. Signor Facta eventually constituted a cabinet which fell on July 10 but was compelled to return because no other group could gain the confidence of the Chamber. The menace to the state was not Communism now, but Fascism.

The strength of the Fascisti waxed greater as the year progressed. Fascisti and Communists continued their warfare openly amid a general helplessness. There was fighting in Rome, Bologna, Genoa, Trieste, Alessandria, and Parma, and a Fascisti force took Fiume and drove out the provisional government (March 3). New recruits were continually filling out the ranks. On Aug. 21, 1922, the syndicate of railway men went over to the Fascisti; in the same month, with the connivance of the transport workers, Fascisti seized the ports of Genoa and Naples. On September 1, a body of 4000 moved on the town of Terni and captured it. In October, the Fascisti took it upon themselves to Italianize the German populations of the Trentino which had been accorded racial autonomy. The schools were closed and the local councils dismissed while the military was unable to intervene. It was thus evident that Fascism was exerting a force far superior to that of the constituted authorities. Signor Mussolini, the leader of the movement, demanded for his party the cabinet portfolios of Foreign Affairs, War, Navy, Labor, and Public works. An offer of several minor cabinet posts was tartly refused, and at the annual convention of the Fascisti at Naples Signor Mussolini declared, "either the government of the country must be given peacefully to the Fascisti, or we will take it by force." As the cohorts of black-shirted Fascisti began to mobilize against the capital, Premier Facta bowed before the impending storm and resigned office, October 26. Thereupon Mussolini, summoned by the compliant King, entered Rome in triumph, formed a cabinet on October 30, and declared, "To-day Italy has not

only a cabinet, but a government." His successful intimidation of the Chambers gained him a vote of complete authority. In the ensuing years the career of Mussolini was, in large part, the history of Italy. The conciliatory tone of the new government surprised many, and the strong measures for the economic reconstruction of the country gave a new impetus to manufacturing and trade. Opposition was stilled, the fear of the swift arm of the black-shirted Fascisti succeeding in overawing dissident groups. On December 16, Mussolini, not as head of the state, but as leader of the Fascisti, moved against all armed organizations through the creation of a newly nationalized militia of 80,000 men. Fascisti organs frankly advocated the suppression of the freedom of the press and the death penalty for the opponents of Fascism. Throughout the year 1923, Mussolini's hold tightened. The parade of reforms executed made a brave show. The desperate financial situation was manfully tackled and the budget for 1923-24 showed a smaller deficit than any previous post-war year; the middle classes were conciliated by the abolition of 9 out of the 13 sources of direct taxation; the inheritance tax was dropped; many onerous duties on necessities were removed; expenditures were cut down through the elimination of useless functionaries and the dismissal of extra employees, on the railways in particular. In the field of public works, sums were allotted for the rebuilding of Messina, the construction of aqueducts in Sardinia, the rebuilding of the harbor at Naples, and for constructing new railways in Sicily. Railways, something unheard of before, ran on schedule time, notable reforms were achieved in the Department of Justice, as many as 500 local courts and four of the five courts of cassation being suppressed. In educational matters, the changes were far reaching. Religious education was made compulsory; vocational guidance was stressed; and, as a move against too zealous an application of the democratic dogma, a limit was placed on the number of free students in state institutions. The state, too, proceeded to relinquish its participation in industry. Several state monopolies, notably the match industry, some telephone services, and concessions for building railways, were surrendered. In administration, the process of centralization went on speedily: five ministries concerned with internal affairs were consolidated into one as were also the ministries of finance and the treasury; the former practice of ministerial reports to Parliament was replaced by a single message for all the departments from Mussolini himself; the rule of merit was applied to promotions; working conditions for state employees were improved. Never were relations between Italy and the Vatican more cordial. In short, in every field of activity the new administration could point with pride to some just change or some alleviation of old distresses. Whether, however, reforms of this character had any claims to permanency or whether they had the whole-hearted approval of the Italian population it was impossible to say, at least, in 1923, for the free exercise of opinion and the give and take through which a democracy functions were almost wholly lacking.

The Communists were moved against with severity. On February 10, leaders of the party were seized and arrests in all parts of the coun-

try followed. On January 25, on a charge of interfering in politics, the General Workers' Union of Turin was dissolved; and in March, the editor of the radical Socialist *Avanti* was arrested by order of the prime minister. At Venice, Rome, and Florence, Communist disorders were put down with a high hand. A general order prohibited the publication by newspapers of false or biased reports, or reports tending to excite class hatred, or subvert the respect due to national institutions, the Pope, and the state. By the passage of an electoral reform measure in July, 1923, Fascism's hold was strengthened, for the act gave the party polling a plurality of the votes in an election two-thirds of the seats in the Chamber. On December 10, a decree was promulgated dissolving the Chamber and ordering a new election. Mussolini made it plain on that occasion that he would request a renewal of his dictatorial powers from the new Parliament.

In the domain of foreign affairs the same resoluteness of purpose was marked. It became increasingly evident that Mussolini's foreign policy was aimed at a speedy intimidation of Jugo-Slavia and the establishment of Italy in a commanding position not only in the Adriatic but in the Mediterranean as well. Several events pointed to this end. The murder on Greek soil, in August, 1923, of Italian officers on their way to participate in the delimitation of the Græco-Albanian frontier was immediately followed by a drastic ultimatum to Greece which demanded full apologies and an indemnity of 50,000,000 lire. Greece's desire to discuss the matter first, before yielding up, as she believed, her national honor, was sternly rejected, with the result that an Italian fleet was sent to Corfu and ordered to open fire. In the bombardment of the island 20 refugees were slain and 30 others wounded. Mussolini's refusal to consider the matter as lying within the jurisdiction of the League of Nations and his defiance of Great Britain even in the face of a threat to cut off his coal supply, for the moment seemed to threaten an international crisis. For a week uncertainty prevailed, when Mussolini was induced to accept the Council of Ambassadors as arbiter. On September 7, the Council decided in favor of practically all of the Italian claims: apologies were to be rendered to the Allied representatives as well as naval salutes to the flags of the Allied ships; official mass for the dead was to be celebrated at Athens; and military honors bestowed on the Italian victims. Inasmuch as the search for the murderers had been carried on half-heartedly, Greece was ordered, on September 26, to pay the 50,000,000 lire demanded as an indemnity. On the other hand, Italy agreed to evacuate Corfu before October 1. Toward Jugo-Slavia Mussolini applied something of the same methods. The execution of the Treaty of Rapallo he regarded as a surrender of Italy's just claims and upon Jugo-Slavia's insistence that the matter be brought to a close, Mussolini on August 30 dispatched a peremptory note to Belgrade in which he declared that the only settlement acceptable to Italy would be the inclusion of Susak (including the Baros Basin) in the Fiume Free Port area. Jugo-Slavia refused to be intimidated. The result was the dispatching of an Italian force into Fiume on September 16 and the establishment of a military protectorate. It is true that this did not change mat-

ters any, for it merely gave official approval to what had been a virtual Italian occupation by the Fascisti over the previous 18 months. In the face of so trying an incident the Jugo-Slav government remained cool, contenting itself with the statement that the matter was to be submitted to the League of Nations which had, only shortly before, registered the Treaty of Rapallo. The crisis, however, was settled without recourse to the League. Direct negotiations led to the signature at Rome in January, 1924, of a treaty whereby Fiume was yielded to Italy and the River Eneo fixed as a boundary. Porto Barros, however, was included in Jugo-Slavia, and arrangements were made to facilitate Jugo-Slav commercial access to the sea through Fiume and Porto Barros. Furthermore, each nation pledged neutrality in case the other should be attacked by a third power; and both agreed to maintain the peace settlement. (See FIUME-ADRIATIC CONTROVERSY.) In the eastern Mediterranean the same success attended Italy's efforts. In the fall of 1922, as Turkish success over Greece seemed assured, the Italian government repudiated the Treaty of Sèvres by which it had consented to the evacuation of the Dodecanese (q.v.) and indicated that it meant to prolong its occupation of the islands. The Treaty of Lausanne of 1923 put the stamp of approval on this act. By it the 13 islands in question, including Rhodes, were yielded up to Italy and not to Greece, in spite of the prevailingly Greek population. Other incidents of the year pointed to the fact that Italy meant to assume a more important position in world affairs. In November the Spanish royal family, accompanied by Rivera, was received at Rome and the conversations carried on pointed to the fact that both nations meant to adopt a common Mediterranean and South American policy. This was indicated by the insistence of Italy on representation at the Tangier Conference, and later, in January, 1924, by the sending of a mission to South America for the creation of a more cordial attitude toward both Italy and Spain. That Italy was drawing away from France and once more assuming her traditional hostility was evident. On November 16, Mussolini declared that his government was opposed to further occupations of German territory; on November 30, he indicated that he was sympathetically disposed toward granting Russia *de jure* recognition. By the adoption throughout 1923 of commercial treaties with Spain, Albania, the Baltic States, Russia, Switzerland, Austria, Canada, and Czecho-Slovakia, it was seen that attempts were being made to shake off the old economic dependences and turn to new sources for raw materials. The year 1924 opened auspiciously for Fascism. Italy, by the Treaty of Rome, had gained Fiume and was firmly established in the Adriatic. Mussolini's foreign policy continued to meet with triumph after triumph. First Jugo-Slavia, then Russia (which was granted *de jure* recognition, February 7), then Poland (which was promised, in April, a loan of 400,000,000 lire), then Czecho-Slovakia (as a result of the treaty of friendship of May 17), were drawn into the Italian European system and the hold of France on Central and Eastern Europe greatly weakened. Too, Mussolini, in June, had come to an amicable understanding with Great Britain over the Jubaland question (see AFRICA) and negotiations were under way

with Rumania for the settlement of the long-outstanding dispute over the repayment of the Italian loan. As never before, Italy was at peace with the whole of Europe. In internal affairs, Fascism seemed firmly entrenched, and every indication showed it had become an integral part of the Italian national life. In the election of April 6, the Fascisti polled 65 per cent of the vote cast and returned 375 seats to the new Chamber. The Opposition was hopelessly divided, being made up of 40 Popular party, 25 Socialists, 22 Maximalists, 17 Liberals, 17 Communists, 12 Constitutional Opposition, 11 Social Democrats, 7 Republicans, 3 Peasant party, 2 Slavs, 2 Germans, 2 Sardinian autonomists. The new Parliament was opened with the old pomp, May 24, and King, Court, and Mussolini basked in the approbation of the Roman populace. It was the calm preceding a storm. The kidnapping and murder of the Socialist deputy Matteotti, in June, the implication of members of the Mussolini Cabinet in this and other outrages, the evidences that deluged the press of the continued high-handed character of Fascisti methods, rocked Italy. The demand for constitutional liberty, for the first time in two years, once more seriously raised its head. All parties of the Opposition, except the Communists, met to present the following demands to the government: that the government restore order; that the Fascista

Militia be abolished; that all illegality be moved against. Mussolini accepted the first and third demands, temporized about the second for a time, and then completely yielded by consenting to the incorporation of the Fascista Militia into the Army. In July a reconstruction of the ministry followed and concessions were made to the Opposition by the incorporation of non-Fascisti in the Cabinet. Mussolini, by yielding to Parliament, had become like other European premiers, merely the head of a parliamentary government. See ITALIAN LITERATURE; NAVIES OF THE WORLD; SOMALILAND; TANGIER CONTROVERSY; WAR DIPLOMACY.

IVANOV, VYATCHESLAV I. (1866-). A Russian poet, one of the most learned of the moderns. He has also distinguished himself as historian, philologist, and philosopher. He joined the Decadents first as a critic and essayist. His first volume of poems, *Guiding Stars*, was published in 1903. He published three later volumes, the last one in 1917. After Pushkin, he is perhaps the greatest mold of the Russian language. In his earlier poems he used Greek words and syntax to a point of incoherence, but his later works, the majority lyrical, show no trace of this pedantry. His models were Pushkin, Dante, Petrarch, and especially Goethe. The sonnet is his favorite poetic form. Besides verse and essays he wrote some tragedies.

J

JACKSON, ABRAHAM VALENTINE WILLIAMS (1862-). An American Orientalist (see Vol. XII), professor of Indo-Iranian languages at Columbia University since 1895. He traveled in India, Persia and Central Asia between 1901 and 1918. He is editor of a *History of Persia* and, among other works, of *Early Persian Poetry* (1920).

JACKSON, CHEVALIER (1865-). An American laryngologist, born at Pittsburgh. He obtained his medical degree at Jefferson Medical College in 1887 and was appointed professor of otolaryngology in the University of Pittsburgh, resigning in 1916 to accept the chair of laryngology at his Alma Mater. Dr. Jackson is one of the pioneers in the new development of laryngology known as tracheobronchoscopy, having studied under Professor Kilian of Germany, the inventor of the bronchoscope, an instrument which is of great value not only in diagnosis but in the location and removal of foreign bodies in the deep air-passages. He has been a prolific contributor to periodical literature in various subjects which pertain to laryngology, bronchoscopy, rhinology, otology, etc. His first textbook, *Tracheobronchoscopy*, appeared in 1907, and his monograph *Bronchoscopy and Esophagoscopy* was issued in 1922. In 1923, there appeared in French the volume *Endoscopie et chirurgie du larynx*. Up to the first of the year 1924, Professor Jackson had preserved over 1300 foreign bodies successfully removed by him from the bronchi as the nucleus of a museum collection.

JACKSON, FREDERICK JOHN FOAKES (1855-). An American theologian, born at Ipswich, England. He graduated from Trinity College, Cambridge, in 1879, and was fellow of Jesus College from 1886, and dean and assistant tutor at the same college from 1895 to 1916. In the latter year he was appointed Briggs graduate professor of Christian institutions at the Union Theological Seminary. In 1916, he was also Lowell lecturer in Boston. He was a member of several learned societies and was the author of *The Christian Church* (1891); *Biblical History of the Hebrews* (1903); *St. Luke and a Modern Writer* (1916); *Introductions to Church History* (1920). He also edited several theological works.

JACKSON, HENRY EZEKIEL (1869-). An American clergyman and author, born in Chester County, Pa., and educated at Princeton Theological Seminary. He was ordained to the Presbyterian ministry in 1896, and after holding several pastorates, the Community Organization of the United States Bureau of Education at Washington, D. C., secured his services as special agent, which post he held from 1916 to 1920. Later he became president of the National Community Board at Washington, D. C. His writings include: *Benjamin West, his Life and Work* (1900); *Great Pictures as Mor-*

al Teachers (1910); *The Legend of the Christmas Rose* (1914); *The New Chivalry* (1915); *A Community Center, What It is and How to Organize It* (1918); *The League of Nations* (1919); *A Community Church* (1919); *What America Means to Me* (1920); *Robinson Crusoe, Social Engineer* (1922); *The Thomas Jefferson Bible* (1923).

JACKSONVILLE. A city of Florida. The population increased 58.6 per cent in ten years, from 57,699 in 1910 to 91,558 in 1920 and to 100,046 by estimate of the Bureau of the Census for 1923. A new charter was passed by the State Legislature in 1917 providing for an elected council of 21 members and a commission of five members. The Mayor is elected for two years. A bridge 3800 feet long with a vertical lift draw was built in 1921 across the St. Johns River at a cost of \$1,250,000. Bank clearings rose from \$124,657,071 in 1910 to 571,389,000 in 1923, and total deposits from \$18,102,000 to \$58,647,897, building permits increased from \$3,184,940 to \$5,831,078.

JACOBS, THORNWELL (1877-). An American educator, born at Clinton, S. C. He graduated from the Presbyterian College, S. C., in 1894, and from the Princeton Theological Seminary in 1899. In the same year he was ordained to the Presbyterian ministry and was pastor in North Carolina for several years following. In 1915, he founded, at Atlanta, Ga., Oglethorpe University, and was its president from that date. He is the author of *The Law of the White Circle* (1908); *Midnight Mummer*, poems (1911); *The Oglethorpe Story* (1916); *Life of Plumer Jacobs* (1918).

JACOBSEN, SIEGFRIED (1881-). A German writer. He was born in Berlin and studied at the university. He became dramatic critic of *Die Welt am Montag* and in 1905 founded his own magazine devoted to the drama, *Die Schaubühne*, through which he exercised considerable influence over the theatrical life of Germany. He was also dramatic correspondent for *Die Zeit* and other Viennese papers. He is the author of: *Das Theater der Reichshauptstadt* (1904); *Max Reinhardt* (1910); *Der Fall Jacobsen* (1913); and *Die ersten Tage* (1917).

JACOBY, HENRY SYLVESTER (1857-). An American educator, born at Springtown, Pa. He was graduated from Lehigh University in 1877 and during the season of 1878 was connected with the topographical corps of the Pennsylvania Geological Survey. During 1879-85, he was chief draftsman in the United States Engineer's Office in Memphis, Tenn. In 1886, he returned to Lehigh, where until 1890 he was instructor of civil engineering; he then accepted a call to Cornell, where in 1897 he became professor of bridge engineering. Professor Jacoby has long been a fellow of the American Association for the Advancement of Science and in 1901 presided over the Section on Engineering,

with the rank of vice-president, and was president of the Society for the Promotion of Engineering Education in 1915-16. Besides numerous papers on his specialty of bridge engineering, he is the author of: *Notes and Problems in Descriptive Geometry* (1892); *Outlines of Descriptive Geometry* (Part 1, 1895; 2, 1896; 3, 1897); *Text Book in Plain Lettering* (1897); with Mansfield Merriman, *Text Book on Roofs and Bridges* (1890-8); with R. P. Davis, *Foundations of Bridges and Buildings* (1914); and *Structural Details, or Elements of Design in Timber Framing* (1919).

JAENSCH, ERICH R. F. (1883-). A German philosopher and director of the psychological institute and philosophical seminary at Marburg. He strives for a closer relation between philosophy and psychology and has written among other works *Einige allgemeine Fragen der Psychologie und Biologie des Denkens* (1920).

JAGGAR, THOMAS AUGUSTUS (1871-). An American geologist, born in Philadelphia, Pa. He was graduated at Harvard in 1874, and received his Ph.D. in 1897; he also studied at Heidelberg and at Munich. In 1895, he became an instructor of geology at Harvard, where he remained until 1906, attaining in 1903 an assistant professorship. Then he accepted a call to the Massachusetts Institute of Technology, where he was professor of geology and head of the Department. During 1898-1904 he also served the United States Geological Survey as an assistant geologist. He was director of the Hawaiian Volcano Observatory (1912-19) and in 1919 became volcanologist to the United States Weather Bureau, stationed in Hawaii. Volcanology has been his specialty and he has studied chiefly the volcanoes of the Aleutian Islands, Hawaii, Japan, Italy, New Zealand, and Central America, to most of which he has made expeditions, and descriptions of which he has published in papers or reports, notably those of the Hawaiian Observatory. Dr. Jaggar also delivered popular lectures on the phenomena of volcanoes, illustrated by photographs of his own making.

JAGIĆ, VATROSLAV (1838-1923). An Austrian philologist, (see Vol. XII). His recent works are *Beitrag zur Erforschung der altkirchenslavischen Evangelientexte: Evangelium Bucovinense* (1916) and *Zum altkirchenslavischen Apostolus* (1919-21). He also edited Johannes Paprek's *Slavische Brautwerbungs- und Hochzeitsgebräuche* (1914).

JAGOW, GOTTLIEB VON (1863-). A German diplomat (see Vol. XII). He was state secretary for foreign affairs from 1913 to 1914, and was retired in 1916. He added to the literature of the War with his *Ursachen und Ausbruch des Weltkrieges* (1919).

JAHN, GEORGE MAX (1885-). A professor at the technical high school of Braunschweig. He was born in Leipzig and studied history, philosophy and political science at the universities of Leipzig and Jena. He was director of the municipal high school for girls in Jena and lecturer on political economy at Leipzig. He is the author of: *Die Gewerbepolitik der deutschen Fürsten vom 16. bis zum 18. Jahrhundert* (1909); *Verstaatlichung und Vergesellschaftung* (1919); *Grundzüge der Volkswirtschaftslehre* (1920). He also edited several economic magazines.

JALOUX, EDMOND (1878-). A French

novelist. His works include: *L'Agonie de l'Amour* (1899); *Les Sangsues* (1904); *Le Jeune Homme au Masque* (1905); *L'Ecole des Mariages* (1907); *Le Démon de la Vie* (1908); *Le Reste est Silence* (1909); *Le Boudoir de Proserpine*; *L'Eventail de Crêpe* (1911); *Fumées dans la Campagne* (1915); *L'Incertaine* (1918); *Les Amours Perdues* (1919); *Au dessus de la Ville*; *Vous Qui Faites l'Endormie* (1920); *L'Ennemi des Femmes* (1921); *L'Escalier d'Or*; *Les Profondeurs de la Mer*; *Les Barricades Mystérieuses*; *Le Roi Cophétua* (1922).

JAMAICA. An island of the British West Indies; area, 4207 square miles; population in 1911, 831,383 and in 1922, 885,692. According to the census of 1921, the East Indian population was 18,610 as compared with 17,380 in 1911, and the Chinese 3696 as compared with 2111. Kingston, the capital, had 62,707 inhabitants in 1921 and 57,379 in 1911. The leading activity of the population continued to be agriculture. Sugar cane once more advanced to a place of importance, the acreage under the cane being 55,431 in 1921-22 (31,753 in 1912-13). Other crops with their acreages in 1921-22 were (1912-13 figure in parentheses): bananas, 58,282 (81,071); coffee, 19,918 (22,275); coconuts, 38,183 (17,377); cocoa, 14,673 (11,236); ground provisions, 69,159 (99,632). The year 1922, from the planters' point of view, was one of deficient rainfall, and in some sections of the Island acute conditions of drought prevailed so as to cause serious loss and suffering to the community. The reflex consequences of the rainfall of 1922 were, however, shown in the cases of some crops, such as sugar. The sugar industry achieved the high record of 50,655 tons of sugar, or more than double the quantity exported in 1921. Exports in 1922, in the order of importance, were bananas, sugar, logwood extract, coffee, coconuts, cacao, logwood, and rum. The values of imports in 1912, 1920, 1921, and 1922 were, respectively, £3,040,500, £10,313,282, £5,473,800, and £4,581,000. Exports for the same years were valued at £2,709,283, £7,146,010, £3,357,700, and £4,623,700. The export figures reveal the fact that the declining prices of 1921 recovered their stability during 1922 and may be said to have been more or less normal. Imports and exports from and to the United Kingdom in 1922 were (1912 figure in parentheses): £1,301,562 (£1,333,352) and £1,120,593 (£358,516). For the United States: £2,091,591 (£1,273,389) and £2,284,838 (£1,618,614). There was no change in administration. Women were enfranchised in 1919. Government accounts follow for 1922-23 (1912-13 figures in parentheses): revenue, £2,057,412 (£1,432,400); expenditure, £1,949,034 (£1,549,667); public debt, £3,662,000 (£3,843,974).

JAMES, HERMAN GERLACH (1887-). An American lawyer and author, born at Philadelphia, Pa. He was graduated from the University of Illinois in 1906 and studied law at the Harvard Law School. In 1909, he was admitted to the bar and after official service in Santiago, Chile, was lecturer at the University of Leipzig in 1911. In 1912 he became a member of the faculty of the University of Texas as professor of government. During the War he served as organizer and representative of the War Camp Community Service. He was a member of many economic and learned societies and was the author of several books on legal

and municipal subjects, including *A Handbook of Civic Improvement* (1915), *Municipal Functions* (1917), and *Local Government in the United States* (1921).

JAMIESON, CHARLES CLARK (1866-). An American engineer, born at Glover, Vt. He was graduated at the United States Military Academy in 1892, became a second lieutenant in the 15th Infantry, and continued in the United States army until 1906, when on account of disability in line of duty he was retired with the rank of major. In 1910, he was recalled to the service but was again retired in 1918, having in the meanwhile attained the provisional rank of brigadier-general in the National Army. He later became connected with various engineering undertakings, notably with George W. Goethals and Company. During the War he was on duty in Washington as assistant to the chief of production division, then its chief, and later as special assistant to the chief of ordnance until 1918, when he was made director of sales of property acquired by the War Department after Apr. 6, 1917.

JANET, PIERRE (1859-). One of the foremost French psychologists, born in Paris. Nephew of the philosopher Paul Janet, he combined in his education a deep philosophical culture and a thorough mastery of the medical sciences. Like Freud, he was the pupil of the great French alienist, Charcot, but he developed the latter's theories along lines much more sober than those of his Viennese colleague. After teaching philosophy in a lycée at Le Havre, he began to devote himself to a clinical observation of psychopathic cases. His first work, *L'Automatisme Psychologique* (1889), singled him out as a leader in this field. Then followed in succession researches on hysteria, *L'Etat Mental des Hystériques* (2 vols., 1893) and on neuroses, *Névroses et Idées Fixes* (2 vols., 1898). In 1903, he founded the *Journal de Psychologie*, and on the death of Ribot he succeeded to the latter's chair at the Collège de France. He was elected in 1918 to the *Académie des Sciences Morales et Politiques*. Professor Janet made two visits to this country as the representative of French psychology. On his first visit, he delivered a course of lectures on *The Major Symptoms of Hysteria* (published 1908).

Without building a system, M. Janet oriented his psychology around the notion of a hierarchy of states of consciousness, ranging from conscious reflection to a biological automatism that is almost indistinguishable from the mechanism of a machine. No attempt is made to "construct" consciousness, but all analyses are made from within conscious experience.

Besides the works mentioned above, M. Janet is the author of *Obsessions et la Psychasténie* (2 vols., 1903), *Les Médications Psychologiques* (3 vols., 1919-21), and *La Médecine Psychologique* (1923). See PSYCHOLOGY, ABNORMAL.

JANEWAY, THEODORE CALDWELL (1872-1917). An American physician, son of the late Dr. E. G. Janeway. He was born in New York City, took his bachelor's degree at Yale and received his medical degree from Columbia (College of Physicians and Surgeons) in 1895. He followed in the footsteps of his father as diagnostician and consultant, was visiting physician to St. Luke's Hospital and in 1907 became professor of the practice of medicine at his alma mater, resigning in 1914 to occupy the chair of

medicine at Johns Hopkins, where he was also physician in chief of the University Hospital. He was very active during the War and his labors are believed to have caused his premature decease at the age of 45. Dr. Janeway did much to promote the study of blood pressure and his only publication in book form is *Clinical Study of the Bloodpressure* (1904).

JANIS, ELSIE (?-). An American actress born in Columbus, Ohio. She first appeared on the stage as Cain in *The Charity Ball* (1897); played in vaudeville (1898-1903); then starred in *The Belle of New York* (1904). She appeared later in *The Fortune Teller* and *The Duchess*, and starred in *The Vanderbilt Cup* (1906-08). Under the management of Charles B. Dillingham she took the leading rôle in *The Hoyden*, *Fair Co-ed*, *The Slim Princess*, and also in *Elsie Janis* and *Her Gang* (1920), of which she is the author.

JAN MAYEN. This Arctic island, in about 71° north latitude, 8° west longitude, is equidistant from Greenland and Spitzbergen. Discovered by Hudson in 1607, it later became economically important through its occupation by the Dutch whalers. With the decadence of that profitable fishery, Jan Mayen was abandoned and became a no-man's land. Fog-beshrouded, it has been rarely visited. From 1920 it was occupied by Norway. The meteorological station established there was sending to Christiana daily wireless reports, which were proving valuable in forecasting the advance of the violent and destructive gales of the North Sea.

JANSON, KRISTOFER NAGEL (1841-1917). A Norwegian author (see VOL. XII). Among his last works are: *Aspasia*, novel (1914); *Norske Eventyr som taletikster* (1915); *Mangelslags kjaerlighed*, published posthumously in 1923.

JANTZEN, HERMANN (1874-). A German writer. He was born at Breslau and studied at the university of that city. He was director of the Victoria Institut of Breslau (1900-05), then went in the same capacity to the Königin Luise Institut at Königsberg. His works include: *Geschichte des deutschen Streitgedichts im Mittelalter* (1896); *Gotische Sprachdenkmäler* (1898); *Saxo Grammaticus* (1901); *Deutsche Literaturgeschichte* (1904); *Königin Luise* (1910); *Ostpreussische Sagen* (1912); *Von deutscher Schule und Erziehung* (1915); *Ueber Erziehung und Unterricht* (1918). He also edited: *Literaturdenkmäler des 14. und 15. Jahrhunderts* (1903); *Goethe's Egmont* (1914); *Hebbel's Nibelungen* and *Agnes Bernauer* (1919); and Grillparzer's *Sappho* (1903).

JAPAN. An empire of the Far East. It consists of Japan proper, made up of the islands of Hondo, Shikoku, Kyushu, Hokkaido, and of Chosen (Korea), Taiwan (Formosa), Karafuto (Sakhalin), as well as 600 smaller islands, including the four archipelagos the Pescadores, Agasawara (or Bonin group), Okinawa (or Linchu group), Chishima (or Kuriles). The total area is 268,330 square miles. The total population of Japan, according to the census of 1920, was 77,005,510, distributed as follows: Japan proper, 55,961,140; Formosa, 3,654,308; Karafuto, 105,765; Korea, 17,284,207. The density of population was 286 to the square mile. One-sixth of the land was under cultivation, and the population was predomi-

nantly rural, 41 per cent of the people living in villages of between 2000 and 5000 inhabitants, 19 per cent in towns of between 5000 and 10,000 inhabitants, and 9 per cent in towns of between 10,000 and 20,000 inhabitants. Only 12 per cent of the population were in cities of over 100,000 inhabitants. In 1920, there were 581,431 Japanese residing abroad: 274,565 in Asia; 2944 in Europe; 135,667 in North America; 47,571 in South America, and 120,612 in Oceania, principally in the Hawaiian Islands, where 112,221 Japanese resided. There were 115,533 Japanese in the United States proper, 77,230 in California alone. Principal cities, 1920: Tokyo, 2,173,162; Osaka, 1,252,972; Kobe, 608,628; Nagoya, 429,990; Yokohama, 422,942; Kyoto, 299,689.

Foodstuff Production. The principal foodstuff and agricultural product was rice, the 1922 crop amounting to 309,570,000 bushels. It was still necessary to import, principally from Siam, China, Indo-China, and the United States, 3,006,688 bushels during 1922 in order to feed the population. In 1913, Japan produced 249,264,000 bushels of rice and imported 1,212,300 bushels, so even with increased production of 25 per cent imports tripled showing the tendency of population to outstrip food supply. During 1922 about 29,265,000 bushels of wheat were produced and 18,000,000 bushels imported. This was an 8 per cent increase in production and a 300 per cent increase in imports of wheat over 1913, indicating the growing use of wheat in the form of vermicelli as a substitute for rice. In 1921, about 44,252,000 bushels of barley were produced, nearly a 20 per cent decline since 1913, when 52,784,000 bushels were produced. This was due to the greater profit in wheat growing. In 1921, Japan raised 36,126,000 bushels of rye, and in 1920, 11,305,000 bushels of millet, the latter showing quite a decline from the 19,537,000 bushels produced in 1913. These latter grains furnished a valuable food for the poorer farmers who had to sell rather than consume their own rice. In 1920, Japan produced 4,437,430 bushels of white potatoes, almost double the 2,845,500 bushels produced in 1913, and 1,081,440 bushels of sweet potatoes, considerably more than the 829,767 bushels produced in 1913, the latter being a popular article of diet for the poor classes. Japan also produced in 1920, 21,180,000 bushels of soya beans. This was 50 per cent greater than the 1913 production of 14,845,000 bushels, the beans being used for making bean curd, to replace butter, and soya sauce. Also there were grown 5,297,000 bushels of red beans (almost double the 2,976,000 bushels of 1913) used as a supplement to the rice diet; 2,613,000 bushels of horse beans (slightly more than the 2,425,000 bushels of 1913), and 1,500,000 bushels of peas (a decline from the 1,847,000 bushels of 1913, other food crops being found more nutritious and profitable).

In 1921, Japan produced 143,000,000 pounds of leaf tobacco, the manufacture of which was a government monopoly. This was a substantial increase over 1913 production of 111,000,000 pounds. Other products included rape seed, indigo, hemp, sugar cane and crops of vegetables, including radishes, turnips, cabbages, flax, peppermint, and ginger, all in small quantities.

Raw Material Production. Raw silk was the most important money crop and was a subsidiary household occupation of the rice farmer.

It was produced throughout Japan, the principal districts being to the north and west of Tokyo in the centre of the main island. In 1921, production of raw silk amounted to 51,577,813 pounds, as against 30,900,000 pounds in 1913, and waste silk (produced by combing cocoons which have been pierced by the silk moth) to 19,650,659 pounds as against 9,086,000 pounds in 1913. Constant experimentation for the elimination of diseased eggs brought about this increase. This was approximately two-thirds of the world's silk production. In 1921, Japan exported 34,849,724 pounds of raw silk, and in 1922, 45,777,536 pounds, valued at \$335,023,771, 90 per cent of which went to the United States in each year. In 1921, Japan produced 96,350,000 pounds of tea, as against 72,520,000 pounds in 1913, one-fourth being produced in Formosa. Because of cheaper labor in India and Ceylon, Japan's tea production did not increase in proportion to world consumption in recent years. Practically all of Japan's tea, of which 28,478,133 pounds was exported in 1922, went to the United States.

Forestry. In 1920, Japan had a total of 54,842,000 acres in forests, 40 per cent of which was held by private individuals and corporations, 35 per cent by the state, 5 per cent by the Imperial household, and 20 per cent by communities. Due to a consistent reforestation policy this showed substantial increase over the 46,305,000 acres in 1913. Principal types of forest growth were pines, spruce, fur, cryptomeria, chestnut, oak, ash, beach, maple, cherry, magnolia and bamboo. Due to this policy of conservation of timber resources, Japan's imports of lumber increased from 8,734,356 cubic feet in 1920 to 33,593,670 cubic feet in 1921, mostly from the United States for construction purposes. In 1922, about 326,000 tons of wood pulp were produced from forests in Japan proper, Karafuto, and Korea. Considerable wood is used in the toy and match industries. Japan had almost a complete monopoly of the camphor supply of the world. The camphor tree grew most profusely in Formosa and had to be completely destroyed to obtain the product, which was distilled from the water in which the wood was boiled. The production declined as the trees became more inaccessible; 2,006,000 pounds were produced in 1921, only about one-third the 1913 production. In 1922, camphor exports totaled about \$3,600,000 in value, two-thirds of which went to the United States.

Minerals. In 1922, Japan proper produced 26,221,000 metric tons of coal, as against 21,315,000 tons in 1913, principally in the northern part of Formosa, in Kuyushu, Korea and Hokkaido. Coal exports in 1922 were 1,691,000 tons, only about two-thirds of the 1921 figures. Imports increased one-third to 1,169,000 tons in 1922. Japan produced 52,354 tons of copper in 1922, a steady decline from 1913 production of 73,940 tons and from peak figures of 79,128 tons in 1917, due to relatively high production costs. For the same reason, exports practically stopped in 1922 as Japanese copper prices were higher than world prices. Other mineral production in 1922 was: pig iron (including Korea) 77,262 metric tons, compared with 71,273 in 1913, and 514,361 tons at the war peak of 1918; iron sulphide ore, 113,015 metric tons; petroleum, 85,639,969 gallons in 1922 (amounting to half the annual consumption), compared with 81,179,000 gallons in

1913; silver, 3,940,874 ounces; and gold, 240,866 ounces produced in 1922 (mostly from Korea) compared with 4,680,000 ounces of silver and 177,000 ounces of gold produced in 1913.

Fisheries. The annual catch of Japan was about \$230,000,000 in value. In 1921, 1,755,965 long tons of fish were caught, 1,124,977 long tons for food, and the remainder for oil and fertilizer. Annual exports about \$8,000,000.

Pastoral Activities. In 1920, there were only 1,469,000 horses in Japan, a decline from the 1,579,000 in 1914, most of the draught work being done by human beings. There were 1,376,000 cattle in the same year, 133,232 goats, and 528,112 swine, as against 1,387,000 cattle, 45,000 goats and 332,000 swine in 1914. The area available for grazing in Japan proper was very limited, owing to the large amount of level land needed for rice cultivation and the very mountainous nature of the remaining terrain. Especial efforts on the part of the government were made during this period to increase the number of goats and swine. The number of sheep also increased from 2771 in 1914 to 8519 in 1920 through special encouragement to foster wool production.

Industries. The industrial population of Japan was slightly over 5 per cent of the total adult labor power of 31,000,000, amounting in 1921 to 1,686,353 people and 916,252 in 1913. Of this 1921 total, 945,788 were engaged, as against 609,638 in 1916, in textile factories; 249,102 in machine and tool factories, compared with 146,477 in 1916; 171,249 in chemical works and 105,139 in 1916; 143,554 in breweries, tea-drying establishments, flour and rice mills, compared with 44,908 in 1916; and 154,908 in printing, woodenware, gas and electric works, and foundries, compared with 79,188 in 1916. Government works employed 15,752 in 1921, a tremendous reduction from 157,902 in 1916, most of whom were in military factories. Wages paid laborers ranged in 1921 from 40 cents per day paid female silk spinners to \$1.50 per day for bricklayers. In 1913, the former were paid 14 cents per day and the latter 55 cents. In most trades, however, the yearly bonus and the separation bonus, received by an employee on his discharge, brought these figures up to 10 per cent more. Japanese labor was relatively inefficient compared with European and American labor, four or five persons being required as a rule to do the work of one skilled western workman.

Electricity. About 90 per cent of Japan's electric power was hydroelectric, 1,526,718 kilowatts being produced in 1921. This was nearly three times the kilowatt production of 1913, which was 590,856 kilowatts. Japan manufactured its own electric lamps, telephone and telegraph apparatus, and many of the motors and other apparatus used. There were 174,000 motors in use in 1921, 18,144,000 electric lamps supplying 6,986,000 households, 26 per cent of the supply being located in the six principal cities. \$381,000,000 was invested in the electrical industry in 1919, compared with only \$93,000,000 in 1916. Japan has available water power to supply approximately 2,330,000 kilowatts and this capacity was rapidly being filled. \$38,000,000 was the value of the output in the electrochemical industry in 1921, compared with \$59,000,000 in 1916, mainly in the manufacture of galvanized copper, calcium carbide,

nitrogen fertilizers, caustic soda, iron and steel alloy, cement and bleaching powders. This value of output had declined from \$88,000,000 in 1918, in which year large amounts of the product were for export. This fall was due to return to normal conditions, when it was found that domestic products could no longer compete on the world markets due to high production costs in Japan.

Cotton Spinning. \$143,399,000 was invested in cotton-spinning companies in 1921, operating 3,838,000 spindles, compared with \$42,910,000 in 1914 and 2,606,004 spindles in 1914. By April, 1923, the spindleage had increased to 4,172,384. This was just double the number operating in 1911. These spindles worked an average of 21 hours a day in 1922, producing in that year 2,228,307 bales of cotton yarn (compared with 1,666,184 in 1914), the largest amount in the history of the industry. Despite the destruction or temporary dislocation of 776,748 spindles in the earthquake of Sept. 1, 1923, the production for that year was 2,155,954 bales. A little over 15 per cent of this production was exported (394,062 bales) in 1922, the principal market being China. In 1914 when the production was 30 per cent less than 1922, Japan exported 569,999 bales of cotton yarn. The growth of the cotton industry in China, Japan's principal market, accounted for this decline.

Cotton Weaving. In 1921, 4556 cotton textile mills (employing five operatives or over), with 54,994 looms and employing 137,381 operatives produced \$332,000,000 worth of cotton textiles, consisting principally of 115,199,000 pieces of narrow and 834,503,000 yards of wide white cloth, 46,026,000 pieces of striped stuff, 203,865,000 yards of flannel, 5,879,000 pieces of crepe and 7,447,000 dozen towels, about two-thirds of which was consumed at home and the remainder of which went to China, India, and the Dutch East Indies. In 1913, 2087 mills with 85,565 operatives produced \$82,500,000 worth of cotton textiles consisting of 90,578,000 pieces of narrow white cloth, 23,588,000 pieces of striped stuff, 3,102,000 yards of flannel, 5,702,000 pieces of crepe, and 5,277,000 dozen towels. About 10 per cent of the looms were put out of commission in the earthquake.

Woolen and Worsted Weaving. In 1921, 932 factories and 17,868 looms, employing 32,534 operatives, produced \$81,000,000 worth of woolen fabrics, including 53,265,000 yards of muslin, valued at \$35,000,000. Other products included woolen cloth, \$11,000,000; flannel, \$1,900,000; serges, \$1,350,000; blankets, \$1,350,000; and all other, \$21,000,000. Muslin output in 1913 had been 69,585,000 yards of which only 760,000 yards were exported. During the War most of the mills concentrated on production of serges and woolen cloth for uniforms, principally for Russia, leaving the stable muslin industry unorganized to combat post-war competition.

Chemicals. 21,920,000 pounds of caustic soda were produced in 1921 compared with 16,088,000 pounds in 1915, as well as 7,500,000 pounds of bleaching powder and 93,300 tons of superphosphate; while 64,570 tons of sulphuric acid were produced by 12 leading companies in the same year. Japan also produced 480,208,000 dozen matches in 1921, quite a decline from the 620,772,000 dozen in 1913 when Japanese

labor was relatively cheap. In 1920, 4,684,000 pounds of celluloid from domestic camphor, a great increase over the 1912 production of 412,000 pounds, due to growing demands for Japanese toys and other celluloid products produced under a systematic preference to camphor allotment for domestic manufacture at the expense of foreign celluloid producers.

Pottery, Glassware, Lacquerware, Brick and Cement. In 1921, Japan produced \$27,000,000 worth of porcelain and pottery (\$8,500,000 in 1913), \$5,000,000 worth of ordinary brick (\$2,400,000 in 1913), \$24,000,000 of tiles (\$5,900,000 in 1913), \$2,000,000 of pipes (negligible in 1913) and \$1,900,000 of fire brick (\$700,000 in 1913). In the same year, \$28,000,000 worth of glass and glassware were produced (\$3,500,000 in 1913), including plate glass, window glass, bottles, beads, and mirrors. The 1920 lacquerware production of dishes, vases, etc., was \$10,595,000, compared with \$4,350,000 in 1913; also, 7,686,000 barrels of Portland cement were produced in 1921, a considerable increase from the 1914 production of 2,207,500 barrels. The need for concrete construction to resist earthquake shock raised the productive capacity to 17,000,000 barrels in 1924.

Sugar Production and Refining. Sugar was produced in the Okinawa group (Loochu Islands) and in Formosa. There were in all 56 mills with a daily capacity of 38,600 tons in these islands, and 13 mills with 16,300 tons daily capacity in Japan proper. In 1921, Japan proper actually refined 335,000 tons of sugar, and Formosa produced 2,080,000 tons of cane, 234,000 tons of coarse, 38,000 tons of raw sugar, and refined 38,000 tons of sugar, shipping 244,000 tons in all of all three grades to Japan proper and exporting abroad 14,000 tons. In 1913, only 73,190 tons of sugar were refined in Japan proper, from 70,186 tons of crude material imported from Formosa. In 1913, 362,534 tons of sugar were imported from foreign countries, principally from Java. In 1920, this had fallen to 126,285 tons, showing the tendency in the development of the Formosan industry.

Sake, Beer, and Soy Brewing. In 1920, Japan produced 552,000,000 gallons of sake, the national liquor brewed from rice, 26,370,000 gallons of beer, and 134,068,000 gallons of soy sauce, brewed from wheat, salt, and soya beans and used like Worcestershire sauce in the native dietary. This was more than double the sake production of 1913, which was 214,048,000 gallons, and much of Japan's rice shortage was attributable to this fact. It was three times the beer production of 9,398,000 gallons in 1913. The soy production shows only a relatively slight increase over the 112,730,000 gallons production of 1913.

Iron and Steel. In 1921, 566,531 tons of pig iron and 557,286 tons of steel were produced, about half the estimated consumption. This shows small progress over the 345,600 ton production of pig iron and 405,100 ton production of steel in 1915. Japanese iron works had a capacity of 1,412,000 tons of pig iron (400,000 government owned and 1,012,000 private owned) and 1,033,000 tons of steel (750,000 government and 283,000 private). It was difficult to increase production to capacity because of competition from the United States and India. Only 87,000 tons of this production represented ores in Japan proper, the balance of 765,000 tons of iron ore coming from China

(70 per cent), and from Korea and Formosa (30 per cent).

Shipbuilding. Shipyards, which had increased from six in 1913 to 51 in 1918, fell to 27 in June, 1921. Only 59,000 tons were launched in 1922 compared with 619,064 tons in 1919. Amalgamation of small companies into larger units kept capital invested in this industry steady at \$72,000,000.

Communications. In 1921, Japan had 135,293 miles of telegraph, and 864,114 miles of telephone wire in operation, all under government ownership, compared with 121,677 miles of telegraph and 503,302 miles of telephone in 1914. Japanese-owned cables connected Japan with China, Siberia, the Philippines, Guam, and the outlying possessions in the Pacific. Danish and American-owned cables entered Japan, but the government operated the radio stations. Japan had 300,000 miles of roads, but only one or two were highways wide enough to permit use of automobiles, most of them being built for narrow-tread native carts and rickshaws. The 346,000 bridges, except those on the 1500-mile Tokkaido highway, extending from Nagasaki to Tokyo, and a few other wide roads, were mostly too narrow and too light for motor vehicles. There were 8475 miles of railway in Japan in 1921, 23 per cent, mostly short lines, being privately owned, and the balance, mostly trunk lines, being government owned. Only a few miles were as yet electrified. In 1913, there were 5987 miles of railroad. Canals were important only in the areas around Tokyo and Osaka, which are located on plains near shallow bays. Canal systems in these cities were important transportation factors.

Shipping. In 1921, Japanese steamer tonnage amounted to 3,206,125 compared with 1,513,000 tons in 1913 and sail tonnage to 1,259,934 compared with 487,000 tons in 1913. After 1920, Japanese shipping was greatly affected by decrease in tonnage which had fallen to Japanese ships as a result of withdrawals of European ships during the War. In 1922, 13,451 steamers and 447 sailing vessels entered Japanese ports, representing 35,795,276 and 65,037 tons respectively. During the same year, 13,421 steamers and 489 sailing vessels cleared, representing 35,556,897 and 69,561 tons respectively. The principal ports of entrance were, in order of importance, Kobe, Yokohama, Osaka, Moji, Yokkaichi, Nagoya, Wakamatsu, Nagasaki, Tsketoyo, Shimija, Otahu (in Hokkaido), Tsuruja, Miike, Naha and Hakata. Those of clearance were Yokohama, Osaka, Kobe, Moji, Nagoya, Shimija, Nagasaki, Otaru, Wakamatsu, Miike, Hokodate (in Hokkaido), Shimonoseki, Yokkaichi, Karatsu and Tsuruga.

Foreign Trade. In 1922 the total exports were \$818,725,908, of which raw silk was 41 per cent, cotton yarn 7 per cent, cotton shirting and sheeting 5 per cent, cotton tissue 5 per cent, habutai (woven silk) 3 per cent, pongee 2 per cent, coal 2 per cent, potteries 1 per cent, refined sugar 1 per cent, tea 1 per cent, knitted goods 1 per cent, paper 1 per cent, matches 1 per cent, machinery 1 per cent, lumber 1 per cent, waste silk 1 per cent, cotton crêpe 1 per cent, hardware 1 per cent, glassware 1 per cent, and all others 23 per cent. The United States took 45 per cent of Japan's exports, including 90 per cent of the raw silk, 25 per cent of the silk goods, 33 per cent of the pottery, 90 per cent of the tea, and 3 per cent of the paper.

China took 24 per cent of Japan's exports, including most of the cotton yarn, shirting, sheeting, paper tissues, and machinery. India took 6 per cent, including most of the silk goods, matches and glassware. France took 5 per cent, including the balance of the raw silk. Great Britain took 3 per cent.

In 1913 when exports were \$316,230,107, raw silk was 30 per cent, cotton yarn 11 per cent, cotton shirting and sheeting 2 per cent, cotton tissue 2 per cent, habutai 5 per cent, coal 3 per cent, potteries 1 per cent, refined sugar 2 per cent, tea 2 per cent, knitted goods 1 per cent, paper $\frac{1}{3}$ of 1 per cent, matches 2 per cent, machinery $\frac{1}{2}$ of 1 per cent, lumber 2 per cent, waste silk 2 per cent, glass $\frac{1}{2}$ of 1 per cent, and all others, $33\frac{1}{3}$ per cent.

In 1922, total imports were \$945,154,116, of which 23 per cent was raw cotton, 6 per cent machinery and parts, 5 per cent oil cake, 5 per cent lumber, 4 per cent iron plate, 4 per cent sugar, 4 per cent rice, 3 per cent wheat, 3 per cent wool, 3 per cent woolen tissues, 3 per cent woolen yarns, 2 per cent beans and peas, 2 per cent iron bars and rods, 1 per cent ingots and slabs, 1 per cent paper, 1 per cent kerosene, 1 per cent fresh eggs, 1 per cent flax hemp, jute and China grass, 1 per cent coal, 1 per cent mineral oils, and 26 per cent all others. The United States supplied Japan with 31 per cent of her imports, including 40 per cent of the raw cotton, 41 per cent of the machinery, 70 per cent of the lumber, 60 per cent of the iron bars, rods and plates, 80 per cent of the kerosene, 18 per cent of the paper. India supplied Japan with 14 per cent of her imports, including 49 per cent of the raw cotton and 28 per cent of the ingots and slabs. Great Britain supplied Japan with 13 per cent of her imports, including 37 per cent of the machinery, 15 per cent of the iron bars, etc., and most of her woolen tissues. China supplied Japan with 10 per cent of her imports, including 10 per cent of her raw cotton, 40 per cent of her ingots and slabs, and most of the eggs, China grass, and coal. Kwantung Leased Territory (in South Manchuria) supplied Japan with 8 per cent of her imports, including most of the wheat, beans, and peas. Germany supplied 6 per cent of Japan's imports, including chemicals and dyestuffs, and Australia supplied 4 per cent of Japan's imports, including most of the wool. In 1913, when imports were \$364,715,822 raw cotton accounted for 32 per cent, machinery and parts 5 per cent, oil cake 5 per cent, lumber $\frac{1}{3}$ of 1 per cent, iron plate 1 per cent, sugar 5 per cent, rice 7 per cent, wheat 2 per cent, wool 2 per cent, woolen tissues 2 per cent, woolen yarns 2 per cent, beans and peas 2 per cent, iron bars and rods 2 per cent, iron ingots and slabs 2 per cent, paper nil, kerosene oil 2 per cent, fresh eggs $\frac{1}{4}$ of 1 per cent, flax, hemp, jute and china grass 1 per cent, coal $\frac{3}{4}$ of 1 per cent and mineral oil negligible, with all others 28 per cent.

Finances. The total national debt increased from \$1,265,000,000 at the end of 1914 to \$1,861,000,000 at the end of 1922, the internal debt increasing from \$518,000,000 in 1914 to \$1,184,000,000 in 1922, while the foreign debt increased from \$647,000,000 in 1914 to \$677,000,000 in 1922. This increase during the War was necessitated by Japan's participation in the capture of Shantung from Germany in 1915 and the Siberian expedition with the Allies in 1917.

After the Armistice, \$55,500,000 of the foreign indebtedness was converted into internal debt. To offset her foreign indebtedness, Japan held \$307,500,000 in specie abroad in December, 1922, and held foreign government bonds of approximately \$222,500,000 as well as other investments abroad of \$400,000,000. In 1922, Japan imported about \$127,000,000 more in merchandise than she exported. To offset this, Japan's invisible balance of international payments was in her favor to the extent of \$121,000,000, leaving a net "unfavorable" balance of international payments against Japan for 1922 of \$6,000,000. These invisible items included the following to the credit of Japan, totaling \$298,500,000: government transactions, \$30,000,000; freight and charter income, \$95,000,000; expenditures of foreign shipping interests in Japan, \$10,000,000; expenditures of foreign tourists in Japan, \$16,000,000; remitted by Japanese business men and residents abroad, \$39,500,000; income from foreign investments, \$23,000,000; insurance and other premiums, \$30,000,000; French and British bonds payable, \$25,000,000; and other income, \$30,000,000. Offsetting these were the following to the debit of Japan, totaling \$178,000,000: interest on foreign bonds, \$49,000,000; payments by Foreign Office for consulates and embassies abroad, \$26,000,000; expenses of Japanese shipping companies abroad, \$32,500,000; expenditures of Japanese abroad, \$19,000,000; income of foreigners in Japan remitted abroad, \$6,500,000; insurance and other premiums, \$37,500,000; expenditures by Japanese business houses abroad, \$1,500,000; other expenditure, \$6,000,000.

Budget and National Wealth. In 1914-15, the annual budget showed a revenue of \$369,000,000 and expenditures of \$324,000,000, or a surplus of \$43,000,000. The budget for 1921-22 balanced at \$846,000,000, and that for 1922-23 at \$673,000,000, a reduction of \$173,000,000, chiefly due to decreased expenditures on the army and navy. The outstanding note issue of Japan on Aug. 1, 1923, amounted to \$736,376,500 with gold holdings of the government and Bank of Japan on the same date of \$800,000,000. National wealth of Japan was estimated at from \$32,000,000,000 to \$49,000,000,000, or \$575 per capita. Per capita taxation had increased from \$2.55 in 1903-04 to \$4.30 in 1913-14 and to \$7.10 in 1919. After that, it dropped about 25 per cent (1923). The per capita national debt in 1903-04 was \$5.65, but in 1913-14, it totaled \$17.88, and in 1922, \$27.80.

Effects of the Earthquake. On Sept. 1, 1923, Japan was visited by one of the greatest catastrophes in history. An area 50 miles square was completely devastated by an earthquake and a much larger area severely affected; most of the buildings were injured or destroyed, and many were burned, while the rails on the railway were twisted and telephone and telegraph wires were thrown down. The total losses were officially estimated at from \$3,500,000,000 to \$5,000,000,000. They included the total destruction by fire of the City of Yokohama and the destruction of 70 per cent of Tokyo. Property in these cities insured to the extent of \$950,000,000 was a total loss to its owners because of the so-called "earthquake clause" in insurance contracts protecting the insurance company against "fire resulting from earthquake." It was estimated that 150,000 persons were killed by the quake and at least

half a million houses were burned and a like number wrecked. The chief economic result of the disaster was the necessity for Japan to find immediately large supplies of lumber, iron and steel, hardware and other construction materials abroad. In the four months after September, 1923, import statistics indicated a purchase of nearly \$150,000,000 of these materials. Early in 1924, Japan floated two new foreign loans, one for \$150,000,000 in the United States, with a share subscribed in dollars in Europe and one for £25,000,000 in England. All of the £25,000,000 loan and about \$60,000,000 of the dollar loan were to be set aside to take up two outstanding issues of 4½ per cent municipal bonds of the City of Tokyo coming due early in 1925. The gold holdings abroad of the government and the Bank of Japan on Jan. 15, 1924, were \$227,500,000, and this, together with about \$90,000,000 of the dollar loan, was to be used to finance purchases of raw materials for reconstruction. A reconstruction programme was adopted by the Japanese Diet in December, 1923, calling for expenditures for widening streets in Tokyo, providing for fire prevention zones, rebuilding walls, and paving streets. This was to cost \$350,000,000 covering a period of five years, or \$70,000,000 a year. A further expenditure of \$300,000,000 was decided upon by the cabinet in January, 1924, but was not voted by the Diet. This covered amounts to be spent for rebuilding government buildings, including arsenals. The earthquake also profoundly affected Japan's foreign policy, both economic and diplomatic. Money for the exploitation of Manchuria would not be available for some years, and the markets in China for Japanese cotton goods and in the United States for raw silk became such important factors in maintaining a volume of exports to counterbalance huge imports of reconstruction materials, that the good will of these markets had to be assiduously cultivated. The result was apparent, in 1924, in the studious forbearance from any action that might tend to affect good will toward Japan in either China or the United States. The fact that 65 per cent of Japan's exports were marketed in China and the United States and that in neither case were the commodities making up most of this amount of such a nature as to prove essential, or incapable of substitution in time of war or boycott, was a tremendous factor leading Japan, dominated by military clans, along the path of peaceful settlements.

Emigration Problem and Food Supply.

On the other hand, Japan's population was increasing at the rate of about 400,000 per annum while industrialization was not progressing sufficiently to take care of this surplus. The government was, therefore, faced with constant pressure in order to find sufficient food to take care of this increasing population. In 1924, Japan was already 10 per cent deficient in her production of the most important foodstuff, i.e. rice. The normal net excess of Japanese imports, visible and invisible, was represented by just about this necessary import of rice. If the population, which consumed this imported rice, could be allowed to emigrate each year, and the remaining population, by improved methods, could maintain the same production of rice, most of Japan's problems would be solved. However, most parts of the world to which Japanese cared to emigrate were shut off from

them. The Japanese is not a successful emigrant in countries of lower living standards than his own. In the 13 years that Japan held Korea and in the 20 years that it dominated South Manchuria, Japanese emigration to these regions was not successful, although fostered by every artificial inducement, including land grants, financial assistance in agriculture, etc. According to the *Japan Year Book* for 1923, Japanese formed less than 2 per cent of the population of Korea, or 367,618 inhabitants in 1921. In the same year there were only 82,145 Japanese in the Leased Territory of Liaotung, South Manchuria, as against 683,173 Chinese. See BRITISH COLUMBIA; IMMIGRATION.

Results of Disarmament Conference. As a result of the series of treaties and conventions concluded at Washington in 1922, Japan definitely agreed to a 5-5-3 ratio of capital ships with Great Britain and the United States. The result was a considerable curtailment in naval expenditure, without which Japan's financial position after the earthquake would have been much less strong than it was. The Four Power treaty, replacing the Anglo-Japanese Alliance (q.v.), jointly guaranteed Japan in her insular possessions in the Pacific Ocean and further reduced her need for expensive fortifications of these possessions, including Karafuto, Formosa, the Pescadores, and the mandated islands of the Pacific. The Nine Power treaty guaranteeing and reaffirming the open door principle in China lessened Japan's fear of western aggression in that country. Previously the open door principle had rested only upon an exchange of notes and the Anglo-Japanese Alliance. The Nine Power China Customs Treaty, when effectively carried out, should help to abolish troublesome interior taxes in China which tend to impede Japanese commerce in that country. It also provided China with increased revenue through which large sums owing to Japanese banks on which neither interest nor principal had been paid for five years might be refunded. Other resolutions regarding China and the Chinese Eastern Railway all affected Japan indirectly by working toward a minimizing of international friction in China and the necessity of Japan's maintaining large standing armies in her neighboring territories. Japan was, therefore, able to reduce her military expenditure proportionately with her naval expenditure, and per capita taxation was decreased. The military and naval appropriation for 1922-23 totaled \$343,331,000 or \$57,549,890 less than 1921-22. See NAVIES OF THE WORLD.

Conclusion. Japan made remarkable progress in adapting herself to Western conditions. In the short space of 56 years after the restoration of the Emperor to the power which had been usurped by the military leaders, Japan evolved from mediæval to modern civilization with wonderful celerity and no grave economic or social disturbances. With industrialization, however, came a certain amount of social unrest, which was emphasized during the War by the creation of many new millionaires (*Narikin*) and a great influx of Russian refugees. The Japanese Army in Siberia also brought back the germ of communism and its influence spread with the difficult living conditions created by the earthquake. A number of Korean revolutionists, difficult to distinguish from Japanese, were believed to be fomenting unrest. The ever-present food shortage, the long hours, and

comparatively hard conditions in the factories to a people of agricultural traditions were all "leaven which leaveneth the whole." The most difficult years in the history of the empire were to be faced, in all likelihood, during the coming decade.

HISTORY

Domestic Affairs. Social unrest and the demand for constitutional government and democratic reform grew apace in Japan with the increasing modernization and industrialization of the country. This tendency became strongly manifest in the beginning of 1914, when there was widespread opposition to the proposed naval increases in the budget. Fuel was added to this dissatisfaction by the naval scandals of the spring of the same year which exposed the existence of wide corruption among high naval officials in connection with the award of contracts to English and German firms. In the face of the crisis resulting from these happenings, the Yamamoto government resigned on March 24. After prolonged difficulties a new cabinet, headed by Count Okuma, was formed on April 16, with a programme calling for economic reform, the elimination of corruption, and the establishment of true constitutionalism. A new crisis developed in December, 1914, when the Lower House by a majority of 65 rejected the army increases which under the influence of the events of the War had been incorporated in the budget for 1915. By Imperial Decree, the Lower House was dissolved and new elections were called for March of the following year. In the elections the ministerial party won a complete victory and the obvious consequence of this was the adoption of the previously rejected budget for national defense by a handsome majority. Thereupon the opposition resorted to different tactics and attempted to break the government by a vigorous attack upon its Chinese policy. On the failure of this move, recourse was had to charges of corruption. Subsequent revelations which substantiated some of these charges and in particular brought to light the bribing of deputies by a member of the cabinet, forced, on July 30, 1924, the resignation of the Okuma government, but on the insistence of the Mikado, Count Okuma resumed office with a reconstructed cabinet. The opposition, however, did not let up in its assaults on the government until Count Okuma resigned definitely in the summer of 1916, ostensibly for reasons of health. The retiring premier designated as his successor Viscount Kato, the leader of the newly formed Kenseikai or Constitutional party which had a majority in the Diet. In opposition to this parliamentary procedure, the Genro or Elder Statesmen who wielded the real power in the Japanese Empire, brought about on Oct. 9, 1916, the appointment of Marshal Terauchi, Governor-General of Korea, who had the reputation of being an arch-militarist. This disregard of constitutional rule highly incensed the Diet, and the Kenseikai in particular, and a sharp opposition developed against the Terauchi government in consequence of which the Diet was dissolved early in 1917. The following elections, held on April 20, resulted in a victory for Marshal Terauchi and the military party.

The Terauchi government remained in undisputed power till the fall of the following year,

when, as a direct result of temporary economic distress, an explosion occurred which in many ways signified the evolution of a new Japan irreconcilably opposed to Terauchi and the party and spirit which he represented. Japan had enjoyed an era of great prosperity during the War. Manufacture of war materials for the belligerent nations had given a tremendous impetus to Japanese industry which in consequence had undergone a great expansion; but with increased industrial power there had also arrived more complicated social and industrial problems and an increased demand for democratic reform. When, therefore, the shortage and high price of rice, the chief food of the Japanese, caused great suffering among the common people, the forces which had been accumulating broke loose in a storm of serious internal disorders in the early fall of 1918. The famous "Rice Riots," in conjunction with widespread strikes and other manifestations of social and industrial unrest, brought about the fall of the Terauchi cabinet on Sept. 29, 1918. The appointment of Takashi Hara as prime minister was a concession to this new spirit. Hara was the first commoner to become chief of the cabinet and he was, moreover, the leader of the Seiyukai, the party which had for a long time opposed the war policy and the Siberian policy of the Japanese government. The same year, 1918, had seen already in March, as a result of the wide popular demand for democratic reform, an extension of the franchise whereby the property qualifications for voting were lowered and the number of voters was increased from 1,500,000 to 3,000,000. Since this latter figure represented, however, only one-twentieth of the total population of Japan, this measure failed to satisfy the people, who in the early part of the following year renewed their loud demands for universal suffrage. Members of the educated classes actively agitated toward this end. Contrary to the usage of previous Japanese governments, the Hara ministry showed remarkable clemency in dealing with mass meetings and other demonstrations. In 1919, the Hara government expressed its willingness to take steps for the extension of the suffrage, but when the opposition at the beginning of 1920 introduced bills aiming at the adoption of universal suffrage the government opposed these on the ground that the time for such action had not yet arrived. On February 26, when the bills were up for final consideration, the Prime Minister declared that it was doubtful whether the majority of the people desired universal suffrage and thereupon announced the dissolution of the Diet by Imperial Decree. In the elections of May, 1920, the Seiyukai, the government party, was victorious and obtained 280 seats against 199, 39, and 29 for the three opposition parties. Notwithstanding the government's victory, however, and the vote of confidence given to the government on the question of national defense in February, 1921, active agitation for universal suffrage continued throughout the country.

On Nov. 24, 1921, the Crown Prince Hirohito was appointed regent, the Emperor Yoshihito having been long incapacitated by illness. The Regent was born in April, 1901, had been proclaimed Heir Apparent in 1912 on the accession of his father to the throne, and had been consecrated Crown Prince in 1916. Already, in May, 1920, his father had handed over to him

certain functions and had sent him on a mission to Europe.

After holding office for three years, Prime Minister Hara was assassinated on Nov. 4, 1921, at a time when the Washington Conference was about to begin and problems of the utmost importance for Japan were pending. A new ministry was formed by Baron Takahashi, who had been minister of finance in the Hara cabinet and who continued in substance the policy of his predecessor. Lack of harmony among the ministers brought about the early fall of the Takahashi cabinet in June, 1922. Thereupon Admiral Tomosaburo Kato, a member of the Liberal party and an opponent of the militarists, agreed to head a new government, constituted on a non-partisan basis, on the condition that the army leaders submit to a reduction of the army budget by 40,000,000 yen. After some minor reductions before that time, the government took final steps on Nov. 25, 1922, for the retirement of 60,000 men and an annual saving of the before-mentioned sum. At the same time, Japan, having ratified the Washington Treaties on July 6 of the same year, reduced its naval budget on assurance from the United States government that its own naval budget would be framed in accordance with the treaties of the Washington Conference. In pursuance of this policy of retrenchment, further substantial economies in connection with military and naval expenditures were made in the budget for 1923-24. An important forward step in juridical reform was a measure for the introduction of the jury system. The bill was laid before the Lower House on Feb. 10, 1923, and passed the Upper House on March 10. Its provisions were to go into effect in 1928. On August 28, Admiral Baron Kato died and it devolved upon Foreign Minister Count Uchida to conduct the government as prime minister, ad interim. Count Yamamoto undertook immediately the formation of a new cabinet and he was still engaged upon this task when Tokyo and surroundings were visited, on Sept. 1, 1923, by one of the most disastrous earthquakes in the history of the country.

The earthquake affected an area measuring some 80 miles deep by 120 miles wide. The destruction in life and property was terrific. Yokohama was practically wiped out by the disaster and Tokyo was partially destroyed. The toll in killed and missing amounted to nearly 150,000 lives. The government which at the time was in process of formation, and which held its first meeting in the open air amid smoking ruins, faced now the vast problem of reconstruction. But people and officials alike put themselves to the task and in a surprisingly short time reconstruction was begun. The whole nation, from the Imperial Family down to the last laborer, rallied heroically to the assistance of the government and by generous contributions helped in allaying misery and repairing the losses. Relief poured in from all parts of the world, especially from the United States. The Capital Restoration Council and the Restoration Board, established by an imperial edict, took under consideration immediately plans for the rebuilding of the destroyed cities on a greater and more modern scale. The supplementary estimates, amounting to 468,438,849 yen, for the preliminary work of reconstruction for the period 1923-29, were passed by the Diet, as was also a bill concerning the organiza-

tion and procedure for town planning in Tokyo and Yokohama. The plans for rebuilding these cities were drawn up with the assistance of the American expert, Dr. Charles A. Beard, who came to Japan for this special purpose by invitation of Minister Baron Goto. In a statement to the Diet, the Minister of Finance estimated the damage caused by the earthquake at between seven and ten billion yen.

On Dec. 27, 1923, an unsuccessful attempt was made on the life of the Prince Regent as he was on his way to the Diet to deliver the speech from the throne. Since no such attack on the Imperial House had occurred in modern times the entire ministry felt compelled in consequence to hand in its resignation. The Prince Regent refused to accept it, but the cabinet persisted and its resignation was finally accepted on Dec. 29, 1923. The position of the Yamamoto government had been precarious for some time, due to the opposition of the Seiyukai. A new cabinet, formed by Viscount Kiyoura on a non-partisan basis, came into office on Jan. 1, 1924. It received little support in the Diet and its early fall would have been certain, had not a split occurred in the Seiyukai and had not the seceding group, which adopted the name of Seiyu-honto or Original Constitutional party, and mustered 148 votes in the Lower House, thrown its support to the Kiyoura cabinet. As a result of the attempted wrecking of a railroad train which had three opposition leaders aboard, a storm broke loose in the Diet which led to the dissolution of the Diet on Jan. 31, 1924.

The first loan placed by Japan on the American market since the Russo-Japanese War was offered on February 11. The American share of this loan was to be \$150,000,000 and another section offered to the English public amounted to £25,000,000. Both issues were greatly oversubscribed. The proceeds of the American and English shares of this loan were intended to be used for the retirement of the remainder of sterling 4½ per cent bonds and the balance was to be applied to the financing of reconstruction measures growing out of the earthquake disaster, the total cost of which was placed at approximately \$700,000,000.

Elections for the Lower House were held on May 10 and resulted in the defeat of the Seiyu-honto, the newly-formed party supporting Premier Kiyoura. The returns were reported as follows: Kenseikai 146, Seiyu-honto 120, Seiyukai 101, Kakushin Club 30, Businessmen's party 8, Independents 57. An outstanding feature of the election was the defeat of many members of the previous Parliament and the return of 250 deputies without parliamentary experience. The resignation of the Kiyoura cabinet, necessitated by the adverse vote, was postponed until after the celebration of the wedding of the Prince Regent on June 5. Since no party commanded a majority in the Diet, Viscount Kato formed subsequently a coalition cabinet which represented the Kenseikai, the Seiyukai and the Kakushin Club.

The new American immigration policy and the discrimination against Japanese resulting therefrom aroused a storm of indignation in Japan. Protest meetings were held, five Japanese patriots committed hara-kiri in protest, and the anti-exclusion organization, called the "Kokumin Taibeikai," was formed. A boycott of American moving picture films, which had been

instituted in retaliation, had to be subsequently abandoned as a failure. On the whole, the American measures had the effect of creating a wave of anti-American feeling in Japan which the government strove earnestly to keep within bounds so as to prevent any untoward incidents which might further strain Japanese-American relations. Japanese indignation was not so much aroused by the general exclusion policy of the United States as by the special discrimination between Japanese and other aliens and by the placing of members of the proud Japanese nation on the same level with other Asiatics whose governments did not sit at the council table of the great powers of the world. The feeling of friendship and gratitude generated by American generosity on occasion of the earthquake was seriously impaired by the policy of the United States. While the Immigration Bill was under consideration the Japanese government took steps to bring about, and actually effected in July, 1924, a change in the laws of citizenship whereby the "dual citizenship" was abolished and Japanese nationals would henceforth lose their Japanese citizenship upon naturalization in another country.

Foreign Policy. In 1914, before the outbreak of the War, Japan was confronted with two great international problems, the effects of the unsettled conditions in China on Sino-Japanese relations and the difficulties with the United States arising from the treatment of Japanese citizens on the American Pacific Coast. The outbreak of the War pushed these issues temporarily into the background and supplied the astute statesmen of Japan with a great opportunity for which they had been patiently waiting for a long time. Within a fortnight after the commencement of hostilities between Great Britain and Germany, Japan delivered an ultimatum to the latter demanding the immediate withdrawal of all German warships from Chinese and Japanese waters and the surrender of Kiaochow to Japan, with a view to the eventual return of this territory to China. A week later, Japan declared war on Germany and on Nov. 7, 1914, the German force at Tsingtao capitulated to the Japanese Expeditionary Force. Already, during the previous month, Japan had occupied the Marianne, Caroline, and Marshall Islands in the Pacific. The rapidity of this move came rather as a surprise to the Germans, and even to other nations, in view of the well-known German sympathies in certain influential Japanese circles. As its reason for entering the War, the Japanese government cited its treaty obligations with Great Britain. (See *ANGLO-JAPANESE ALLIANCE*.) A more convincing reason, however, was the Japanese desire to dislodge a western power from a position that was dangerous to Japanese hegemony in the Far East. Ever since 1895, when the combined action of Russia, Germany, and France compelled Japan to forego part of the spoils of the war with China, guaranteed to her by the Treaty of Shimonoseki, she had been hiding her time. In the case of Russia, the opportunity had come with the Russo-Japanese War, and the outbreak of the European conflagration presented now the occasion to hold a reckoning with Germany. Behind the screen of the Anglo-Japanese Alliance, Japan used the preoccupation of the Western Powers in Europe to establish herself in a practically impregnable position in the Far East. No doubt Japan fulfilled faithfully the

obligations arising out of the Anglo-Japanese Alliance, helped in removing all vestiges of German power from the Pacific, and even sent a naval squadron to the Mediterranean for convoy duty; but with much more faithfulness did she apply herself to the task of emerging from the War as the Power in the Far East, and of using her position of economic vantage as best she could, with the result that the close of the War found her financially in excellent condition and industrially greatly developed. See *WAR, DIPLOMACY OF THE*.

Ostensibly, Japan had seized Kiaochow to restore it eventually to China. This pious intention harmonized ill with the fact that before the dispatch of the Japanese ultimatum to Germany negotiations had been going on between Germany and China looking toward the voluntary return by the former to the latter of the Kiaochow Leased Territory. When therefore, on Jan. 18, 1915, Japan retaliated to the Chinese demand for the restoration of the territory by presenting to the Chinese government in a peremptory manner the well-known Twenty-one Demands, this move came rather as a surprise and aroused the suspicion even of Japan's allies. After some resistance, the Chinese government, in the face of a Japanese Note with a time limit, signed the Japano-Chinese Treaties and Agreements of May 25, 1915, which embodied 15 of the original Twenty-one Demands. In the meantime, Japan increased constantly her military forces in Chinese territory. These flagrant encroachments of Japan on Chinese territory and sovereignty could hardly be reconciled with her previous declarations of concern for China's welfare and the absence of any aggressive intentions.

Following the Treaty of Portsmouth, there had been a rapprochement between Japan and Russia, in the course of which four secret treaties, the last one in 1916, had been concluded between the two powers (see *SIBERIA* and the *FAR EASTERN REPUBLIC*). The last of these secret treaties, which practically amounted to an alliance in Far Eastern affairs between the former enemies, stated that the "vital interests" of the contracting parties required the "safeguarding of China from the political domination of any third power whatever having hostile designs against Russia and Japan." This potentially significant Russo-Japanese policy was ill-fated, however, for the Russian Revolution annulled all treaties and agreements entered into by Imperial Russia, and left Japan with new problems on her hands, but at the same time delivered her also from her most formidable rival.

A Special Japanese Mission to the United States concluded, in the autumn of 1917, a convention with the American government, commonly known as the Lansing-Ishii Agreement. By this document, the liberty of action of Japan in China was further extended, inasmuch as the United States, the only power that was free to interfere with Japanese plans in the Far East, recognized the special interests of Japan in China arising out of territorial proximity. The Japanese further consolidated their position in China by the secret military Sino-Japanese Agreement of May, 1918, which provided for common defense of mutual interests in China against Soviet Russia for the duration of the War, and by the secret agreements of Sept. 24, 1918, which granted Japan

far-reaching railroad concessions in China. These agreements, which were not disclosed officially to the other Allied Powers until after the opening of the Peace Conference, caused great resentment in China when they became public and proved also injurious to the Chinese claims at the Peace Conference. Of far greater significance, however, were the secret agreements concluded between Japan and the Allies early in 1917, whereby the British, French, Russian, and Italian governments, which were at that time greatly in need of Japanese naval assistance, pledged themselves more or less unconditionally to support at the Peace Conference the Japanese claims with regard to the disposal of the former German rights in Shantung and the Pacific islands north of the Equator (see SHANTUNG).

The military collapse of Russia and the Russian Revolution not only delivered Japan from her greatest rival in the Far East, but also gave her an opportunity to pursue a policy of her own with regard to Siberia. Already early in 1918, Japan had landed troops in Vladivostok for the protection of Japanese nationals and interests. In the subsequent Allied Intervention in Siberia during the fall of 1918, Japan was an active participant, but at no time did she manifest any genuine concern for the establishment of a strong and stable anti-Bolshevik government. In fact, she refused to extend her intervention to the region east of Lake Baikal where she had no special interest. At the same time, there was strong evidence of Japanese underground dealings with such semi-independent Cossack leaders and notorious brigands as Semenov and Kalmikov who were far more of a liability than an asset to the White Russian movement and served to further materially the designs of Japan in Siberia. Thus Japan, by her policy of obstruction, seems to have contributed materially to the final collapse of the anti-Bolshevik government and to the failure of Allied Intervention in Siberia (see SIBERIA and the FAR EASTERN REPUBLIC).

At the Peace Conference, Japan was represented by a strong delegation headed by Marquis Saionji. The Japanese representatives took part in all the important sessions on a footing of equality with those of Great Britain, France, Italy, and the United States; and Japan was one of the powers which formed the all-powerful Council of Ten. The Japanese delegates presented two separate claims. Of these, the demand for the recognition of racial equality met with strong opposition, primarily on the part of the United States, and hence was eventually rejected (see PEACE CONFERENCE). Japan was more successful in her claims with regard to Shantung and the former German islands in the Pacific north of the Equator. The arguments advanced by the head of the Japanese delegation in favor of retention of these territories were in substance as follows: Japan had taken these places from Germany during the War in fulfillment of her treaty obligations; she held them in occupation at the time; they should form Japan's just compensation for her contribution to the Allied victory. After much delay and discussion, the former German rights in Shantung were finally awarded to Japan on Apr. 30, 1919. The withdrawal of Italy from the Conference had given Japan an opportunity to threaten with a refusal to sign the Peace Treaty unless her claims with regard

to Shantung were favorably considered. It was then that Messrs. Clemenceau and Lloyd George voted in accordance with the pledges given to Japan in the secret agreements of February and March, 1917, and thus overrode the opposition of President Wilson, who claimed to be ignorant of these understandings (see PEACE CONFERENCE; also SHANTUNG). On May 7, 1919, the Council awarded to Japan the islands in the Pacific north of the Equator to be administered under the mandatory system. The Japanese sovereignty over the Island of Yap, contained within this group, was disputed by the United States, which based its objection on the ground that it had never ratified the Peace Treaty of Versailles. A final adjustment of the matter took place at the Washington Conference at the end of 1921, in the form of an agreement whereby the United States recognized Japanese sovereignty over Yap and was accorded in return full rights and facilities in connection with the cables and other matters (see YAP and also WASHINGTON CONFERENCE).

The allocation of German rights in Shantung to Japan caused a storm of protest in China and general indignation throughout the world. There was universal apprehension at the way in which Japan within recent years had surged to the fore as a first-class power. The close of the War found Japan, as a result of astute statesmanship during the conflict, to have obtained a more or less firm grip on a vast territory in the Far East, comprising Eastern Siberia, Sakhalin, Kamchatka, Manchuria, Inner Mongolia, and Shantung. Post-war history marks the gradual retreat of Japan from some of these territories, partly as a result of international public opinion and of pressure from the other powers, which were free now to devote more attention to Far Eastern affairs, and partly as a result of re-orientation of Japanese foreign policy due to the exigencies of world affairs. On May 7, 1920, Japan announced her readiness to withdraw her reservations in Manchuria and Mongolia. By this concession the territories in question came under the authority of the Chinese Loan Consortium, consisting of American, British, French, and Japanese banking groups. Far greater difficulties were encountered in the settlement of the Shantung problem. Repeated attempts of Japan to negotiate with Peking over the Shantung issue were blocked by the steadfast refusal of China, which insisted that any agreement must be preceded by the restoration to China of the territory and the rights connected therewith. Japanese proposals on Sept. 7, 1921, before the meeting of the Disarmament Conference in Washington, involved the restoration to China of the Leased Territory of Kiaochow, in return for which the territory was to be opened to foreign trade and Japan was to receive certain railway and mining concessions. These rather moderate proposals were rejected by China. A final agreement was reached at the Washington Conference in the form of a treaty signed between Japan and China on Feb. 7, 1922, which provided for the immediate transfer of the former German port and concessions to China and for the payment of a monetary compensation and the grant of certain rights to Japan (see SHANTUNG; also WASHINGTON CONFERENCE). At the same time Japan, by affixing her signature to the Treaty of the Open Door in China, relinquished other reservations in China, but

refused to abandon her hold on Manchuria and Mongolia (see WASHINGTON CONFERENCE). On May 10, 1923, the Chinese government addressed a Note to Tokyo in which the desire was expressed to open negotiations relative to the abrogation of the Sino-Japanese Treaties and Agreements of May 25, 1915. The Japanese reply bluntly rejected this request and made clear at the same time that Japan did not regard these treaties as susceptible of modification.

In spite of solemn declarations and promises, Japan did not participate in the withdrawal of the Allied Expeditionary Force in Siberia after the Kolchak débâcle early in 1920. Instead she consolidated her position in the region east of Lake Baikal, testifying thereby that her policy in the Russian Far East was dictated by special interests arising out of geographical propinquity. The Japanese Siberian policy aroused the suspicion of the other powers and caused representations to be made by the United States to the Tokyo government. Partly in consequence thereof, but chiefly as a result of the progress of Soviet power in Siberia and the stabilization of eastern Siberian affairs under the Far Eastern Republic, which had been established in Chita after the collapse of the White Russian movement, the Japanese slowly retraced their steps in the following years and withdrew their troops to the Maritime Province and to Vladivostok where an anti-Bolshevik government held sway as a powerless instrument of Japanese policy. At the same time, however, Japan extended her occupation to Northern or Russian Sakhalin in retaliation for the Nicolai-evsk Massacre early in 1920. In the face of the steadily growing power of the Soviets in Siberia, Japan began subsequently to prepare for total evacuation. A conference between the Japanese and representatives of the Far Eastern Republic at Dairen, which lasted from fall, 1921, to spring, 1922, ended in failure. Shortly afterwards Japan announced her intention to withdraw all troops from the mainland of Siberia by the end of October, 1922. The reasons for this move must be sought in the results of the Washington Conference and in the strengthening of Soviet rule. While the evacuation was in progress, another conference took place in September, 1922, at Changchun in Manchuria between representatives of Japan and the Far Eastern Republic, in which also emissaries from Moscow participated. This conference broke up because of Japan's refusal to evacuate Northern Sakhalin and to recognize the Soviet government. The Japanese Russian policy underwent some modification, however, with the absorption of the Chita government by the Soviets immediately after the Japanese evacuation and with Soviet possession of the entire mainland of Siberia. At the same time, the Soviet government began to adopt various aspects of the Czarist Far Eastern policy and above all came to evolve a definite Chinese policy, especially with regard to Mongolia. Thereafter signs began to appear that Moscow and Tokyo were seeking a *modus vivendi*. Thus the year 1923 was taken up with private and semi-official conferences between high Russian and Japanese officials looking toward the conclusion of a Russo-Japanese commercial treaty, the recognition of the Soviet government by Japan, and the evacuation of Northern Sakhalin. Negotiations progressed only very slowly, the chief stumbling block being the Sakhalin

issue. On July 24, 1924, the Japanese cabinet adopted a plan submitted by Foreign Minister Shidehara which would form the basis for an understanding with Soviet Russia, as worked out in protracted negotiations between the Japanese and Russian envoys in Peking. The chief points were reported to be as follows: (1) Cession by Russia to Japan of mining and oil concessions in Northern Sakhalin; (2) a Russian apology to Japan for the Nicolaievsk Massacre; (3) withdrawal of Japanese troops from Northern Sakhalin; (4) recognition by Russia of the Portsmouth Treaty; resumption of Russian-Japanese diplomatic relations. Finally persistent rumors were current in the summer of 1924 that Russia and Japan had reached a secret agreement providing for coöperation of the two countries in Far Eastern affairs to the exclusion of the interests of any third power. If substantiated this would mean the final adoption by Soviet Russia of the Far Eastern policy of the Czar and would be, in connection with the recent American immigration policy, of tremendous significance in future Japanese foreign policy, particularly with relation to the United States. For Japan's Siberian policy, see SIBERIA and the FAR EASTERN REPUBLIC.

Japan was one of the chief participants in the Washington Conference, Nov. 12, 1921-Feb. 6, 1922, in which agreements of outstanding importance to Japan were arrived at. The treaties and agreements affecting Japan, aside from those specifically relating to China—such as the Shantung agreement, the Nine Power Treaty of the Open Door in China, the treaty pertaining to the Chinese tariff, the agreement relative to the withdrawal of foreign control of post offices in China—were the Four Power Treaty, dealing with the problems of the Pacific; the Five Power Naval Treaty, and the agreement between the United States and Japan relating to the status of the island of Yap. The Four Power Treaty aimed at the settlement of problems arising out of Japan's need for expansion in the Pacific by an agreement between the contracting powers for the mutual protection of island possessions and dominions in the Pacific. The Five Power Treaty provided for naval limitation on the basis of the 5-5-3 naval ratio, Japan limiting herself thereby to the maximum of 10 capital ships of 312,700 tons as against 20 of 582,540 tons for Great Britain and 18 of 525,850 tons for the United States. On the part of Japan, these treaties represent a sincere effort at an amicable understanding with the view to preventing questions arising out of Japan's astonishing growth as a power within the last 10 years from developing into armed conflict. A further manifestation of this spirit was the faithful carrying out of the Washington agreements and the adoption by the Japanese government of a policy of military and naval retrenchment. A direct result of the Washington Conference was the cancellation of the Lansing-Ishii Agreement in March, 1922, because in view of the Nine Power Treaty a new understanding had become possible. By the Four Power Treaty the Anglo-Japanese Alliance was definitely superseded. (See ANGLO-JAPANESE ALLIANCE.) Subsequently there occurred in Great Britain much criticism of Japan and apprehension at the growing power of that country in the Far East. Concentration of British naval units in the Pacific and the drafting of a plan for a naval base at Singa-

pore caused increased watchfulness on the part of Japan.

Perhaps the most serious factor in Japanese foreign relations was the status of Japanese in the United States and especially their treatment in the Pacific States. Difficulties arising therefrom had been to some extent regulated by the gentlemen's agreement concluded between Japan and the United States. After a comparative lull in the situation due to the exigencies of the War, new friction arose in 1920 with the passage by California on November 2 of an act by which "ineligible aliens" forfeited all rights of holding land in that State. This was followed by anti-alien land legislation in other Western States, with the Washington Conference, the generous extension of aid to Japan by the United States on the occasion of the great earthquake, in 1923, and the manifestation of sincere gratitude on the part of the Japanese government and people, an era of better understanding between the two countries seemed to be approaching. But whatever ground for hope in that direction might have existed was hopelessly blighted by decisions of the United States Supreme Court on Nov. 12 and 19, 1923, sustaining in full the alien land laws of California and Washington. Much more serious, however, was the effect of the new American immigration law, effective July 1, 1924, which carried a Japanese exclusion clause and amounted to an abrogation of the "gentlemen's agreement." This measure caused a storm of indignation in Japan. The Japanese government, however, proceeded with caution and did everything in its power to avoid cause for conflict. It prevented too extreme expression of public indignation and took steps to abolish "dual nationality." On April 10, Masanao Hanihara (q.v.), Japanese Ambassador in Washington, wrote a letter to Mr. Hughes in which he referred to the "grave consequences which the enactment of the measure" would inevitably bring upon the otherwise happy and mutually advantageous relations between the two countries. This statement provoked hostile criticism in the United States. On May 31 the Japanese Ambassador presented a lengthy note of protest of his government to the American government. Secretary Hughes's reply was well received in Japan but failed to satisfy public opinion. The departure of the Japanese Ambassador to Japan on June 11 was interpreted in many circles as a direct result of the Immigration Bill. Whatever right the United States might possess to pursue such a policy and whatever merits the bill has from the standpoint of American domestic policy, there can be no doubt that the new policy has seriously impaired the beneficial results of the Disarmament Conference, in spite of the fact that the Japanese government preserves a very calm front. It is significant that the Japanese Minister of the Navy declared on July 7 in the Diet that a decided expansion of the Japanese naval air forces, "necessitated by recent developments at home and abroad," was contemplated. Japan also resumed, in July, 1924, negotiations with Soviet Russia toward a closer understanding.

JAPANESE BEETLE. See ENTOMOLOGY, ECONOMIC.

JARDINE, WILLIAM M. (1879-). An American agronomist, born in Oneida County, Idaho. He graduated from the Agricultural College of Utah in 1904 and took postgraduate

studies at the University of Illinois. In 1904, he was appointed assistant in agronomy at the Agricultural College of Utah, and became professor in 1905-06. He was agronomist at the Kansas State Agricultural College and Experiment Station in 1910, and in 1913 was acting director of the Experiment Station and dean of agriculture at the Kansas State Agricultural College. Professor Jardine was director and dean of agriculture at this university from 1913 to 1918, and in the latter year was chosen its president. He was a member of many agricultural societies and wrote numerous papers and bulletins on dry farming and crop production.

JASTROW, IGNAZ (1856-). A professor of the science of government at the University of Berlin (see Vol. XII). His works after the War deal mainly with economic problems. They include: *Kriegszustand* (1914); *Mitteleuropäische Zollannäherung und Meistbegünstigung* (1915); *Geld und Kredit im Kriege* (1915); *Die Handelspolitische Zukunft Deutschlands* (1917); *Völkerreichtum und Wirtschaftskrise* (1917); *Volksvermögen im Kriege* (1920); *Reform der staatswissenschaftlichen Studien* (1924).

JASTROW, JOSEPH (1863-). An American psychologist (see Vol. XII). His later work comprises analytic studies of the sentiments and higher mental complexes. His published works include *Character and Temperament* (1915) and *The Psychology of Conviction* (1918).

JASTROW, MORRIS, JR. (1861-1921). An American philologist and Orientalist, (see Vol. XII). His last published works are: *The Civil Law of Babylonia and Assyria* (1915); *The War and the Bagdad Railroad* (1917); *The War and the Coming Peace* (1918); *A Gentle Cynic*, an abbreviated translation of the Book of Koheleth or Ecclesiastes (1919); and *The Eastern Question and its Solution* (1920).

JAVA. See DUTCH EAST INDIES.

JAY, PETER AUGUSTUS (1877-). An American diplomat, born in Newport, R. I. He was graduated from Harvard College in 1900 and in 1902 entered the diplomatic service as third secretary of the American Embassy in Paris. He served as secretary at several embassies, including Constantinople and Tokyo. From 1909 to 1913, he was diplomatic agent and consul-general at Cairo. He served as secretary of the American Embassy in Italy in 1913, and at the same time was counselor at that embassy. He was minister at Salvador in 1920, and in 1921 was minister to Rumania.

JAZZ. Immediately after the close of the War, a new kind of popular music made its appearance in the United States and at once attained enormous vogue, taking complete possession of the dance halls, the theatres, the movies and the hotels. Jazz is a natural development of the older rag-time, which finally became transformed through the amalgamation of various elements. During the War the soldiers amused themselves by doing "stunts" on their musical instruments. Some one discovered that very funny effects could be produced by laughing, catcalling, wailing or uttering short exclamations through brass instruments. After their return to civilian life, these ex-soldiers introduced these stunts into the dance orchestras. The circus bands contributed their weird imitations of oriental music. Real oriental ef-

fects were contributed by musicians who had played in orchestras in San Francisco and other Western cities. The influence of the Negro melodies of the South also is very noticeable. Even Futurism is responsible for some queer harmonic combinations, although this influence is rather casual and slight, for jazz still respects the fundamental laws of harmony and moves within the limitations of a fixed tonality. Some attempts have been made to trace the origin of jazz to African tunes. Comparison, however, at once establishes the fact that the aboriginal African melodies are characterized by the absence of any regular periodic structure and the presence of several cross-rhythms, whereas jazz clings to regular four or eight bar periods supported upon one predominating rhythm. The first jazz compositions, which appeared in 1919, were crude enough; in fact, little more than degenerate rag-time. This is not surprising, when one considers that these pioneers were men who elaborated their tunes by ear on the piano and required the aid of some musician to fix them in musical notation. As these tunes quickly superseded, and even drove out the older dances, the dance orchestras naturally became the principal factor in the development of jazz. To remedy to some extent the crudities of the printed score, embellishments of various kinds were introduced *ad libitum* (vulgarily called "libbin'") during actual performance. The conductors soon began to realize the necessity of reducing to a system this free improvisation by a number of players, if the performance was not to degenerate into chaotic noise. Thus there sprang up a group of regular arrangers, skilled musicians, able to recognize the possibilities of certain jazz tunes and capable of altering, harmonizing and embellishing them so as to render them acceptable to the popular ear. From this point on it was the arranger, rather than the composer, who became the important factor in the development of jazz. Effective orchestral coloring became a prime consideration, and this brought about a radical revolution in the constitution of the former monotonous dance orchestra, so that the jazz band is capable of a considerable variety of tonal effects. The average combination of instruments for a small band is a piano, two or three saxophones (the typical jazz instrument), a violin, two trumpets, a trombone, a tuba, a banjo and drums. Finally large symphonic jazz orchestras were formed which consisted of the almost complete classical symphony orchestra with the addition of the indispensable saxophones. Paul Whiteman with his jazz orchestra made a most successful tour of Europe, and in 1924 gave at Carnegie Hall, in New York, a concert that was attended by many serious musicians. Briefly, jazz may be described as light music with melodious themes elaborately embellished and adapted to some popular dance rhythm. A very common practice is to give the principal theme to the violin, against which the saxophone executes a melodious counterpoint which often attains the importance of a counter-theme. Several arrangers have not hesitated to jazz themes of famous composers (Beethoven, Wagner, Schubert, Saint-Saëns, etc.). A special form of jazz, which had its origin in Memphis, is the "Blues," so-called from the fact that the music illustrates a text describing some melancholy tale of disappointed love. On

the musical side this form derives directly from the Negro spirituals, and its special characteristic is a triplet appoggiatura before the bass note of the principal accent in each measure. As to the origin of the word "jazz," the following story is current: In Memphis, a dusky trio consisting of a singer, a banjo player and a performer on a tin can became locally known as the Jackass Band, which was jocularly transposed to Jassack's or Jazzack's Band; whence the abbreviation Jazz.

JEBEL SHAMMAR. See ARABIA.

JELlicoe, JOHN RUSHWORTH, first Viscount of SCAPA (1859-). An English naval officer (see Vol. XII). Shortly after the outbreak of the War he was placed in command of the Grand Fleet, and in 1915 he was created a full admiral. In this capacity he was in supreme command of the British Fleet at the Battle of Jutland. In November, 1916, he was succeeded as commander of the fleet by Admiral Beatty, and was appointed first sea lord of the admiralty. He established the antisubmarine division of the Navy Staff. In May, 1917, he was appointed chief of the Naval Staff, and retired in December, 1917. He was raised to the peerage. He wrote *The Grand Fleet, 1914-16; its Creation, Development, and Work*, and *The Crisis of the Naval War*.

JELLIFE, SMITH ELY (1866-). (See Vol. XII). In addition to editorial supervision of the *New York Medical Journal*, *Journal of Nervous and Mental Diseases* and *Psychoanalytic Review*, and of translations and new editions of books on psychiatry, etc., Dr. Jelliffe collaborated with Dr. W. A. White in the preparation of a very successful textbook, *Diseases of the Nervous System* (1915).

JELLINEK, KARL W. K. (1882-). An Austrian professor of chemistry, professor of analytical chemistry at Danzig. He is the author of textbooks on analytical chemistry, of *Weltengeheimnisse*, a work on the harmonious union of philosophy, art and religion (1920) and *Weltäther und Relativtheorie* (1922).

JENKINS, BURRIS ATKINS (1869-). An American clergyman and educator, born in Kansas City, Mo. He was graduated from Bethany College in 1891 and took postgraduate courses at Harvard. He was ordained to the Christian (Disciples) ministry and was pastor in Indianapolis from 1896 to 1900. From 1898 to 1900, he was professor of New Testament literature and exegesis at the University of Minneapolis, and was president of that institution from 1899 to 1900. He was president of Kentucky University from 1901 to 1907, and from the latter date was pastor in Kansas City. From 1919, he was editor and publisher of the *Kansas City Post*. He wrote *The Man in the Street and Religion* (1917); *It Happened Over There* (1918); *The Brace-Girdle* (1922).

JENKS, ALBERT EDWARD (1869-). An American anthropologist. He was born in Ionia, Mich., and studied at the University of Michigan. He is a valued contributor to anthropological and ethnological magazines and has published, among other works, *Indian-White Amalgamation: an Anthropometric Study* (1916).

JENKS, JEREMIAH WHIPPLE (1856-). An American economist and educator (see Vol. XII). In 1916, he served as one of two neutral arbitrators on the board of six, between the

Switchmen's Union of North America and certain railways. He was director of the Far Eastern Bureau from 1913 to 1921. During the War he acted as a member of the Advisory Commission of the Council of National Defense, and in several other important capacities. His later books include *Business and Government* (1917); *Jesus' Principles of Living*, with C. F. Kent (1920); *Great American Issues*, with John Hays Hammond. He was a frequent contributor to periodicals on literary, economic and political questions.

JEPSON, WILLIS LINN (?-). An American botanist. He graduated from the University of California in 1889 and took post-graduate studies at Cornell and Harvard universities, and in England and Germany. He was appointed assistant in botany at the University of California in 1891, and was successively assistant professor, associate professor and professor, assuming the last office in 1919. He explored the remote mountain and desert regions of California and conducted botanic expeditions in Alaska and the Bering Sea. He was a member of many scientific societies and the author of: *Flora of Western Middle California* (1901); *The Trees of California* (1909); *The Silva of California* (1910).

JERITZA, MARIA (1893-). An Austrian dramatic soprano, born at Brünn. She attended the Musikschule there and studied singing privately with Professor Krejci, then continued her lessons with Professor Auspitzer for three years. After her début as Elsa in *Lohengrin* at Olmütz, in 1910, she sang there for five months, when she was engaged for the Volksoper in Vienna, where she rapidly rose to prominence, so that Strauss chose her to create Ariadne in the world première of his *Ariadne auf Naxos* at Stuttgart (1912). In the same year, while still in her teens, she was engaged for leading rôles at the Vienna Hofoper, at first as guest, but from 1913 as regular member, after the Hofoper had paid the forfeit for her unexpired contract with the Volksoper. In 1917, she was made Kammersängerin, being the last artist on whom that title was bestowed. She created the principal rôles in most of the novelties produced at the Hofoper, which in 1919 became the Staatsoper. On Nov. 19, 1921, she made her American début, with sensational success, at the Metropolitan Opera House as Marietta in the American première of Korngold's *Die tote Stadt*, establishing herself immediately as a prime favorite. While her voice is one of rare beauty and power, she fascinates her audience primarily through her unusual talent as an actress. Her repertory comprises more than 50 rôles.—Consult W. von Wymetal, *Maria Jeritza* (Vienna, 1922) and her autobiography, *Sunlight and Song: A Singer's Life* (New York, 1924).

JERSEY CITY. The second city of New Jersey in population and the chief seaport of the State. The population increased from 267,779 in 1910 to 298,113 in 1920. The estimated population in 1923 was 309,034. Jersey City is one of the most important manufacturing cities on the Atlantic coast. It forms part of New York harbor, and the improvements projected by the Port Authority in 1922-23 would, when carried out, result in much-needed improvements in dock and harbor facilities. During the War, the city was a shipping point of great importance, and its need of larger capacity in docks

was greatly emphasized in this period. During the decade 1914-24 many important municipal improvements were made. A large mileage of streets was repaved, and many miles of sewers were laid. One of the chief improvements was the construction and opening of Pershing Field, a great park and recreation centre embracing a large area of what was previously waste land. This was dedicated in 1920. The Health Department was especially active during the decade. Eight centres for the care of children were established, and the City Hospital was enlarged and made a Community Health Centre. Jersey City is an important industrial city. The number of establishments increased from 770 in 1909 to 896 in 1919, while the value of products increased from \$164,529,000 in 1914 to \$374,183,000 in 1919. The four leading products with their comparative values in 1914 and 1919 are as follows: slaughtering and meat packing, \$25,235,000 and \$78,226,000; foundry and machine shop products, \$4,650,000 and \$13,989,000; bread and bakery products, \$2,583,000 and \$12,201,000; cars and shop construction, \$1,560,000 and \$7,729,000.

JERUSALEM. See WAR IN EUROPE, Turkish Front.

JEWETT, FRANK BALDWIN (1879-). An American electrical engineer, born at Pasadena, Cal. He was graduated from Throop Polytechnic Institute in 1898, and then became a research assistant at the University of Chicago, receiving his Ph.D. there in 1902. During 1902-04 he was instructor of physics at the Massachusetts Institute of Technology, then entered the service of the American Telegraph and Telephone Company as transmission and protection engineer. In 1912, he joined the Western Electric Company of which he became chief engineer in 1914. During the War he was a lieutenant-colonel in the United States Signal Corps and also a member of various committees connected with the National Research Council, receiving in 1919 a Distinguished Service Medal.

JEWISH NATIONAL HOME. See PALESTINE.

JEWS AND JUDAISM. The decade 1914-24 brought a radical transformation in the position of Jewry throughout the world. The two chief gains resulting from the War were the recognition of the Jews as citizens in countries such as Russia, Poland, and Rumania, where they had hitherto been legally oppressed, and the creation of a national Jewish homeland in Palestine. On the other hand the distress and turmoil incidental to the War wrought great havoc among the communities of eastern Europe which had always contained a majority of the race and caused the destruction of much life and property. The situation of the Jews in the war areas of eastern Europe during the actual military operations was, from an economic and political standpoint, little less than desperate. The suffering in Galicia and Russian Poland in 1915 worked especial hardships on the Jewish populations of those regions. In the German capture of Warsaw alone, over 300,000 Jews were directly concerned, and the open country of Poland was almost entirely denuded of its Jewish population. The economic misery and commercial ruin continued in 1916 and was emphasized by the entrance of Rumania into the War and by the invasion of Bukowina and a greater part of Galicia by the Russians. In

Poland, under the new German régime, the Jews were given full civil rights, and educational and social conditions were greatly improved. In Russia also, they enjoyed a freedom which they had not hitherto known. In that country numerous schools were established for the children of refugees in interior cities. Further promise of better conditions in Russia accompanied the Russian Revolution, which emancipated 5,000,000 Jews within the boundaries of the Empire. The revolutionary government abolished all restrictions on Jews and granted them full liberty and equality. The Jews began at once to take an active part in the social and political activities of the new democracy, and new schools and colleges were established for the exclusive use of Jewish students.

The accession of the Bolsheviks to power modified in important ways the life of the Russian Jews. The programme of Communism as instituted by the more extreme leaders was ruthless toward private enterprise, and as the Jews were among the most active of the merchants and traders they suffered intensely under the new régime. The Bolshevik government made efforts to give land to the unemployed, but as the financing of such an agrarian programme necessitated large funds, little progress was made. The teaching of the tenets of the Jewish religion to children was forbidden, synagogues were confiscated and turned into Communist clubs, and Zionists were arrested and sent into exile. Jews who espoused the cause of Communism were given full freedom by the government to regulate the life of Russian Jewry, and all who dissented from their views found themselves limited in their activity and liberty.

In Poland and Lithuania after the War the Jews formed a distinct national unit on a par with the other national groups, such as the Germans, the Ruthenians, etc. Theoretically protected by the Racial Minorities Treaties, in actual life racial antagonism proved an effective barrier to their free economic, political, and cultural development. They found themselves discriminated against in the schools, and their right to free entrance into the universities was in many instances questioned. In Latvia, Rumania, Hungary, and the other countries of central and eastern Europe, with the notable exception of Czecho-Slovakia, the same condition prevailed. In Poland the anti-Semitic organization known as the Rozvoi instituted an economic boycott which brought ruin to many Jewish merchants. See POLAND; UKRAINE.

In the United States the patriotism of the American Jews was shown in 1917-18 by their undertaking of military service and liberal support of the various war loans. Henry Ford, in the *Dearborn Independent*, brought against the Jews charges of attempting to dominate the world financially and otherwise. These charges were based on the so-called "Protocols of the Elders of Zion," which were later proven to be forgeries brought to America by former agents of the Czar's secret police. Shortly after the exposure of the fraud, the *Dearborn Independent* ceased its systematic attacks.

In October, 1923, the second session of the American Jewish Congress was held. Plans were formulated for the close organization of American Jews and the continuation of the struggle against racial discrimination in the United States and abroad. The Congress urged Great Britain to enforce the conditions of the

Palestine mandate, declared in favor of a world congress of Jews, and protested against the further restriction of immigration to the United States.

Relief Work. The chief efforts of the Jews in the neutral countries during the War was directed toward relief. In the United States were established several great organizations, including the American Jewish Relief Committee, the Central Relief Committee, and the People's Relief Committee. Millions of dollars were raised and pledged for relief. Over \$6,500,000 was collected in the United States during the first two years and a half of the War; Jan. 27, 1916, was named by the President as Jewish Relief Day. Relief funds were also established in 1915-16 in Great Britain for the relief of suffering Jews throughout the world. The Federation of Rumanian Jews in the United States, at a conference in New York City in 1916, made plans for raising \$1,000,000 for the relief and emancipation of the Rumanian Jews. At a conference of relief workers early in 1917, plans were made for raising \$10,000,000. By the end of November, about half this sum had been raised. Jacob H. Schiff, with the assistance of leading Jews in the United States, initiated a drive for \$5,000,000, \$1,000,000 of which was to go to the Jewish Army Welfare Board. This sum and more was raised by December 16.

Relief activity slackened in the early part of 1918 on account of the chaotic conditions in Russia, but the work revived as the year went on. Special consideration was given to the distribution of relief funds in Palestine and elsewhere. Great activity was displayed by the Jewish Welfare Board in work for the army and navy. The great suffering of the Jews of eastern Europe during 1919 stimulated intense relief activity among the Jews of the United States. Over \$10,000,000 was raised for the relief fund by various committees. Due to the fact that with the conclusion of the Armistice the channels of communication with Poland, Rumania, and Austria were opened, distribution was able to proceed in an orderly way. The Joint Distribution Committee sent, in addition to money, large quantities of food and clothing to Poland, Rumania, and Austria. Large sums of money and enormous contributions of food and clothing continued to be sent to the suffering Jews of Europe in 1920. In 1921 conditions gradually improved in Europe, although thousands of Jews remained in want and homeless. At the close of the year a report issued by the Relief Committee of the Ukraine indicated that there were in Bessarabia about 30,000 Jewish refugees without homes; in Poland nearly 30,000 Jewish orphans were cared for by the Warsaw bureau of the committee. In Poland as a whole, there were about 50,000 refugees, and in Rumania 60,000 to 70,000. The Jewish population of the Ukraine continued to suffer incredible hardships during the year. According to the president of the Jewish Relief Committee, 50 per cent of all the houses belonging to Jews in eastern Europe had been destroyed by the end of 1921, and about 90 per cent in the regions where they had especially suffered: eastern Poland, Galicia, Poland, Lithuania, and southern Russia. See PALESTINE; ZIONISM.

Statistics. The most authoritative statistics for Jewish populations are contained in the *American Jewish Year Book*. These, however, are little better than estimates. In 1914-15 the

Jews of the world were estimated at 13,277,542; in 1923, 15,500,000. In Europe the figure is practically the same, 10,000,000 for the two periods. In America the Jews increased from 2,500,000 in 1915 to 3,700,000 in 1924. Since the Jewish occupation, it is reported that 40,000 Jews have gone to Palestine. The countries of Europe in the order of Jewish populations are Poland, the Ukraine, Germany, France, Great Britain, and Turkey.

JOFFRE, JOSEPH JACQUES CÉSAIRE (1852-). A French general (see VOL. XII). On Dec. 13, 1916, General Joffre was called to Paris as "technical adviser to the government" and on December 16 he was made a Marshal of France, the first to receive that title since 1870. In the spring of 1917 he was sent on a mission to the United States. He was elected a member of the Académie Française in 1918. The evidence which he gave before the Briey Commission was published under the title, *La Préparation de la Guerre et la Conduite des Opérations*, and the story of the political side of his tenure of command is given in Mermeix's *Les Crises du Commandement*, Part I.

JOHN, AUGUSTUS EDWIN (1879-). A British painter (see VOL. XII). With his vivid manner of portraiture and his ability to catch unerringly some striking and usually unfamiliar aspect of his subject, he superseded Sargent as England's fashionable portrait painter. He was commissioned by Canada during the War to paint Canadian soldiers on the western front. In 1921 he was made a member of the Royal Academy. Among his later works may be mentioned "Symphonie Espagnole," "Madame Suggia," "Robin," "The Mumpers" and "The Tinkers."

JOHNS HOPKINS UNIVERSITY. This nonsectarian institution for men and women (excluding women from some undergraduate courses) at Baltimore, Md., was founded in 1876. The student enrollment increased from 1374 for the summer and fall sessions of 1914-15 to 3891 for the year 1923-24 (753 in the summer of 1923) and the number of members in the faculty increased from 268 to 475 professors, associates, instructors and lecturers. During the same decade the library was increased from 174,777 to 257,365 volumes, the productive funds from \$6,226,287 to \$18,818,400, and the income from \$521,205 to 1,430,033. The School of Hygiene and Public Health was established by the Rockefeller Foundation in 1916 and opened in 1918; and in 1922, the Foundation gave \$6,000,000 to the School for endowment and building funds. Fire destroyed the pathological laboratory in 1919 and a larger building was completed in 1923 through a gift of \$400,000 for this purpose from the General Education Board. An alumni memorial dormitory and a women's clinic were also built in 1923. Many gifts were received for special purposes, as well as for the general ends of the university. Joseph De Lamar, who died in 1919, bequeathed \$2,500,000 for instruction and research in medicine, and the General Education Board added \$100,000 to the William H. Welch Endowment for Clinical Education and Research in 1917, in order to make possible more work in the department of pediatrics, and also gave \$250,000 to strengthen the work in the laboratory departments of the Medical School. The William H. Collins Vickers Chair in Archaeology was founded in 1920, \$200,000 was received from

the estate of Eugene Mergenthaler for scientific research, and \$20,000 from the estate of Mrs. J. A. J. Creswell for instruction and research in international law. In the summer of 1923 construction work on the new chemical laboratory, which was to cost approximately \$500,000, was begun. President, Frank Johnson Goodnow.

JOHNSON, ALLEN (1870-). An American educator, born at Lowell, Mass. He graduated from Amherst College in 1892 and took postgraduate courses in Germany and in France and at Columbia University. He was appointed professor of history at Iowa (now Grinnell College) in 1898, serving until 1905, and from that year to 1910 was professor of history and political science at Bowdoin College. In the latter year, he became Larned professor of American History at Yale. His published writings include: *The Intendant Under Louis XIV* (1899); *Stephen A. Douglas* (1908); *Readings in American Constitutional History* (1912); *Union and Democracy* (1915); *Jefferson and His Colleagues* (1921). From 1918 to 1921, he was editor of *Chronicles of America*.

JOHNSON, ALVIN SAUNDERS (1874-). An American economist (see VOL. XII). From 1912 to 1916, he was professor of economics at Cornell University, and from 1916 to 1918 was professor of political science at Leland Stanford Junior University. From 1917, he was also editor of the *New Republic*, New York City. His later books include *The Professor and the Petticoat*, a novel (1914); *John Stuyvesant, Ancestor* (1919).

JOHNSON, DOUGLAS WILSON (1878-). An American geologist, born at Parkersburg, W. Va. He was graduated at the University of New Mexico in 1901 and received his Ph.D. at Columbia University (1903). After teaching in public schools, he entered the United States Geological Survey as a field assistant (1899), and was later an assistant professor of geology at the Massachusetts Institute of Technology until 1907. He was also lecturer in physiography at Harvard University during 1906-12. Returning to Columbia in 1912, he became associate professor of physiography and after 1919 was professor. During the War he was connected with the intelligence work of the American Expeditionary Forces with the rank of major; and also served with the American Commission to Negotiate Peace. In addition to many scientific papers and bulletins, he is the author of *Lettre d'un Américain à un Allemand* (1916); *Topography and Strategy in the War* (1917); *Perils of Prussianism* (1917); *My German Correspondence* (1917); *Shore Processes and Shoreline Development* (1919); *Battlefields of the World War* (1921).

JOHNSON, EMORY RICHARD (1864-). An American educator (see VOL. XII). He was assistant director of the Bureau of Transportation of the War Trade Board in 1917 and also acted as expert and adviser to several other important government boards during the War. He was president of the Association of Collegiate Schools of Business in 1920-21. His later books include *History of Domestic and Foreign Commerce in the United States* (1915); *The Panama Canal and Commerce* (1916); *Principles of Railroad Transportation* (1916); *Principles of Ocean Transportation* (1917).

JOHNSON, HIRAM WILLIAM (1866-). An American lawyer and legislator (see VOL.

XII). He served as governor of California for the term 1911-15 and was reelected for the term 1915-19, but resigned in 1917 following his election as United States Senator from California for the term 1917-23. He was reelected in 1922 for the term 1923-29. Senator Johnson was leader of the Progressive element of the Republican party in the Senate and in 1920 was one of the leading candidates for the Republican nomination for the Presidency. He was also a candidate in 1924 for the nomination, but practically abandoned his efforts in April of that year.

JOHNSON, JAMES WELDON (1871-). An American editor and author, born at Jacksonville, Fla. He graduated from Atlanta University in 1894 and took postgraduate courses at Columbia University. After acting as principal of a high school for colored pupils in Jacksonville, he was admitted to the Florida bar in 1897. In 1901, he began practice in New York. He served as United States Consul in Venezuela and in Nicaragua from 1906 to 1912, and became secretary of the National Association for the Advancement of Colored People. With his brother, J. Rosamond Johnson, he wrote for the light opera stage. His publications include *The Autobiography of an Ex-Colored Man* (1912); *Fifty Years and Other Poems* (1917); and *The Book of American Negro Poetry* (1921).

JOHNSON, ROBERT UNDERWOOD (1853-). An American poet and editor (see VOL. XII). In 1917, he organized and was chairman of the American Poets' Ambulance in Italy. This organization presented 112 ambulances to the Italian army in four months. In 1918-19, he was president of the New York Committee of the Italian War Relief Fund of America. He served as ambassador to Italy from April, 1920, to July, 1921, and represented the United States as observer at the San Remo Conference of the Supreme Council of the League of Nations, in April, 1920. He was awarded decorations by the Italian government in recognition of his work in behalf of good relations between Italy and the United States. His later books include *Poems of War and Peace* (1916); *Italian Rhapsody and Other Poems of Italy* (1917); *Collected Poems* (1919). He published a volume of reminiscences in 1924.

JOHNSON, TREAT BALDWIN (1875-). An American chemist, born at Bethany, Conn. He was graduated in 1898 at Yale, where he also received his Ph.D. in 1901. He became an instructor of chemistry at the Sheffield Scientific School of Yale and in 1908 was advanced to the assistant professorship of organic chemistry of which branch he became full professor in 1915. Organic chemistry is his specialty and he has published papers on organic synthesis as applied to therapeutic substances, on phrenanthrene and its relation to morphine, an account of new local anesthetics, histamin, tyramin and cyclic polypeptides. In 1915, he received the Nichols medal of the American Chemical Society.

JOHNSON, WALTER (1888-). Professional baseball player, born at Humboldt, Kan. He is recognized as one of the most effective pitchers the American National game has ever known. After a brief sojourn in an obscure Rocky Mountain League he joined the Washington Club of the American League in 1907 and has been the mainstay in the box for that club ever since.

JOHNSON, WILLIAM EUGENE (1862-).

An American publicist, born in Coventry, N. Y. He was educated at the University of Nebraska and for several years was engaged in newspaper work. He was prominently connected with prohibition and was in the government employ, for the enforcement of the liquor law, for several years. He edited several prohibitionist papers and was European representative of the Anti-Saloon League of America from 1919. He wrote much on subjects connected with temperance. He carried on campaigns in England, Scotland and elsewhere, for the advancement of prohibition.

JOHNSON, WILLIS FLETCHER (1857-). An American editor, born in New York City. He graduated from New York University in 1879 and for several years taught school. He was on the editorial staff of the *New York Tribune* for many years, and was its literary editor (1917-20). In 1914, he was also on the editorial staff of the *North American Review*. From 1914, he was honorary professor of the history of American foreign relations at New York University. He was a member of many societies and was the author of *Four Centuries of the Panama Canal* (1906); *America's Foreign Relations* (1916); *America and the Great War for Humanity and Freedom* (1917); *Political and Governmental History of the State of New York*.

JOHNSTON, SIR HARRY HAMILTON (1858-). An English public official and author (see VOL. XII). His later books include *A Gallery of Heroes and Heroines* (1915); *The Truth About the War* (1916); *The Black Man's Part in the War* (1917); *The Gay-Donkeys* (1919); *Mrs. Warren's Daughter* (1920); *The Veneerings* (1922). In 1923, he published a volume of reminiscences.

JOHNSTON, JOHN (1881-). A chemist, born at Perth, Scotland. He was a Carnegie scholar at St. Andrews, Scotland, and also studied at Breslau during 1905-07. Coming to the United States, he was a research associate in physical chemistry at Massachusetts Institute of Technology in 1907-08, and during 1908-16, chemist at the geophysical laboratory of the Carnegie Institution in Washington. He had charge of the research department of the American Zinc, Lead, and Smelting Company during 1916-17 and was chemist to the United States Bureau of Mines in 1917-18. In 1919, he became professor and chairman of the department of chemistry at Yale. During the War he served as secretary to the National Research Council. His original investigations have had to do with topics in geochemistry and physical chemistry on which he has published the results of his studies, notably in the *Journal of the American Chemical Society*. In 1914, he became a member of the editorial board of the *Society*.

JOHNSTON, MARY (1870-). An American novelist (see VOL. XII). Her later books include: *The Fortunes of Garin* (1915); *The Wanderers* (1917); *Foes* (1918); *Michael Forth* (1919); *Sweet Rocket* (1920); *Silver Cross* (1922); *1492* (1922).

JOHORE. See MALAY STATES, NON-FEDERATED.

JONES, EDGAR DEWITT (1876-). An American clergyman and author, born at Hearne, Texas, and educated at the University of Missouri and Illinois Wesleyan University. He became a minister of the Disciples of Christ

denomination in 1901 and held pastorates in Kentucky, Ohio, Illinois, and Michigan. During 1915-16 he was president of the Illinois Convention of the Disciples, and from 1917 to 1919 of the International Convention of the Disciples. In 1922 he joined the staff of the *Detroit News*. His writings include: *The Inner Circle* (1914); *The Wisdom of God's Fools* (1916); *Fairhope, the Annals of a Country Church* (1917); *The Tender Pilgrims* (1917); *Ornamented Orthodoxy* (1918); *When Jesus Wrote on the Ground* (1924); *The Wisdom of Washington and the Learning of Lincoln* (1924).

JONES, GRINNELL (1884-). An American chemist, born at Des Moines, Iowa. He was graduated at Vanderbilt University and in 1908 received his Ph.D. at Harvard. In 1916, he returned to Harvard as assistant professor. In 1917-19, he was also chief chemist to the United States Tariff Commission to which in 1919 he assumed a consulting relation. Dr. Jones has determined the atomic weights of sulphur and phosphorus and has studied the electrochemistry of silver iodide, and the fixation of atmospheric nitrogen, on which he has published papers in chemical journals. He is also the author of numerous reports issued by the Tariff Commission.

JONES, HILARY POLLARD (1863-). An American naval officer, born in Virginia. He graduated from the United States Naval Academy in 1884. He served in the Spanish-American War, and was in command of the Navy Yard in Washington from 1906 to 1909. He served on shore and afloat in many important capacities, and in 1917 was made commander of Squadron One, Patrol Force, Atlantic Fleet. In the same year he was appointed commander of Division One, Cruiser Force, Raider Guard, of the Atlantic Fleet, and was director of the Naval Overseas Division from January to July, 1919. He was appointed to be vice-admiral of the 2d Battleship Squadron of the Atlantic Fleet, from 1919 to 1921, and from the latter date was promoted to be commander-in-chief of the Atlantic Fleet.

JONES, LAUDER WILLIAM (1869-). An American chemist, born at New Richmond, Ohio. He was graduated at Williams College in 1892, and received his Ph.D. from the University of Chicago in 1897. In the same year, he became an assistant in chemistry at Chicago, where he remained until 1907. From 1907 to 1918, he was professor of chemistry at the University of Cincinnati, and from 1918 to 1920, he was dean of the School of Chemistry at the University of Minnesota, after which he accepted a call to the chair of chemistry at Princeton. He has devoted his attention chiefly to organic chemistry and has published papers on nitro-paraffin salts, alkyl derivatives of hydroxylamin, preparation of hydroxamic acids from hydroxylamin of organic acids, electron conception of valence, and preparation of electromeres. During the War he served with the Chemical War Service as its chief of the research section of offense. Dr. Jones is the author of *A Laboratory Outline of Organic Chemistry* (1911).

JONES, ROBERT EDMOND (1887-). An American artist born in Milton, N. H., and educated at Harvard University. He started his career of designing for the theatre in New York City in 1911, and among his notable works are his designs for *The Man Who Married a Dumb*

Wife; The Jest; Richard III; The Birthday of the Infanta; Macbeth; and Redemption. He has conceived of the theatre as an art by itself and he knits together the various scenes of the play by his design effects. There is a simple and unpretentious symbolism in all of his works; in his *Richard III*, the Tower of London looms up behind every scene as it does in the minds of his characters.

JONES LAW (MERCHANT MARINE ACT OF 1920). See SHIPPING.

JONNART, CÉLESTIN AUGUSTIN CHARLES (1857-). A French diplomat. He was born at Flechin, Pas de Calais, and was educated in the law. In 1882, he entered upon his political and diplomatic career by becoming a member of the private cabinet of the Governor-General of Algeria. He subsequently was elected deputy from the Pas de Calais and became president of the regional council. Before the War he was Governor-General of Algeria and Senator from his district. During the War he was the Inter-Allied High Commissioner in charge of Grecian Affairs, and was instrumental in effecting the entrance of Greece into the War on the side of the Allies. In 1921, when the French government resumed relations with the Vatican, he was made professor at the Holy See.

JONNESCO, THOMAS (1861-). A celebrated Rumanian surgeon for many years professor of surgery in the University of Bucharest. He has been distinguished especially for his attempts to cure certain diseases by dividing some part of the cervicothoracic sympathetic nerve and has recently reported cures of angina pectoris—usually regarded as purely a degenerative affection—by this resource. His major writings comprise *La Rachianesthésie Générale* (1919) and *Le Sympathique Cervico-Thoracique* (1923). The division of the sympathetic by his technique is known as Jonnesco's operation.

JOWETT, JOHN HENRY (1864-1923). A British-American clergyman (see VOL. XIII). In 1918 he returned to England and became a pastor of Westminster Chapel. His last appearance in public was at the conference in Copenhagen of the World's Alliance for Promoting International Friendship through Churches.

JOYCE, JAMES (1882-). An Irish author. He was educated at Dublin, but spent his manhood in Europe, largely in Paris. His works were few: *A Portrait of the Artist as a Young Man* (1914); *Chamber Music*, a book of lyrics; *Exiles*, a play; *Dubliners*, a collection of short stories; *Ulysses* (1922). His first novel, *A Portrait*, had been highly received: it contained lyrical powers and a dignity and honesty that marked it off; but it was his *Ulysses* that gave him almost a universal attention and made him the storm-centre of a bitter literary controversy. The novel has almost 500,000 words, little plot in the accepted sense, and marks a violent break with the current technique. It was attacked for its crudities and its formlessness; and it was extolled for its frankness and the epic quality of its portraiture. Whether or not it marked a milestone in the intellectual history of the twentieth century remained to be seen, but that it contained elements of great courage, understanding, and a depth of feeling could not be denied.

JUGO-SLAVIA. Jugo-Slavia, or as it is officially known, "The Kingdom of the Serbs, Croats, and Slovenes," comprises the old kingdoms of Serbia and Montenegro, combined with

certain provinces originally belonging to the Austro-Hungarian Monarchy. The country is situated in southern Europe, bordering on the Adriatic Sea; area, 96,134 square miles; population, census of 1920, 12,017,323. Jugo-Slavia is primarily an agricultural state, the great bulk of its population being agrarian, and most of its income is derived from farming and stock raising. Racially the population is divided into Jugo-Slavs, 10,900,000; Germans, 560,000; Magyars, 450,000; Albanians and Turks, 550,000; Rumanes and Vlachs, 200,000; the remainder consisting of Italians and other nationalities. There is no dominant religion in the country, and freedom of worship is guaranteed. The majority of the people, however, are either Orthodox or Roman Catholic. The population is distributed by religions as follows: orthodox, 5,843,000; Catholic, 4,923,000; Moslem, 1,363,000; Protestant, 235,000; and Jewish, 79,000. Cities of over 20,000 are: Belgrade, 120,000; Zagreb, 89,000; Ljubliana, 60,000; Sarajevo, Novi Sad, Spalato and Nish.

Agriculture. The total agricultural and forest area in 1922 was 47,434,000 acres, including cultivated land, 15,954,000; meadows, 4,093,000; pastures, 6,895,000; vineyards, 458,000; orchards, 634,000; forests, 18,988,000; and marshes, 413,000. While there were many small land owners, there were still many large estates, particularly in the provinces of Slovenia, Vojvodina, and Slavonia. The problem of the breaking up of these large holdings was, during the period, the chief problem of the agrarian reform. Pre-war grain yields in bushels were: wheat, 63,666,000; rye, 10,142,000; barley, 20,280,000; oats, 33,500,000; and corn, 11,892,000. The crops of all these cereals declined, as was shown by the 1923 production, wheat being then 61,876,500 bushels; rye, 5,911,000 bushels; barley, 14,327,000 bushels; oats, 19,354,000 bushels; and corn, 88,554,000 bushels. This decline in yield may be accounted for through the conversion of the land to other uses, principally fruit growing and stock raising. Besides the principal cereals enumerated, Jugo-Slavia also cultivated, in lesser quantities, buckwheat, millet, rice, lentils, beans, and peas. There were also increasingly large crops of tobacco and sugar beets, tobacco production having grown from 3,000,000 pounds, pre-war, to 44,995,000 pounds in 1923. Production of sugar beets in 1923 was 331,000 short tons.

Mining. Mining was little developed in Jugo-Slavia in 1924, although a great diversity of minerals was known to exist. The industry only began to assume any real importance within the last century, with the exception of the provinces of Slovenia and Croatia (formerly parts of the Austro-Hungarian Empire). There were, however, many traces of old workings for gold and copper dating back to the days of the Roman Empire, and also to the Middle Ages. The principal minerals found in the country were brown coal, anthracite, bauxite (used in the manufacture of aluminium), lead, iron, copper, sulphur, antimony, silver, and gold. Petroleum and asphalt also occurred in various parts of Jugo-Slavia, but not in large quantities. The large coal deposits were of great advantage to the industries of Jugo-Slavia, the principal mines being located in the provinces of Slovenia, the only drawback being that they consisted almost entirely of brown coal and lignite, which was inferior to the British, Belgian, and Silesian black

coal, and in many cases was unsuitable for industrial consumption. All coal so far mined in Slovenia, Croatia-Slavonia, or Bosnia was of this inferior quality, the only anthracite being found in Serbia. Coal production for 1922 was 3,719,938 metric tons; for 1921, it was 2,949,103 metric tons. No statistics for pre-war production are available.

Forest. The forests of Jugo-Slavia covered about 32 per cent of her entire area, lumbering being one of the principal industries of the country. The forests were particularly valuable assets to the country because of their close proximity to the Mediterranean, whereas most of the other countries bordering on it had been more or less deforested, and the demand for Jugo-Slav timber was constantly increasing. The principal varieties of trees found were birch and oak, and in lesser quantities, fir, pines, and spruce. The provinces of Bosnia and Slovenia were the principal timber sections of the country.

Industry. The manufacturing industry of Jugo-Slavia was still in the early stages of its development, and consisted principally of flour milling, weaving, tanning, boot making, pottery manufacturing, and iron foundries. In view of the immense water power resources of the country, a great development in this phase of the industrial life was hoped for. One of the greatest difficulties in the development of manufacturing was the lack of proper railway facilities, and when the railways projected in 1924 are completed this handicap will be, to a great extent, removed. In 1922, there were 5696 miles of railroads all owned by the state with the exception of 974 miles. Locomotives numbered 1809; freight cars, 38,065 (14,000 in need of repairs); passenger cars, 2866. In 1920, telegraphs, 11,430 miles of line; and telephones, 16,030 miles of line.

Commerce. The foreign trade of old Serbia in 1911 was: imports \$22,277,000, and exports \$22,564,000. These figures, however, do not afford a proper basis of comparison with statistics on foreign trade for post-war years, in view of the much greater present area of the country. Imports for 1921 were \$97,694,000; for 1922, \$85,676,000; and for the first six months of 1923, \$38,800,000. Exports for 1921 were \$58,320,000; 1922, \$49,092,000; and for the entire year of 1923, \$86,244,000. The principal countries of origin of imports for the first six months of 1923, in order of value, were Austria, Czechoslovakia, Italy, Germany, England, and the United States. The principal countries of destination of exports for the entire year of 1923, in order of value, were Austria, Italy, Czechoslovakia, Switzerland, and the United States. The principal items of import were textiles, metals and metal products, machinery and vehicles, chemical and pharmaceutical products. The principal items of export were lumber, grain, cattle, meat products, eggs, and dried prunes.

Finance. Bank note circulation at the end of 1923 was 5,790,241,000 dinars; gold reserve, 68,838,000 dinars. Average exchange rate of the dinar, 1913, \$0.193 (par); 1921, \$0.0237; 1922, \$0.0133; 1923, \$0.10715. The dinar exchange was practically stabilized at the latter figure in 1923-24. The foreign pre-war debt, converted at par, was \$169,999,000, in 1924, but would be much less if discharged in paper currency of the several countries, due to their

depreciated currencies. War debts to the British, French, and American governments, at par, were \$451,950,000; pre-war debts of Austria and Hungary (assumed), converted at agreed exchange rates, \$4,452,000. In addition there were several foreign loans negotiated after the War. The total foreign debt was approximately \$650,000,000 in 1924.

Education. Elementary education was compulsory and in the schools under the Ministry of Education was free. In 1920, there were 5974 elementary schools with 12,758 teachers and 800,868 pupils; number of secondary schools was 139, with 2794 teachers and 55,636 pupils; there were three universities located at Belgrade, Zagreb, and Ljubljana, with a total of 333 professors and accommodating about 12,000 students.

Government. Jugo-Slavia is a constitutional monarchy, whose ruler in 1924 was Alexander I, former King of Serbia. The present constitution was adopted on Jan. 1, 1921 and provides for a single chamber called Narodna Skupština, consisting of 313 representatives elected for four years on the basis of one member for every 40,000 inhabitants. The military defense of the country was provided for by a peace-time army of 7000 officers and 120,000 men recruited on the basis of universal service. Compulsory service was enforced for men between the ages of 21 and 45 in the first line, and for men between 18 and 21 years and 45 and 50 years for the second line defense. The navy consisted of 12 torpedo boats and four monitors.

History. While the new kingdom of the Serbs, Croats, and Slovenes did not become a reality until December, 1918, the idea of a unified Jugo-Slavia was by no means new. Here and there, throughout the nineteenth century sporadic movements made their appearance whose purpose was the union of the southern Slav peoples under a single head. The creation of the Dual Monarchy of Austria-Hungary gave the notion of Jugo-Slav unity a serious setback and for a time, at the beginning of the twentieth century, the idea was completely submerged. The Dual Monarchy played off Serbs against Croats while the Serbian kingdom was to all practical purposes treated as a fief of the Austrian-Hungarian throne. But from 1905 on Serbs and Croats became more conscious of kindred interests and, as dissatisfaction with Magyar supremacy grew, the more real became the belief in a Jugo-Slav nation. Not without reason Austrian officials suspected that the southern Slav agitation in the Dual Monarchy was being fostered by Serbia; it can be seen, therefore, why Austrian animosity toward Serbia was so keen. Serbian victories in the Balkan War only succeeded in increasing the Slav ardor for freedom, and the hot-headed proposals of the students' organizations, to which belonged the assassins Princip and Cabrinovitch, brought on unnecessary excesses. Throughout the War, Slavs in Austria-Hungary suspected of any sympathy with the patriotic propaganda were treated with the utmost cruelty. Thousands died in the internment camps; all literary and intellectual communications were cut; the police courts had no mercy on any, even school boys, with whom the idea of Pan-Slavism might be linked. In all the provinces except Croatia, every semblance of government disappeared to the accompaniment of wholesale confiscations

and the terrorization of the civilian population. Abroad the claims of these peoples, i.e. for the dissolution of the Dual Monarchy and the liberation of Serbs, Croats, and Slovenes, were constantly kept before the eyes of the Allied populations by the Jugo-Slav Committee headed by Dr. Trumbitch and Mr. Supilo. The secret Treaty of London of April, 1915, by which the Allies gained the adhesion of Italy by promising away large sections of Gorizia, Istria, Carniola, and Dalmatia, was in effect a betrayal of the Jugo-Slav cause, and though the Jugo-Slav Committee became immediately acquainted with the terms of the treaty its loyalty to the Allies and its own aspirations suffered only slightly. For the spoliation of Serbia by enemy invaders came soon after and served to strengthen the common resolve. To the Jugo-Slav Committee support was added in 1917 by the Jugo-Slav Club, made up of sympathizers in the Austrian Reichsrat, as well as by the exiled Serbian government under Mr. Pashitch. By Mr. Pashitch for the Serbian government and Dr. Trumbitch for the Jugo-Slav Committee was signed the "Corfu Declaration" (July 20, 1917) which set forth the principles of southern Slav unity under the Karageorgevitch dynasty together with the democratic tenets of universal suffrage and freedom of religion. A further step in the direction of Jugo-Slav independence was realized when Jugo-Slavs and Italians came together in 1918 and decided to work for their common purpose, i.e. the defeat of the Dual Monarchy and the freeing of the Adriatic. This meeting and a similar one at Prague had the desired effect with the result that defections from the Austro-Hungarian ranks became increasingly numerous. Thenceforth it was merely a question of months to the creation of the Jugo-Slav kingdom. There were difficulties, of course, even after the collapse of Austria-Hungary. The Serbian government sought to found a kingdom with itself as a nucleus; to the Jugo-Slavs under Dr. Trumbitch nothing less than the entire Jugo-Slav programme would do. Again Italian disapproval served seriously to retard the formation of the new state. Finally, however, on Nov. 23, 1918, an act of union was promulgated at Zagreb, the capital of the ex-Austrian Slav provinces, and Prince Alexander was invited to take the throne of a united Jugo-Slavia. At the same time King Nicholas of Montenegro was deposed and Montenegro (q.v.) joined the union. See SERBIA, *History*.

The path of the new state was to be a thorny one in the beginning. Italy consistently refused its recognition of the accomplished fact of the Jugo-Slav state and at the Peace Conference unalterably insisted not only on the Treaty of London line but, in addition, Fiume. To the Jugo-Slavs mediation by President Wilson of the whole Adriatic question was perfectly acceptable; to the Italians, aware of President Wilson's doctrines of self-determination and also understanding that on such a basis not all their claims could be substantiated, there was no way out but the Treaty of London. Wilson's proposals they hotly rejected and Wilson's sensational declaration of Apr. 23, 1919 over the heads of the Italian government, infuriated the Italian people. The Adriatic question continued intermittently to trouble the progress of southern Europe affairs for the next four years. For the D'Annunzio escapade, the succeeding conversa-

tions with the Supreme Council, the patched-up Treaty of Rapallo of Nov. 12, 1920, and finally the threatening gesture of Mussolini and the Peace of Rome of January, 1924, see the article FIUME-ADRIATIC CONTROVERSY. Jugo-Slavia was, in a sense, the victor, for, excepting the cession of Fiume to Italy, the new line followed substantially Wilson's proposals of 1919. There were other questions that served to distract attention from domestic concerns and to prevent that reconstruction that was so sorely needed. The division of the Banat of Temesvár (q.v.), which both Jugo-Slavia and Rumania claimed on ethnographic grounds, was not consummated until 1920, when, by the Treaty of the Trianon Jugo-Slavia finally gained the western county (Torontál) as well as the Bačka district containing the large city of Szabadka. To the southwest, the Pan-Serbs agitated for the annexation of the Scutari region (northern Albania). Not until 1921 did Jugo-Slavia agree to relinquish her claims to this rich district, which included the valleys and outlets of the Drin and Boyana Rivers. Again the settlement of the Austrian boundary line presented difficulties. By the treaty, a plebiscite had to be held in the Klagenfurt (q.v.) area before its disposition could be finally determined. In October, 1920, one of the two zones voted to remain in Austria, with the result that the whole area was restored. By the Treaty of Neuilly (November, 1919) Bulgaria was forced to give up to Jugo-Slavia, on the east, the Strumitsa district as well as the Tsaribrod and Bosilegrad districts.

Thus, not until 1921 was Jugo-Slavia ready to turn to the business of setting her house in order. In November, 1920, elections were held for members of a Constituent Assembly, and the meeting of that body, the first to represent the opinion of the new state, indicated something of the new loyalties. Cleavages were largely on racial and then on economic lines, although religious animosities were also apparent. Decentralization was particularly favored by the Catholic Croats and Slovenes, who feared the supremacy of the Orthodox Serbs. The Communists gathered about them the dissident spirits from the late enemy provinces, especially the Bačka, as well as the Mohammedans of Bosnia. The character of the new groupings may be adduced from the parties represented in the Constituent Assembly. There were 102 Radicals, 94 Democrats, 42 Communists, 51 Croatian-Agrarians, 33 Serb Agrarians, 25 Mohammedans, 21 Catholic People's party. As a result of these fundamental differences the establishment of the new state proceeded slowly. Government by bloc was the only way out and could be carried on only as a result of the alliance of the Radicals and the Democrats, strengthened by the adherence of the Bosnian Mohammedans and the Slovene Agrarians. It was only on June 28, 1921, that the constitution, embodying the notion of a centralized Serb state, finally passed through the Assembly. Even then this result could hardly have been achieved had not the entire Croat delegation of 161 members quit the body. Throughout 1922, however, the new constitution was not promulgated, the rump Assembly remaining in control and the government under Mr. Pashitch continuing in office despite the well-authenticated charges of disregard for ministerial responsibility. Communist outbreaks in 1921 added to the

general uncertainty and were followed by harsh measures of reprisal in which the Communist members were expelled and the constitutional guarantees annulled. However, the increasing growth of the Peasant party indicated the true temper of the country. Jugo-Slavia is essentially agricultural and its problems centre in the development of its natural resources and the spread of its means of communication. To these the country was increasingly devoting itself and making as rapid headway as the vexatious administrative questions would permit. In the field of foreign affairs the prevailing policy was conciliatory. By a series of conventions with Czecho-Slovakia and Rumania in 1920 and 1921, the Little Entente (q.v.) was constituted to check the Habsburg pretensions; in October, 1923, Jugo-Slavs gained Greek permission for their use of the port of Saloniki; in 1924, an understanding was effected with Italy (q.v.) for the amicable settlement of the Adriatic problem. The friendliness of France contributed much toward strengthening the financial structure of the new state and the security of its national integrity. Jugo-Slavia was assured of a respectable place among Central European nations. The first general election, March, 1923, gave the same groups that had controlled the Constituent Assembly, ascendancy in the national Parliament. Mr. Pashitch remained at the head of affairs, his party and that of the Democrats backing vigorously his resolute attitude toward the separatist Croats. Though in February, 1924, 96 Croats once more appeared to take their seats in the Parliament after an absence of four years, their policy continued hostile, as was shown by their opposition to the Fiume treaty and their continual demands for Croatian independence. In March, and again in April, 1924, by combining with the other Opposition groups, the Croats succeeded in compelling Premier Pashitch to resign. Thanks to the King's continued confidence in him, the veteran leader returned to power, each time, with a reconstructed cabinet. But the significance of Croatian opposition was larger than mere cabinet jugglery would indicate. The important fact revealed by more than four years of Croatian obstruction was that the Croats, though willing to unite with their kinsmen in a decentralized Jugo-Slav nation, were irreconcilably opposed to the continued dominance of the Serbs in the new and enlarged nation. Territorial consolidation had proved to be but the first step toward genuine national unification, and the other steps remained to be made. The head of the Croat movement was Stephen Raditch, whose whole-hearted devotion to the cause of the Croat peasant earned him the regard of all the Balkan peoples. By 1924 he was a leader of the first importance in southeastern Europe and his leaning toward Russia, together with his strength in Macedonia, encouraged the belief, expressed widely in the summer of 1924, that Soviet Russia would have little difficulty in gaining over the Balkan peoples, once such an offensive was launched.

JUNG, CARL GUSTAV (?-). A celebrated Swiss psychologist and psychoanalyst. Jung, who was the earliest convert to the new doctrines of Freud was at that time assistant to Professor Bleuler (q.v.) the psychiatrist of the Zurich University, who also was favorably disposed to the new departure. All of his works

are in English translations: *Psychology of Dementia Præcox* (1909); *Theory of Psychoanalysis* (1915); *Analytical Psychology* (1916); *Psychology of the Unconscious* (1916); *Studies in Word Association* (1918) and *Psychological Types* (1923). Jung has divided all mankind into extraverts and introverts with many subdivisions. See PSYCHOLOGY, ABNORMAL, AND PSYCHOANALYSIS; ASSOCIATION TESTS.

JUNIOR HIGH SCHOOLS. See EDUCATION IN THE UNITED STATES.

JUSSERAND, JEAN ADRIEN ANTOINE JULES (1855-). A French diplomat and scholar (see VOL. XIII). During the War his services were of the greatest value, both in France and the United States. He had profound knowledge of English literature and life. Two of his later works were: *A Literary History of the English People* (1913) and *With Americans of Past and Present Days* (1916).

JUTLAND, BATTLE OF. See WAR IN EUROPE, *Naval Operations*.

JUVENILE COURTS. Although the first juvenile courts were established about 1900, during the last decade marked progress has been made in the formulation of principles and the development of methods of administration. In 1914, a report of a special committee of the National Probation Association appointed to consider juvenile courts and their administration was published in book form under the title of *Juvenile Courts and Probation*, by Bernard Flexner and Roger N. Baldwin. This statement of the aims of the juvenile court and detailed discussion of the means by which its purposes may be realized, together with the educational work of the National Probation Association, of State organizations supervising juvenile court work, and of individual judges and probation officers, have brought increased recognition of the importance of the movement and the administrative standards that must be maintained. In 1923, following a series of studies made by the Children's Bureau of the United States Department of Labor and conferences held under the joint auspices of that Bureau and the National Probation Association, a detailed statement of Juvenile-Court Standards was published by the Children's Bureau and widely distributed.

Since it aims to save, rather than to punish, the delinquent child and to protect the neglected and dependent child, the primary function of the juvenile court is not to determine whether or not a child has committed a specific offense, but through social investigations and physical and mental examinations, to ascertain the needs of each child and determine the treatment to be given. Children are to be kept in their own homes if possible, and if institutional care is needed, it must be educational and not punitive. To attain these ends, the procedure in children's cases must not be criminal in nature, and the court hearings must be entirely separate from the trials of adult offenders. The hearings must be private and informal (see COLORADO, *Political and Other Events*), and must be held before a judge or referee who understands problem children and is able to use intelligently the resources which the community and the State provide; and skilled probation service and facilities for expert study of the child's physical and mental condition must be available. Children are to be kept in their own homes if possible pending the hearing and de-

termination of their cases, and if detention is required for their own welfare or the public safety, it must not be in jails or police stations, but in family boarding homes or special detention homes adequately equipped for constructive service.

These are the ideals of the juvenile court, but their realization even in the larger cities is far from complete, and in many small towns and rural districts throughout the country children are still subjected to publicity, criminal procedure, jail detention, and treatment that can not be effective because of the absence of facilities for the study of the child and for skilled probation service. Nevertheless, real progress has been made in the last 15 years (up to 1924) in the extension of juvenile court principles and practice. In 1910, legislation authorizing probation in children's cases was on the statute books of 38 States and the District of Columbia, but the application of this legislation was mainly confined to the larger cities. Eight years later, juvenile court laws having been passed in every State except two, and laws authorizing probation in children's cases in every State except one, a survey was made by the Children's Bureau of the United States Department of Labor, covering 2034 juvenile courts and other courts hearing children's cases. This study showed that of an estimated 175,000 children's cases in 1918, 125,000 were heard by courts with some degree of special organization, and that such service existed in all the large cities and in 71 per cent of the cities having populations of from 25,000 to 100,000. The minimum degree of specialization used as a basis of comparison in this survey was separate hearings for children, officially authorized probation service, and the recording of social information. Only 321 courts, or 16 per cent of those reporting, had even this minimum; and almost half of these courts were in five States. It was found that many States were not fully carrying out their laws. From at least one court in every State came reports of detaining children in jails, and in 37 courts in 18 States no effort was made to separate children detained in jails from adult offenders; more than one-fourth of the courts with probation service reported that no provision whatever was made for physical examinations, and relatively few courts had facilities for mental examinations. Although authorized in every State but one, probation service was known to have been used during the year in only 45 per cent of these courts with jurisdiction over children.

Considerable progress has been made since 1918 in the extension of juvenile court service to rural communities, chiefly as a result of activities of State departments and the new movement for the organization of county child welfare or public welfare boards, working in co-operation with State departments. State assistance rendered juvenile courts includes the preparing of forms, the developing of community co-operation, securing appointment of probation officers, training probation officers, publishing educational literature, and advising and assisting in difficult cases. Among the States in which county organization has been in progress are: Minnesota, North Carolina, Missouri, and Virginia. Alabama, Georgia, Indiana, Pennsylvania, North Dakota and a few others have been added to the older list of States, including Massachusetts and New York, in which

State supervision or stimulation of juvenile court work has been carried on.

In addition to its extension, the juvenile court movement during the last decade has been marked by the broadening of jurisdiction, increased specialization, the development of higher standards of probation service, and closer supervision of its scientific study of the child, and the growth of the practice of dealing informally with cases which do not require official court action or prolonged treatment.

The original age limits have been raised so that in 1922, the limit was 18 years or higher in approximately one-third of the States. More classes of cases have been included, such as aid-to-mothers cases and in a few States adoption cases and cases involving feeble-minded children. In order to increase the effectiveness of the work of the children's courts, by 1922 jurisdiction over adults contributing to delinquency or dependency of children had been granted in the majority of the 40 States that had enacted laws on the subject, this jurisdiction usually being concurrent with that of the criminal courts; jurisdiction over desertion and non-support cases had been given in 12 States; and in some States jurisdiction over cases of offenses against minors not under the "contributing to delinquency or dependency" laws, and of violations of child-labor laws. There has been a definite tendency to give to a juvenile court or to a court of domestic relations general jurisdiction over all cases involving children or the relationship of adults to children. At the same time, there has been noticeable a movement to free the juvenile courts from certain types of administrative work such as child-placing, and from responsibility for cases which can easily be handled by such organizations as school-attendance departments.

Certain standards for probation work have been evolved—that it should be a regular, paid service by trained persons, and should when necessary extend to the reconstruction of the child's family, school, vocational, and recreational relationships. Definite training courses for probation officers have been established in universities and in schools of social work. Pro-

bation staffs have been increased, and more adequate salaries for workers have been secured.

Since 1910 more specialized judicial service has been gained, the earlier system under which judges served in rotation for only a short period having been replaced to a large extent by longer assignments. In many of the larger cities special judges give full time to juvenile court work, and woman referees have been authorized to hear the cases of girls, as in San Francisco, or to hear the cases of girls and of younger boys, as in Los Angeles, and to make recommendations as to the disposition of the cases. Referee power has been given to woman probation officers in Detroit, Cincinnati, and also in other cities.

Because the fundamental concept of the juvenile court is to supply corrective treatment according to the individual needs, the principle of scientific diagnosis has been developing certainly, if slowly. In addition to providing means of investigating the social history of the child and his family, of giving physical examinations and treatment and routine mental tests, there has been a growing movement to provide psychiatric clinics for the study of all the associated factors of conduct. Scientific diagnostic study as a regular service for delinquents and for a court began in Chicago in 1909. Since 1922, to demonstrate the value of such service to juvenile courts and other agencies dealing with children, the Commonwealth Fund of New York, through the National Committee for Mental Hygiene, has been financing the assignment of psychiatric clinics to selected communities for limited periods, and has also been supporting training courses for psychiatric social workers and probation officers given by the New York School of Social Work.

Juvenile courts, in one form or another, closely modeled after those in the United States, were established after 1899 in England, France, Russia, and, in fact, all the principal European countries. The movement had also appeared in Japan. Its extension in the decade was rapid and far-reaching; in 1923, there was hardly a civilized country in which it had not manifested itself at least in spirit.

K

KAHN, GUSTAVE (1859-). A French symbolist poet, born at Metz, and educated in Paris at the Ecole des Chartes, and the Ecole des Langues Orientales Vivantes. He founded with John Moreas and Paul Adam the periodical, *Le Symbolisme*, the organ of the young poets of the 1880's and 1890's and was reputed to have been the first to employ free verse. His early verse showed the influence of Beaudelaire and expressionism. In later years, when the symbolist group gradually broke up, Kahn turned to essays and to the aesthetics of fine art. His works include: *Les Palais Nomades* (1887); *Chansons d'Amants; Domaine des fées* (1895); *La Pluie et le Beau Temps; Le Roi Fou* (1895); *Limbes de Lumière; Premiers Poèmes; Le Livre d'Images* (1897); *Le Conte de l'Or et du Silence* (1898); *Les Petites Ames Pressées* (1898); *Le Cirque Solaire* (1899); *Les Fleurs de la Passion* (1900); *L'Esthétique de la Rue; Adultère Sentimental; Odes à la Raison; Etude sur Boucher; Symbolistes et Décadents; De Tartuffe à ces Messieurs; Le Polichinelle du Guignol; Contes Hollandais; La Femme dans la Caricature Française*.

KAHR, AUGUST RICHARD VON (1862-). A German public official, born at Weisserling. He was active in the establishment of the Bavarian Republic, and in March, 1920, was made Minister-President. He came into conflict with the Reich government over questions of authority and resigned his post in September, 1921, largely as a result of the opposition of General Ludendorff and other reactionaries. In 1923 he was appointed general commissioner of state in full charge of the government and held this position during the attempt of Adolf Hitler and General Ludendorff to overthrow the government. The failure of this attempt resulted in the arrest of Hitler and Ludendorff. See BAVARIA.

KAISER, GEORG FR. G. (1878-). A German playwright of the expressionist school. He was born at Magdeburg, attended college and engaged in commerce at Buenos Aires. After 1901 he devoted himself to the drama. He is the author of *Rektor Kleist* (1910); *Die Jüdische Wittve* (1911); *König Hahnrei* (1913); *Die Bürger von Calais* (1914); *Lorina* (1917); *Die Versuchung* (1917); *Claudia, Friedrich, Anna, Juana*, a one-act cycle (1918); *Von Morgen bis Mitternacht*, produced in the United States in English translation (1919); *Gas* (1920); *Die Koralle* (1920); and *Das Frauenopfer* (1920).

KAISER, ISABELLE (1866-). A Swiss novelist writing in German and French (see VOL. XIII). In the period 1914-24 she published: *Von Ewiger Liebe* (1914); *Le Vent des Cimes* (1916); *Rahels Licht* (1921); *Hilda, die Heze* (1921); and *Die Nächte der Königin* (1924).

KALEDIN, ALEXEI (1861-1918). A Russian general, of Cossack birth. During the great

offensive of Brussilov in 1916, he commanded one of the Russian armies. He succeeded Brussilov as commander of the 8th Russian Army. His masterly conduct of the campaign of Volhania and the capture of Lutsk gained for him the title of "Hero of the Lutsk." Following the outbreak of the Russian Revolution, in 1916, he became leader of the Cossacks, who elected him hetman, or commander-in-chief. On hearing of the defeat of General Alexeiev on the Don River, in 1918, he committed suicide.

KALLEN, HORACE MEYER (1882-). An American philosophical writer (see VOL. XIII). He was born in Silesia, Germany, May 11, 1882, and was brought to this country at the age of four. He was educated at Harvard University and also studied at the Sorbonne and at Oxford. He was named by James as editor of his unfinished book, *Some Problems in Philosophy* (1910). After teaching at Harvard (1908-11), he went to the University of Wisconsin (1911-19). When the New School of Social Research was organized in New York City, he was called in as lecturer in philosophy. He is the author of the following works: *William James and Henri Bergson* (1909); *Creative Intelligence*, with John Dewey and others (1916); *The Structure of a Lasting Peace* (1918); *Zionism and World Politics* (1921); *The League of Nations, To-day and To-morrow* (1921); and *Culture and Democracy in the United States* (1924).

KAMERUN. Formerly a German protectorate on the west coast of Central Africa, but since its capture by British and French troops in 1916, part of the British and French Empires under the names of British Cameroon and French Cameroon (qq.v.). It had an area of 305,000 square miles and a population of 3,650,000 of whom whites numbered 1871 on Jan. 1, 1913. Of these, 1643 were Germans. German penetration had been confined only to the coastal region, while the natives of the interior still recognized the sovereignty of the local Emir of Yola. Cocoa culture was the leading activity of the whites. Exports, made up of rubber, palm products, ivory, cocoa, and tobacco, totaled \$5,500,000 in 1912, and imports, \$8,100,000. Shipping in 1912 amounted to 1,733,000 tons, over half of which was carried in German vessels. For administration, \$3,700,000 was annually derived from customs, and \$1,500,000 was received as an imperial grant. Kamerun was captured by Allied armies in 1916 (see WAR IN EUROPE, Colonies), and in May, 1919, it was conferred as a mandate territory on Great Britain and France. The strip bordering on Nigeria, about 30,000 square miles, fell to Great Britain, while the area of 107,200 square miles in the East and South which Germany had received in 1911 from France was once more incorporated in French Equatorial Africa. The remaining districts in the centre, about 167,000 square miles, became a French mandate territory. See CAMEROON, BRITISH; and CAMEROON, FRENCH.

KANDEL, ISAAC LEON (1881-). An

American educator, born in Rumania. He studied in Manchester, England, and at Columbia and the University of Jena. For several years he taught in universities in Ireland and from 1908 to 1910 was scholar and teaching professor at Columbia University. In 1915 he was associate professor of education at Teachers' College, Columbia University, and in 1914 became specialist of the Carnegie Foundation for the Advancement of Teaching. He was a contributor to several encyclopedias and was the author of *Elementary Education in England* (1914); *Federal Aid for Vocational Education* (1917); *Education in Germany* (1918); and *Reports on Education in Great Britain, Ireland, Germany and France* (1919).

KANSAS. Kansas is the thirteenth state in size (82,158 square miles) and the twenty-fourth in population; capital, Topeka. The population increased from 1,690,949 in 1910 to 1,760,257 in 1920, a gain of 4.6 per cent. The white population rose from 1,634,352 to 1,708,906; Negro, from 54,030 to 57,925. The number of foreign-born whites decreased from 135,190 to 110,578. The urban population mounted from 493,790 to 617,964, while the rural fell from 1,197,159 to 1,151,293. The growth of the principal cities was as follows: Kansas City (q.v.), 82,331 to 101,177; Wichita, 52,450 to 72,217; Topeka, 43,684 to 50,022.

Agriculture. Kansas is one of the most important of the agricultural States. Conditions, during the decade 1910-20, especially in the latter part of that period, were greatly affected by the general agricultural situation in regard to wheat and other grain products, for an account of which see AGRICULTURE, CORN, WHEAT, etc. While the population of the State increased 4.6 per cent in the decade 1910-20, the number of farms decreased 7.1 per cent (from 177,841 to 165,286). In 1910 the total acreage in farms was 43,384,799, compared with 45,425,179 in 1920, an increase of 4.7 per cent; and the improved land in farms also increased, from 29,904,067 to 30,600,760 acres. The total percentage of land in farms increased from 82.9 in 1910 to 86.8 in 1920, but the percentage of improved land in farms decreased from 68.9 to 67.4. The total value of farm property showed an apparent increase from \$2,039,389,910 to \$3,302,806,187; the average value per farm, from \$11,467 to \$19,982. In interpreting these values, however, as indeed all comparative values in the decade 1914-24, the inflation of the currency in the latter part of the period is to be taken into consideration; the index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. Of the total of 165,286 farms in 1920, 97,090 were operated by owners, 1495 by managers, and 66,701 by tenants. The comparative figures for 1910 were 111,108, 1335, and 65,398. White farmers in 1920 numbered 164,048, compared with 176,150 in 1910; native-born, 146,859, compared with 150,346; foreign-born, 17,189 compared with 25,804; colored, 1238 compared with 1691. In 1920 the number of dairy cows was 681,267, as compared with 736,107 in 1910; "beef cows," 912,892, compared with 558,153; mules, 243,332, compared with 196,078; sheep, 361,102, compared with 204,023. The number of hogs decreased greatly during the decade (from 3,037,000 in 1910 to 1,816,000 in 1920), the war-time prices of wheat having caused the supplanting of much corn. The esti-

mated production of the chief farm crops for 1923 was as follows: corn, 126,905,000 bushels; spring wheat, 115,000; winter wheat, 83,678,000; oats, 33,343,000; barley, 23,366,000; potatoes, 4,918,000; and hay, 3,060,000 tons. Comparative figures for 1913 are: corn, 23,424,000 bushels; wheat, 86,983,000; oats, 34,320,000; barley, 1,994,000; potatoes, 2,920,000; and hay, 1,350,000 tons.

Mining. The principal mineral products of the State are petroleum, coal, natural gas, and cement. There is practically no metal mining. The progress of the petroleum industry during the decade 1914-24 is indicated by these figures: production in 1914, 3,103,585 barrels; 1915, 2,823,487; 1916, 8,738,077; 1917, 36,536,125; 1918, 45,451,017; 1920, 39,005,000; 1921, 36,456,000; and 1922, 31,766,000. The greatly increased production in the latter years indicates a remarkable development in the new petroleum fields throughout the State. The coal production in 1914 was 6,860,988 short tons, valued at \$11,238,253; 1916, 6,881,455, \$12,252,723; 1917, 7,184,975, \$16,618,277; 1918, 7,561,947, \$22,028,142; 1920, 5,926,408, \$22,923,000; 1921, 3,466,641, \$13,333,300. The value of clay products varied during the decade from \$1,905,961 in 1914 to \$2,064,520 in 1918; \$4,921,740 in 1920; and \$3,739,594 in 1921; the increased value in the latter part of the period was due largely to the decreased purchasing power of money and the consequent higher prices. Shipments of cement, exclusive of natural cement, varied from 3,237,906 barrels in 1914 to 2,586,834 in 1918; 4,158,399 in 1920; and 3,643,582 in 1921. In addition to products mentioned above, the State produces a considerable quantity of gypsum, lead, natural gas, and sand and gravel. The total value of the mineral products in 1921 was \$113,098,346, compared with \$198,097,758 in 1920, \$120,759,783 in 1919, \$149,902,091 in 1918, and \$25,866,351 in 1914. In the value of its mineral products, Kansas ranked ninth among the States in 1921.

Manufactures. While Kansas is chiefly an agricultural State, it is also important industrially. There are 17 cities which have a population of more than 10,000, the combined population of which forms 23.6 per cent of the total for the State. In 1919 72.1 per cent of the total value of the State's manufactures were reported from these cities. There were in the State, in 1909, 3435 manufacturing establishments; in 1914, 3136; and in 1919, 3474. Persons engaged in manufacture numbered 54,649, 52,032, and 77,009, in those years; and capital invested amounted to \$156,090,067, \$163,789,752, and \$357,534,129. The value of products in 1909 amounted to \$325,104,002; 1914, \$323,234,194, and 1919, \$913,667,094. While the increase in the value of the product in 1914-19 is in great measure due to changes in industrial conditions brought about by the War, the increase in the average number of wage earners clearly indicates a decided growth in manufacturing activities in the State. The most important industry in point of value of products is that connected with slaughtering and meat packing, the value of the product in 1909 being \$165,361,000; in 1914, \$151,647,000, and in 1919, \$427,663,000. Flour-mill and gristmill products rank second; in 1909, they were valued at \$68,476,000; in 1914, \$72,895,000; and in 1919, \$206,881,000. Petroleum refining, in third place, in 1909 amounted to \$4,077,000; in 1914,

to \$8,923,000, and in 1919, to \$63,786,000. Car and general shop construction and repairs amounted, in 1909, to \$11,193,000; 1914, \$12,889,000; and 1919, \$28,231,000. The chief manufacturing cities in the State are Kansas City, Topeka and Wichita. There were in Kansas City, in 1909, 165 establishments, with a product valued at \$164,081,000; 1914, 201 with \$159,700,000, and in 1919, 196 with \$468,686,000. In Topeka, in 1909, there were 202 with \$17,821,000; 1914, 161 with \$20,685,000; and 1919, 169 with \$45,708,000. Wichita had 223, in 1909, with \$10,267,000; 1919, in 1914, with \$11,668,000; and 238, in 1919, with \$38,580,000.

Education. Kansas has been one of the most progressive of the States in educational matters. Its progress continued during the decade 1913-23. The Legislature passed during that period many measures designed to improve the educational system. One of the most important was the rural high school measure of 1915. This law permitted legal electors residing in territory containing not less than 16 square miles and comprising one or more townships or parts thereof to establish rural high school districts and to establish and maintain therein a rural high school. Under this law, over 240 rural high schools were organized. The Legislature of 1923 passed an important educational act reorganizing the county high school system, abolishing normal county high schools, and creating and establishing community high schools and providing for the payment of tuition in connection therewith; and by the end of 1923, 26 such high schools had been established. The same Legislature passed a measure for carrying out the provisions of the law of 1917 relating to vocational education; and useful legislation relating to the blind and deaf and dumb. The name of the normal schools of the State was changed to teachers' colleges. A Board of Administration was authorized to make a survey of the southwestern part of the State, and to determine the advisability of establishing State normal and teachers' colleges, and was to present its report to the Legislature of 1925. The school population of the State increased from 510,273 in 1913 to 539,248 in 1923. The school enrollment in 1914 was 392,662; in 1923 it was 427,310. Kansas has always been among the States with the lowest percentages of illiterates. Its percentage decreased from 2.8 in 1910 to 2 in 1920: among the native-born from 1.1 to 0.7 per cent; among the foreign-born, from 10.3 to 10.2; among the Negro, from 15.9 to 11.2.

Finance. See STATE FINANCES.

Political and Other Events. The period 1914-24 was filled with events of political and economic interest in the State. In 1914 there were elections for United States senator and governor and other State officers. Senator Bristow, whose term expired on Mar. 3, 1915, was a candidate for renomination on the Republican ticket. He was opposed by Charles Curtis and by Victor Murdock, Progressive leader of the House of Representatives. Mr. Curtis received the Republican nomination and was elected in November. Arthur Capper, Republican candidate, was elected governor. At this election a constitutional amendment providing for the recall of public officials, was adopted. In 1916 Governor Capper was reelected, and the Republicans elected all the other State officers and the majority of the Legislature. In spite of this fact, President Wilson carried the State,

receiving 314,588 votes, compared with 277,658 for Charles E. Hughes. In 1918 Governor Capper was elected United States Senator on the Republican ticket, and Henry J. Allen, Republican, was elected governor. In 1919 a general strike in the coal fields of the State resulted in the taking over of the mines by the State authorities under the direction of Governor Allen and their operation by volunteers. The Legislature in this year created an Industrial Court, before which should be brought all matters in dispute between employers and employees in what the law describes as "basic industries," including food, fuel, clothing, and all public utilities. In 1920 Senator Curtis was reelected to the Senate, and Henry J. Allen was reelected governor. In the presidential voting of this year, Warren G. Harding received 326,195 votes; James M. Cox, 185,447. The constitutional amendments were adopted at this election, relating to promotion of farm home-owning, against the increase of farm tenancy, and to the promotion of good roads. The Kansas Court of Industrial Relations, created by the Legislature of 1919, was organized, and at the close of the year, 28 industrial cases had been filed, 20 of these by labor organizations, and in 13 cases wage increases had been granted. On Apr. 9, 1920, strikers in the coal mines were arrested and placed in jail for ignoring the summons of the Industrial Court. On April 30, the Industrial Court was declared constitutional by the State Supreme Court. On Feb. 7, 1921, Alexander Howat, the leader in the coal mining strike, was arrested by the authorities of the Industrial Relations Court for calling a strike in violation of an injunction. He was convicted. In 1922 the Democrats came into power by the election of their candidate for governor, Jonathan M. Davis. In his campaign he spoke against the Industrial Court and promised a reduction of taxes. Governor Davis was inaugurated in January, 1923. His message was devoted chiefly to agricultural problems, and he indicated strong opposition to the Court of Industrial Relations, favoring the substitution of an industrial commission. Although the Legislature did not act on his recommendations, the functions of the Industrial Court were greatly curtailed by a decision of the United States Supreme Court on June 11 that the court had no power to fix wages. See LABOR ARBITRATION.

Legislation. The most important acts of the Legislature in the decade 1914-24 are indicated below. Several measures passed in 1915 were designed to strengthen the prohibition laws of the State. The Legislature of 1917 amended the laws relating to the administration of the State government and created a State manager for State institutions, his duties including those of purchasing agent; enacted a general prohibition law; and amended the child labor law. The woman suffrage amendment to the constitution was ratified on June 16, 1919, and the prohibition amendment on January 14 of the same year. The Legislature of 1921 abolished the Industrial Welfare Commission and conferred its powers on the Court of Industrial Relations; created a State aircraft board; made provision for the establishment and maintenance of city planning commissions in cities of the first class; and imposed a penalty for the failure to employ the English language exclusively in teaching in the elementary schools. A Public Utilities Commission was created, and provision was made

for the organization of rural high school districts and for the consolidation of school districts for educational purposes. An election was authorized to be held in 1922 on the question of compensation of veterans of the War. This proposal, which called for the issuance of \$25,000,000 in bonds, was carried by the people. The Legislature of 1923 accordingly passed a soldiers' bonus law. It also authorized a board of administration to make contracts for the drilling of oil and gas wells on land under its control belonging to the State, where there is a State institution on such land within two miles of one or more producing oil wells. The Legislature of 1923 submitted to the people to be voted on at the general election of 1924 a constitutional amendment qualifying the provision of "uniform assessment and taxation" and permitting the Legislature to distinguish among subjects of taxation.

KANSAS, UNIVERSITY OF. A coeducational State institution at Lawrence, Kan., founded in 1864. The university showed a steady growth during the entire period between 1914 and 1923-24. The student enrollment increased from 2812 in 1914 to 4557 in the year 1923-24 and 1506 in the summer of 1923; the faculty membership was increased from 200 to 303, and the library from 100,000 to 159,000 volumes. Ernest H. Lindley succeeded Frank Strong, Ph.D., as Chancellor in 1920.

KANSAS CITY. A city in Kansas. Its population increased from 82,331 in 1910 to 108,851 in 1920. The estimated population in 1923 was 108,851. This includes the suburb of Rosedale, which was annexed in 1922. The manufacturing establishments decreased from 261 in 1914 to 196 in 1919. The value of products, however, increased from \$159,700,000 in 1914 to \$468,868,000 in 1919. Among the notable achievements in the decade from 1914 to 1924 was the organization of a Chamber of Commerce, which constructed a \$100,000 building. During the war years, a community war chest was organized. There was under construction in 1924 a war memorial, to cost \$500,000. A new court house, to cost \$1,000,000, was authorized. Extensive enlargements were being made in the latter part of the period on the municipal water and light plants, and a \$5,000,000 bond issue was voted for the purpose. A junior college was under construction in 1924. In 1923, 1955 building permits were issued, an increase of 60 per cent over the preceding year; the number of building permits in 1924 exceeded those of any previous year by a considerable amount. Among other important accomplishments were the creation of the 1300-acre Fairfax Industrial District, and the Kansas City, Missouri, Railway and its terminal, one of the few terminals for electric roads in the western United States.

KANSAS CITY, Mo. An important industrial and railroad centre in Missouri. The population rose from 248,381 in 1910 to 324,410 in 1920, and to 351,819, by estimate of the Bureau of the Census, for 1923. Between 1914 and 1924 a viaduct and double-deck bridge, a 14-mile boulevard, a 15-mile sewer system, and a dyke for flood protection were built by the city. At the close of the War a Liberty Memorial was built, including a shaft with a crucible at the top, in which a fire was to burn constantly, a hall of records, and a fraternity house, all surrounded by 33 acres of land in the heart of the

city. The \$2,500,000 necessary for the project was raised by popular subscription. One of the largest baseball parks of the country was completed in 1923. Home-rule charter-making powers were acquired by the city in 1920. The park area increased from 2600 acres in 1914 to 3470 in 1923 and the paved streets from 400 to 600 miles. The bank clearings of Kansas City rose from \$3,835,061,547 in 1915 to \$11,615,142,427 in 1920 and fell again to \$6,881,567,927 in 1923; building permits increased from 3517 valued at \$10,667,405 in 1915, to 5831 valued at \$24,327,400 in 1923; customs receipts from \$262,279 to \$416,803; and postal receipts from \$3,195,424 in 1915 to \$8,528,482 in 1923. The value of factory output rose from \$319,000,000 in 1915 to \$590,192,057 in 1923, and live stock from 6,503,509 in 1915 to 8,537,267 in 1923, valued at \$250,588,240.

KANSAS WESLEYAN UNIVERSITY.

A coeducational institution under the auspices of the Methodist Episcopal Church founded in 1885 at Salina, Kan. The enrollment of the College of Liberal Arts rose from 149 in 1919 to 526 in 1924; the total enrollment in the latter year was 1044. The faculty increased in membership from 20 in 1918 to 38 in 1924, and the library from 12,000 to 15,000 volumes. A new physical laboratory was equipped in 1920, and a new administration building was in process of construction in 1924. The curriculum of the College of Commerce was expanded to a four-year course leading to the bachelor's degree and commercial teacher's certificate; courses were established in secretarial science. An endowment campaign for \$800,000 was completed in 1919. Rev. L. B. Bowers, D.D., succeeded Rev. John F. Harmon as president in 1919.

KAPP, WOLFGANG (1868-). A German revolutionist, born in New York City. He was the son of Friedrich Kapp, a well-known Liberal leader, and was born while his father was in exile in the United States. He founded the Agricultural Credit Institute of East Prussia, which was very successful. During the War he was one of the leading representatives of the Junkers and bitterly opposed all measures taken to establish a republic. In March, 1919, he headed a conspiracy to obtain control of the government. This was at first successful, and he was installed as Imperial Chancellor. He endeavored to form a government but was frustrated largely by a universal strike, which rendered him powerless. The movement collapsed on March 17, and he fled to Berlin, escaping by airplane to Sweden. See *GERMANY, History*, for an account of the Kapp Putsch.

KAPP PUTSCH. See *TRADE UNIONISM, Germany*.

KARAFUTO. See *SAKHALIN*.

KARELIA CONTROVERSY. See *FINLAND, RUSSIA*.

KAROLYI, MICHAEL, COUNT (1875-). A Hungarian statesman. His family, for centuries, had been one of the most influential and important in Hungary and filled a conspicuous place in the political history of the country. Before and during the War, he manifested strong pacifism and outspokenly condemned German ideals of world dominion. In 1916 he was trusted with the Austro-Hungarian peace overtures to the Allies. When defeat was realized, he was called on, in November, 1918, to form a ministry. His first task was to conclude peace with General D'Esperey, commander on the

Macedonian frontier. Later in the same month he became provisional president of the Hungarian Republic. His endeavors to restore order were frustrated by the Bolshevik propaganda under Bela Kun, and he resigned in March, 1919. He took no further active part in the government. He visited the United States in 1923 in the interests of Hungary. See HUNGARY, *History*.

KARPINSKI, LOUIS CHARLES (1878-). An American mathematician, born at Rochester, N. Y., and educated at Cornell University and Strassburg. He also studied (1909-10) at Columbia, where he was a fellow and a university extension lecturer. Meanwhile he taught mathematics at Berea (1898-1900) and at the Oswego (N. Y.) Normal School during 1903-04, but in 1904 accepted a call to Michigan where in 1919 he became full professor of mathematics. Dr. Karpinski has devoted his attention chiefly to the history and pedagogy of mathematics. An authority on the history of science, he was collaborator on the *Archivio di Storia della Scienza* and author of *The Hindu-Arabic Numerals*, with D. G. Smith (1911), *Robert of Chester's Latin Translation of the Algebra of Khwarizmi* (1915), and *Unified Mathematics*, with H. Y. Benedict and J. W. Calhoun (1918).

KATANGA. See COPPER.

KATO, TOMOSABURO (1859-1923). A prime minister of Japan (see VOL. XIII). In the War he was commander-in-chief of the First Fleet which guarded Allied transportation from German raiding in the Pacific. After the War, as minister of marine, he began to build up Japan's navy. He headed the Japanese delegation to the Disarmament Conference at Washington and afterward won his government's consent to the treaty. He became premier in June, 1922, on his return from the Washington conference. He died at Tokyo in 1923. See JAPAN, *History*.

KAUFFMAN, REGINALD WRIGHT (1877-). An American author (see VOL. XIII). He served on the Mexican border in 1916 and enlisted in 1917 for service in France. His later books include *The Latter Day Saints*, with Ruth Wright Kauffman (1917); *The Azure Rose* (1918); *Our Navy at Work* (1918); *Victorious* (1919); *Money to Burn* and *The Ranger of the Manor* (1924).

KAUFFMAN, RUTH WRIGHT (MRS. REGINALD WRIGHT) (?-). An American writer and war correspondent, born in New York City, and educated at Bryn Mawr and in Paris, France, at the Collège de France. During 1905 and 1906 she investigated women's work in department stores, offices, and domestic service, and in 1909 she investigated "white slavery" in the United States and Europe. During the War she was correspondent for *Leslie's* and for *The Christian Herald* and was the first woman correspondent at the American front in France. In 1918 she was connected with the Publicity Department of the American Red Cross. Her writings include: *Women War Workers* (1919); *Three Little Kittens* (1922); *The Boundary Line* (1923); *The "I-Don't-Want-To" Series*, for children (1924).

KAUFMAN, GEORGE S. (1889-). An American playwright, born at Pittsburgh, Pa. For several years he conducted humorous daily columns in the *Washington Times* and the *New York Evening Mail* and was subsequently on the dramatic staff of the *New York Tribune* and of the *New York Times*. He was the author, with

Marc Connelly, of many successful plays, including *Dulcy* (1921); *To the Ladies* (1922); and *Beggar on Horseback* (1924).

KAUTSKY, KARL JOHANN (1854-). An Austrian Socialist (see VOL. XIII). He was one of the most important and prolific writers among the Social Democrats of Germany. During the War he supported the militarism of the Kaiser and said that the Socialists could do nothing to stop the conflict. In 1919 he published four volumes of documents, pertaining to pre-war history, with marginal notes by the ex-Kaiser, which raised a storm in Germany and which the newspaper *Vorwärts* declared showed that Germany before the War was ruled by a man all but mad. In 1920 Kautsky appealed to American Socialists to help reestablish the Socialist Internationale. He was strongly anti-Bolshevik. After the War he published: *Der Politische Massenstreik* (1914); *Die Vereinigten Staaten Mitteleuropas* (1916); *Die Befreiung der Nationen* (1917); *Serbien und Bulgarien in der Geschichte* (1917); *Elsass-Lothringen* (1917); *Uebergangswirtschaft* (1918); *Die Diktatur des Proletariats* (1918); *Hapsburgs Glück und Ende* (1918); *Demokratie oder Diktatur?* (1918); *Die Sozialisierung der Landwirtschaft* (1919); *Wie der Weltkrieg Entsteht* (1919); *Terrorismus und Kommunismus* (1919); *Delbrück und Wilhelm II* (1920); and *Vergangenheit und Zukunft der Internationale* (1920).

KAWAKAMI, K. K. (1875-). A Japanese writer, born in Tokyo. He was educated in the law in Japan and was for a short time engaged in newspaper work in that country. In 1901 he came to the United States and studied at the Universities of Iowa and Wisconsin. In 1905, engaged in journalism, he traveled extensively in China, Siberia, and Russia. He was a correspondent for leading newspapers in Tokyo and a frequent contributor to American magazines and newspapers. He wrote: *Political Ideas of the Modern Japan* (1903); *Asia at the Door* (1914); *Japan and World Politics* (1917); *Japan and World Peace* (1919); *The Real Japanese Question* (1921).

KAYE-SMITH, SHEILA (?-). An English novelist, born at St. Leonard's on the Sea. Her first published novel was *The Tramping Methodist* (1908). This attracted wide attention and was followed by *Star Brace* (1909); *Spell-Land* (1910); *Isle of Thorns* (1913); *Three Against the World* (1914); *Sussex Gorse* (1916); *Little England* (1918); *Tamarisk Town* (1919); *Green Apple Harvest* (1920); and *Joanna Godden* (1921). She was generally recognized as one of the most distinguished of the younger English novelists.

KEDAH. See MALAY STATES, NON-FEDERATED.

KEEN, WILLIAM WILLIAMS (1837-). An eminent American medical man (see VOL. XIII). He published several books during the decade 1914-24: *Treatment of War Wounds* (1917); *Medical Research and Human Welfare* (1917); *I Believe in God and Evolution* (1922); and *Selected Papers and Essays* (1923). He has delivered numerous lectures defending animal experiments and was very active during the War in behalf of the Allies. He received special honors from England and France. In 1917 he was appointed a member of the National Research Council.

KEITH, SIR ARTHUR (1866-). A British anthropologist (see VOL. XIII). He was

Fullerian Professor at the Royal Institute, 1917-23, and afterward its secretary. He edited and wrote numerous works on anatomy and anthropology, including: *Antiquity of Man* (1914); *Menders of the Maimed* (1919); *Engines of the Human Body* (1920); and *Nationality and Race* (1920).

KELANTAN. See MALAY STATES, NON-FEDERATED.

KELLOGG, FRANK BILLINGS (1856-). An American lawyer and diplomat (see VOL. XIII). In 1916 he was elected United States Senator from Minnesota for the term 1917-23 but was defeated for reelection in 1922. In 1923 President Harding appointed him American Ambassador to Great Britain to succeed George B. M. Harvey.

KELLOGG, JOHN HARVEY (1852-). An American hygienist (see VOL. XIII). Dr. Kellogg has shown almost unparalleled activity as a writer of books, many of them large volumes, since 1915. They comprise: *Colon Hygiene* (1915); *The Hygiene of Infancy* (1916); *The New Method in Diabetes* (1917); *Plain Facts*, a summary of some of his older writings (1917); *Auto-intoxication* (1918); *Rational Hydrotherapy* (1918); *The Itinerary of a Breakfast* (1919); *The Health Question Box* (1920); *The New Dietetics* (1921); *Tobaccoism* (1922).

KELLOGG, OLIVER DIMON (1878-). An American mathematician, born at Linwood, Pa., and educated at Princeton and Göttingen. During 1902-05 he was an instructor at the John C. Green School of Science at Princeton, and during 1905-20 he was at the University of Missouri, where he became full professor in 1910. On leave from Missouri, he was mathematician at the United States Naval Experiment Station in New London, Conn. In 1919 he became a lecturer on mathematics at Harvard and in 1920 an associate professor there. He has been interested in various problems of integral and differential equations, potential functions, and functional theory, on all of which he has published papers in mathematical journals. Dr. Kellogg is a fellow of the American Association for the Advancement of Science and presided over the section on mathematics in 1919 with the rank of vice president.

KELSO, JAMES ANDERSON (1873-). An American theologian, born at Rawal Pindi, India. He studied at Washington and Jefferson College, the Western Theological Seminary and in Germany. He was ordained to the Presbyterian ministry in 1898. In 1897 he was instructor in Hebrew at the Western Theological Seminary and was successively professor of Hebrew and Old Testament literature, acting president, and president of this institution (1908-). He was the author of many books on theological subjects, including *A History of the Hebrews in Outline* (1921) and *A Hebrew Prophet and His Message* (1922). He contributed to several Bible dictionaries and to the religious and secular press.

KEMAL PASHA, MUSTAPHA (1879-). A Turkish general and political leader, born in European Turkey (Macedonia). He was educated for the army at the Imperial Turkish Military School at Constantinople and early displayed unusual military abilities. During the War he served on the Turkish General Staff and was division manager in the Gallipoli campaign against the British. Here he displayed a skill and aggressiveness which were a large factor in

the failure of the British to occupy the peninsula. Following the defeat of the Central Powers and the occupation of Constantinople by the Allies, he went to Anatolia, where he reorganized the 3d Army Corps and in September, 1919, having renounced allegiance to the Constantinople government, called a Turkish Nationalist Assembly at Siva. A government was organized of which he was chief. He was joined by many Turkish officers and men and was soon master of a large part of Asia Minor. In April, 1920, a permanent assembly, of which he was president, was organized at Angora. This assembly refused to recognize the Treaty of Sèvres and carried on war with Armenia, with the French in Cilicia, and with the Greeks, to whom Smyrna and other portions of Asia Minor had been given by the Treaty of Sèvres. He became virtual dictator of the Nationalist government. By treaty with the Soviet republics of the Caucasus in 1921, he added a large part of Armenia to the Angora government, and by treaty with France in the same year, he regained Cilicia. On Jan. 1, 1922, he declared that the Nationalist government in Angora, while respecting the Sultan, did not recognize his authority as superior to that of the Turkish people. He carried on a campaign against Greece in 1922, and by his signal defeat of the Greek armies in Asia Minor in September of that year, he became virtual master of Turkey. In August, 1923, he was elected president of the National Assembly, and in March, 1924, first president of the Turkish Republic. As president he used his influence with the Assembly in the move to separate church and state in Turkey, and on Mar. 3, 1924, the caliphate was abolished.

KEMMERER, EDWIN WALTER (1875-). An American economist (see VOL. XIII). His later works include: *Modern Currency Reforms* (1916); *The United States Postal Savings System* (1917); *Monetary System of Mexico* (1917); *The A B C of the Federal Reserve System* (1918); and *High Prices and Deflation* (1920).

KEMP, HARRY HIBBARD (1883-). An American author, born in Youngstown, Ohio, and educated at the University of Kansas. He made a trip around the world, on which he started with only twenty-five cents, and also traveled all over North America in the guise of a tramp. He made special studies of night life in London and New York. He wrote: *Judas*, a play (1910); *The Cry of Youth*, poems (1914); *The Thresher's Wife*, poems (1914); *The Passing God*, poems (1919); *John Gregory*, a novel (1922); and *Tramping on Life* (1922).

KENDALL, EDWARD CALVIN (1886-). An American chemist, born at Norwalk, Conn., and educated at Columbia University. He at once entered the employ of Parke, Davis, and Company, of Detroit, Mich., with whom he remained until 1911, when he returned to New York City and was for three years connected with St. Luke's Hospital. In 1914 he became head of the Section of Chemistry at the Mayo Clinic in Rochester, Minn., and also professor of biochemistry at the University of Minnesota under the Mayo foundation. His chief studies have been on the secretions of the human body, especially of the pancreas and the thyroid gland; his valuable researches have included the isolation of the active principles of the latter. On these subjects he has published papers in the journals of the American Chemical Society and

of the Society of Biological Chemists. He is a member of both these organizations.

KENDALL, (WILLIAM) SERGEANT (1869-). An American figure painter (see VOL. XIII). Among his awards from 1914 to 1924 was a gold medal for painting, from the Panama-Pacific International Exposition in 1915. He was dean of the School of Fine Arts at Yale University, 1913-22. Among his later works may be mentioned "Crosslights" and "Intermezzo."

KENLY, WILLIAM LACY (1864-). An American soldier, born at Springwood, Md. He was graduated at the United States Military Academy in 1889 and entered the army as second lieutenant of the 4th Artillery in June of the same year and continued in the service until 1919, when he was retired with the rank of colonel. Meanwhile, in the war with Spain, he had participated in the actions of El Caney and Santiago. During 1899-1902 he was in the Philippines. He was in France in command of artillery, with the rank of brigadier-general (1917), and later had the second brigade of the Field Artillery. In 1918 he returned to the United States and was made director of military aeronautics with the rank of major-general in the National Army. He was active in the organization of the Army Air Service Association in 1918 and was its first president. His services abroad were recognized by the decorations of the Legion of Honor, the Order of the Bath in 1919, and the Order of the Crown in 1920. Since his retirement he has been active in the development of oil interests in Oklahoma.

KENNEDY, DANIEL JOSEPH (1862-). An American clergyman and educator, born in Knox County, Tenn., and educated in schools in the United States and in Europe. He was ordained to the Roman Catholic priesthood in 1884. He filled chairs in the faculty of colleges in Europe and in 1906 became lecturer on sacramental theology at the Catholic University of America. In 1920 he was professor of dogmatic theology at this university. His several books on theological subjects include *Saint Thomas and Mediæval Philosophy* (1919). He also contributed many articles to Catholic periodicals and encyclopædias.

KENOTRON. This device, in the interval between 1914 and 1924, was developed from a scientific laboratory toy to a practical article of commerce. It will rectify small alternating currents (0.25 amperes) at 100,000 volts. Four of them have been arranged to rectify both half-cycles of 0.25 amperes at 200,000 volts. The kenotron consists of a hot cathode, platinum, tungsten, or impregnated tungsten, and a cold plate or anode in a high vacuum. The heated electrode emits electrons which are carried to the cathode by the correct potential, but as the cold electrode does not emit electrons there can be no current in the opposite direction. It is based on the Fleming valve.

KENT, NORTON ADAMS (1873-). An American physicist, born in New York City, and educated at Yale and Johns Hopkins Universities. During 1901-03 he was an assistant at the Yerkes Observatory and then held the chair of physics (1903-06) at Wabash College. In 1906 he was called to Boston, where in 1910 he became full professor. He had made original investigations of such subjects as electric sparks in liquids and in air at high pressure, the shift

of spark lines due to changed conditions, vacuum tube discharge in magnetic field, and magnetic separation of lithium doublets, on all of which he has published the results of his studies.

KENT, ROCKWELL (1882-). An American artist. He was born at Tarrytown Heights, N. Y. His art studies were followed at Columbia University, and under Chase, Henri, Hayes Miller, and Thayer. He first attracted attention in 1907 with his pictures of Maine, such as "Winter" and "Seiners," realistic marines notable for their strength of outline and massing of color. In 1913 he visited Newfoundland and brought back works which included the imaginative "House of Dread," "A Newfoundland Dirge," and "The Voyage Beyond Life," pervaded by a dark atmosphere of mystery. Thereafter, during a sojourn in Alaska in 1918, he produced work of a symbolic and spiritual quality which was highly reminiscent of Blake. Among these decorative, clean-lined drawings, the "Mad Hermit" series was particularly noteworthy. His trip to Tierra del Fuego in a lifeboat in 1922 was also productive of mystical impressions. He was the author of *Wilderness* (1920) and *Voyaging* (1924).

KENTUCKY. Kentucky is the thirty-sixth State in size (40,598 square miles) and the fifteenth in population; capital, Frankfort. The population increased from 2,289,905 in 1910 to 2,416,630 in 1920, a gain of 5.5 per cent. The white population rose from 2,027,951 to 2,180,560, the native white increasing from 1,987,898 to 2,149,780, while the foreign-born white fell off from 40,053 to 30,780. The negro population decreased from 261,656 to 235,938. The urban and rural populations both increased, the former from 555,442 to 633,543, and the latter from 1,734,463 to 1,783,087. The growth of the principal cities was as follows: Louisville (q.v.), 1910, 223,928, and 1920, 234,891; Covington, 53,270 to 57,121; Lexington, 35,099 to 41,534. Newport fell from 30,309 to 29,317.

Agriculture. While the population of the State increased 5.5 per cent in the decade 1910-20, the number of farms increased 4.4 per cent (from 259,185 in 1910 to 270,626 in 1920); the acreage in farms decreased from 22,189,127 to 21,612,772, or 2.6 per cent; and the improved land in farms decreased from 14,354,471 acres to 13,975,746. The total value of farm property showed an apparent increase, from \$773,797,880 in 1910 to \$1,511,901,077 in 1920; the average value per farm from \$2986 to \$5587. In interpreting these values, however, and indeed all comparative values in the decade 1914-24, the inflation of currency in the latter part of the period is to be taken into consideration; the index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of land used for agricultural purposes decreased from 86.3 per cent in 1910 to 84 per cent in 1920; the percentage of improved farm land from 55.8 to 54.3 per cent. Of the 270,626 farms in 1920, 179,327 were operated by owners, 969 by managers, and 90,330 by tenants. The corresponding figures for 1910 were 170,332,993, and 87,860. White farmers in 1920 numbered 257,998, compared with 247,455 in 1910; colored farmers 12,628, compared with 11,730. There was a decrease of 9.8 per cent in the colored population in the decade, which noticeably affected the farm labor situation. Farms free from mortgage in 1920 numbered 116,613, and those under mort-

gage, 40,615. Unmortgaged farms in 1910 numbered 135,505, and those under mortgage, 33,039. The total number of cattle in 1920 was 1,093,453, compared with 1,000,937 in 1910; dairy cattle, 659,794, compared with 409,834; hogs, 1,504,431, compared with 1,491,816; sheep, 707,845, compared with 1,363,013. The estimated production of the principal farm crops in 1923 was as follows: corn, 95,168,000 bushels; wheat, 7,688,000; oats, 4,921,000; barley, 161,000; potatoes, 5,614,000; sweet potatoes, 2,142,000; tobacco, 565,186,000 pounds; and hay, 1,154,000 tons. Comparative figures for 1913 are: corn, 74,825,000 bushels; wheat, 9,860,000; oats, 3,168,000; potatoes, 2,450,000; hay, 674,000 tons; and tobacco, 281,200,000 pounds.

Mining. Kentucky is an important producer of minerals. It ranked eighth in the value of these products in 1921. Its resources are limited almost entirely to nonmetallic minerals, since there is practically no metal mining in the State; in the order of value they are coal, petroleum, clay products, and stone. The progress of the industry during the decade 1914-24 is indicated by comparative figures. The coal production in 1914 was 20,382,763 net tons, valued at \$20,852,463; 1915, 21,361,674, \$21,494,008; 1916, 25,393,997, \$30,193,047; 1917, 27,807,971, \$60,297,653; 1918, 31,612,617, \$80,666,642; 1920, 35,690,762, \$146,576,000; 1921, 31,588,270, \$85,092,600; 1922, 2,134,175 short tons. The increased value of production in the latter years was largely due to the decreased purchasing power of money and the consequent higher prices received for commodities. The output of petroleum varied during the decade from 502,441 barrels in 1914 to 437,274 barrels in 1915; 3,088,160 barrels in 1917; 4,367,968 in 1918; 8,738,000 in 1920; 9,012,600 in 1921, and 8,973,200 in 1922. In addition to the minerals mentioned above, the State produces considerable quantities of natural gas, gasoline, sand and gravel, and stone. The total value of the mineral products in 1921 was \$114,404,662, compared with \$195,920,036 in 1920; \$110,305,840 in 1919; \$104,165,945 in 1918; and \$26,668,474 in 1914.

Manufactures. While Kentucky is not one of the chief manufacturing States, it has industries of great importance. There are eight cities with more than 10,000 inhabitants, the combined population of which in 1919 was 17.9 per cent of the total for the State. In 1919 these cities reported 72.7 per cent of the value of the State's manufactured products. In 1909 there were in the State 4776 manufacturing establishments; in 1914, 4184, and in 1919, 3957. Persons engaged in manufacture in those years numbered 79,060, 77,865, and 83,954. Capital invested amounted to \$172,778,805, \$193,423,069, and \$276,535,395. The large increase in the value of products in 1914-19 was due chiefly to the change in industrial conditions brought about by the War and therefore cannot properly be used to measure the growth of manufactures during the census period, 1914-19. Flour-mill and gristmill products are most important in point of value, with \$22,365,000 in 1909; \$21,229,000 in 1914, and \$45,774,000 in 1919. The lumber and timber products industry is second, amounting in 1909 to \$21,381,000; 1914, \$20,667,000; 1919, \$34,456,000. Car construction and repair ranks third, with products, in 1909, worth \$6,535,000; 1914, \$13,344,000; 1919, \$30,598,000. Tobacco manufac-

tures, in 1909, amounted to \$15,598,000; 1914, \$16,147,000; 1919, \$24,129,000. The chief manufacturing cities in the State are Louisville, Covington, and Newport. There were in Louisville, in 1909, 903 establishments, with a product valued at \$101,284,000; in 1914, 778, with \$105,223,000; in 1919, 767, with \$204,566,000. In Covington, in 1909, there were 196, with \$8,712,000; in 1914, 161, with \$8,265,000; and in 1919, 133, with \$17,121,000. Newport had, in 1909, 144 manufacturing establishments, with a product valued at \$6,491,000; 1914, 100, \$8,306,000; 1919, 81, \$16,935,000.

Education. The educational problems of Kentucky are unusually difficult because of the isolation of many of its communities and the difficulty of administering to their needs through schools. Nevertheless, progress was made during the decade 1913-23. The Legislature enacted, during this period, many important laws. In 1919 a measure created a survey commission, providing for a State educational survey to be made by five persons. The services of experts, under the employ of the General Education Board, were secured, and more than 18 months were spent in making the survey, which greatly increased public sentiment for the improvement of educational facilities. The General Assembly in 1920 enacted many wise and progressive measures, among them laws increasing the salaries of teachers and county superintendents and providing means by which money should be provided, a compulsory education law compelling children between the ages of 7 and 16 years to attend school; and a law providing for health education in schools. The most important of all, however, was the county school administration law, creating a county board of education elected by the people and having the power to fix the rate of the school levy and to appoint a county superintendent. In 1918 the minimum salary for teachers was made \$45 a month, and in 1920 this was increased to \$75 a month. There was steady growth in the development of high schools. In 1916 there were 149 with an enrollment of 18,850; in 1921, 225 with an enrollment of 25,939. The junior high school movement also made considerable progress. Enrollment in the schools has steadily increased. The total enrollment in the schools in 1914 was 517,299; in 1922-23 it was approximately 590,000. Expenditures for schools increased from \$8,318,640 in 1917-18 to \$13,615,133 in 1921. The percentage of illiterates decreased from 14.5 in 1910 to 10.6 in 1920: among the native white population, from 12.8 to 9.2; among the foreign-born whites, from 8.2 to 7.5; among the Negroes, from 34.7 to 26.4 per cent.

Finance. See STATE FINANCES.

Political and Other Events. The political control in Kentucky in the decade of 1914-24 was, on the whole, Democratic, but the Republicans made gains in certain years and elected their candidates. In this year two United States Senators were elected, one to fill the unexpired term of Senator Bradley, deceased, and the other for the full term beginning Mar. 4, 1915. J. N. Camden was elected to fill out the term of Senator Bradley, while J. C. W. Beckham was elected for the full term. Both were Democrats. In 1915, when A. O. Stanley was elected governor, the Democrats retained all the offices except one. James P. Levine, Republican, was elected Secretary of State. In 1916 the Repub-

lians made a strong effort to carry the State but were unsuccessful. In the presidential voting of this year President Wilson received 269,990 votes; Charles E. Hughes, 241,854. On Sept. 4, 1916, the Lincoln Memorial at Hodgenville, built over the log cabin birthplace of Abraham Lincoln, was formally presented to the nation by the Lincoln Farm Association; the speech of acceptance was delivered by President Wilson. On Nov. 5, 1917, the United States Supreme Court declared unconstitutional a race segregation ordinance passed by the city of Louisville in 1914. At the election held in November, 1917, Charles H. Morris was elected attorney general without opposition. In 1918 elections were held for United States Senator, and Gov. A. O. Stanley was elected, defeating B. L. Bruner, the Republican candidate. In the elections for governor and other State officers in 1919, the Republicans came into control and elected their candidate for governor, E. P. Morrow. The Democrats nominated Gov. J. D. Black. Elections were held in 1920 for United States Senator, and in this the Republicans were again successful, electing their candidate, R. P. Ernst, who defeated J. C. W. Beckham, a candidate for reelection. In the presidential voting of this year, J. M. Cox received 456,497 votes; W. G. Harding, 452,480. In 1923 the Democrats regained power, electing as governor William J. Fields.

Legislation. The Legislature of Kentucky meets biennially, in even years. In 1914 a resolution providing for woman suffrage was defeated. The Legislature of 1916 created a Workmen's Compensation Board, and passed several important laws relating to the regulation of the liquor traffic. In 1917 a modern tax law was enacted. The Legislature in 1918 ratified the Federal prohibition amendment and provided for a State bar examination. In 1919, State-wide prohibition was adopted. In 1920 the child labor laws were amended, a State department of roads and highways was created, a prohibition enforcement act was passed, a measure providing for the suppression of mob violence and the prevention of lynching was enacted, the State school system was modernized, a Department of Charities and Correction was created, a provision was made for physical education and training in the public schools, the election laws were amended, and provisions were made for a State tuberculosis sanatorium. In 1922 a State cooperative marketing act was passed. In 1924 the Legislature passed a law requiring daily readings from the Bible in the public schools, restored the forestry department, and created a State park commission.

KENTUCKY, UNIVERSITY OF. A coeducational State institution at Lexington, Ky., founded in 1858. The enrollment increased from 1245 in 1914 to 1793 in 1923-24, faculty members from 75 to 165, and the library from 30,000 to 54,118 volumes. During the same period the income increased from \$400,000 to \$1,334,269. The courses in economics, sociology, botany, zoölogy, music, art, and agriculture were enlarged, courses in public health and hygiene were established, and a new College of Education created in 1923. The administration building, Neville Hall, and White Hall were remodeled during the decade; a men's dormitory and a stock-judging pavilion were built, and work was begun on a large addition to the chemistry building and a gymnasium. A gift of 15,000

acres from the E. O. Mountain Fund in 1923 provided opportunity for experiment in reforestation, horticulture, farming, and stock-raising in the mountains of eastern Kentucky. Frank Le Rond McVey, Ph.D., LL.D., succeeded Henry Stites Barker, LL.D., as president in 1917.

KENYA COLONY AND PROTECTORATE. A British crown colony in Africa, formerly known as the East Africa Protectorate, but after July, 1920, as the Kenya Colony. The protectorate is a strip of territory along the coastline 10 miles broad, leased from the Sultan of Zanzibar. The area is about 245,000 square miles; the population, in 1921, was estimated at 2,376,000, of whom 9651 were Europeans, 22,822 Indians, and 10,102 Arabs. The largest city, Mombasa, had a population of 32,000 in 1921; the capital, Nairobi, 24,000. Most of the highland area suitable for white settlers was preëempted by 1921. The land was being sown in maize and coffee in increasing quantities, while live-stock, breeding, dairying, etc., were coming in for more and more attention. The colony continued to prosper; imports and exports increased steadily from 1914 on, except for a passing setback in 1919-20. In 1913-14, imports were valued at £2,147,937; in 1920-21, they were £6,911,858, but dropped to £2,871,240 in 1922. In 1913-14 exports were £1,482,876, while in 1920-21 they were £5,060,920, and in 1922, £2,780,998. Shipping, however, dropped from 3,565,795 tons entered and cleared in 1913-14 to 1,404,391 tons in 1920-21. Leading exports were hides and skins, grain, copra, coffee, and fibre. In 1920-21, 51 per cent of the import value came from the United Kingdom, 26.4 per cent from British possessions, 8.2 per cent from the United States; 58 per cent of the export value went to the United Kingdom, 29 per cent to British possessions, 5 per cent to France, 1.5 per cent to the United States. Revenues and expenditures mounted during the period after 1914. In 1913-14 revenues were £1,133,798 and expenditures, £1,115,899; in 1922, £1,649,032 and £1,972,212; in 1923 (estimate), £1,784,662 and £1,757,028. The State railway, by 1922, had been increased to 618 miles. The annual railway surplus, beginning with 1920, was devoted to the railway construction fund. A new line from Nakuru to Turbo, 100 miles north of the main railway, was projected in 1919. In connection with the trade figures above, it should be noted that in 1917 Uganda (q.v.) and Kenya were united in a customs union.

History. In 1920 this protectorate, formerly known as the East Africa Protectorate, was changed to a crown colony with the name Kenya Colony and placed under the British Colonial Office. The year before, in July, 1919, a measure of self-government was granted the territory when Europeans were permitted to elect 11 members to the Legislative Council; Indians were to be represented by two nominated members, and Arabs by one. The government maintained its ascendancy by reserving the right to nominate enough members of the council to assure its control. Kenya became the storm centre of a famous controversy, reverberations of which soon were to be heard all over the British Empire. From 1896 on, Indians had come to the country in increasing numbers in the rôles of money lenders, traders, and artisans, so that after the War there were 22,822 of them to 9561 Europeans. The restrictions placed on

them by the whites were onerous. In particular, Indians in Kenya objected to the reservation of the Highlands for Europeans; commercial and residential segregation in the towns; the limited franchise; and restrictions on Indian immigration. The Indian position derived strength from the significant resolution passed by the 1921 Imperial Conference, favoring citizenship for Indians in the Empire. The question was whether the Indians were to be recognized as citizens of the Empire or as a subject race. With what seemed a good deal of casuistry, the Europeans maintained on their side that the colony was a trust ruled only in the interests of the native blacks and that therefore the character of the ruling population did not matter much. Disagreement, continuing until 1923, became daily more bitter. A programme of 1923 which included a further extension of the franchise for Indians, based on a white majority of seven to four, and the abandonment of segregation and embargo on immigration, pleased neither side. The danger of open violence now spurred the British government to action. A conference was called, and the Colonial Office decided to compromise by establishing the principle of an Imperial trusteeship, based on neither European nor Indian self-government. The settlement, as finally effected, called for a communal franchise with five elected Indians and 11 Europeans, though with the official majority retained; the continuance of immigration regulations then in existence; the reservation of the Highlands for Europeans; the abolition of all segregation. Whether the plan pleased the Kenya Indians it was difficult to say, for they gave no sign; but the storm of disapproval which it aroused in India was significant. No further action was taken, in view of the fact that the 1923 Imperial Conference promised a reopening of the Indian immigration question at the future Conference on crown colonies.

KENYON, WILLIAM SQUIRE (1869-). An American jurist (see Vol. XIII). He was elected United States senator from Iowa in 1911 and was successively reelected. He served until 1921, when he resigned following his appointment by President Harding as judge of the United States Circuit Court. While in the Senate he was leader of the so-called "farm bloc" and was an aggressive supporter of progressive legislation.

KENYON COLLEGE. An institution at Gambier, Ohio, founded by Philander Chase, first bishop, of the Protestant Episcopal Church in Ohio, and incorporated in 1824. The corporation maintains two schools, an undergraduate college for men and a divinity school known as Bexley Hall. At the college the student enrollment increased from 136 in 1914 to 251 in 1923, the faculty from 14 to 23, and the library from 27,000 to 30,000 volumes. In 1923 the divinity school had five professors, 18 students, and a library of 13,000 volumes. The endowment was increased from \$520,000 in 1914 to \$1,400,000 in 1923; \$600,000 was raised in 1921. Of the endowment \$210,000 was specifically designated for the work of the divinity school and \$925,000 for the college proper. In 1923 a new college dormitory costing \$200,000 was in process of construction. The completed building was to house 100 students and to be called Leonard Hall in honor of the bishop of Ohio. A central heating plant was also in process of

construction. President, the Rev. William F. Peirce, L.H.D., D.D., LL.D.

KERAK. See TRANSJORDANIA.

KERENSKY, ALEXANDER (1881-). A Russian Socialist politician, born at Simbirsk, and graduated in law from the University of Petrograd. He practiced law in Petrograd for some years. During the troubles in Turkestan he published a strong attack against the government of the affected districts. He was an impassioned and forceful speaker and became a leader in the Fourth Duma in 1917, largely because of this ability. After the overthrow of the Czar, Kerensky held many important positions in the new Socialist government which was opposed to the radical element, later known as Bolsheviks. He was minister of justice in the Lvov ministry and later premier with the portfolio of minister of war. While holding the latter position he attempted to reorganize the Russian army and make it a potent factor again in the struggle against the Central Powers. He was hampered on every side by the activities of the Bolsheviks and disgruntled military leaders. In September, 1917, Kerensky was able to crush an abortive revolt led by General Kornilov, but by November 1, he was driven from power by the Bolsheviks under the leadership of Lenin and Trotsky. After his downfall he visited many of the capitals of Europe and carried on anti-Bolshevik propaganda. Kerensky was the President of the ill-fated Russian Republic set up shortly after the revolution of March, 1917. See RUSSIA, *History*.

KERR, ALFRED (1867-). A German critic, born at Breslau. He edited the magazine *Pan*, and his published works include: *Brentanos Jugenddichtungen* (1894); *Godwin, ein Kapitel Deutscher Romantik* (1898); *Herr Sudermann, a satire* (1904); *Schauspielkunst* (1904); *Davidstbundler: das Neue Drama* (1904); *Die Harfe* (1918); *Die Welt im Drama* (1918); and *Die Welt im Licht* (1920).

KERR, JAMES MANFORD (1851-). An American legist, born near Tippecanoe City, Ohio, and educated at the National Normal University, Lebanon, Ohio. He began to practice law in Ohio in 1877 and thereafter in many States and in the Federal courts. He edited several law periodicals, founded *The American Law Journal*, and became editor for the Bender-Moss Company and the Bancroft-Whitney Company, law book publishers of San Francisco, Cal. His numerous writings include: *Before and at Trial* (1889); *Business Corporations* (1890); *Cyclopædic California Civil Code*, 2 vols. (1905); *Cyclopædic California Penal Code* (1906; 2nd ed., 1921); *Cyclopædic California Political Code* (1906; 2nd ed., 1921); *Cyclopædic California Code of Civil Procedure*, 2 vols. (1907; 2nd ed. 1921-22); *Kerr's Wharton on Criminal Law*, 3 vols. (1912); *California Digest*, 10 vols. (1915-17); *Biennial Supplement* (1917); *Kerr's Wharton's Criminal Procedure, with Forms*, 4 vols. (1918); and *Kerr's Pleading and Practice under the Procedural Codes*, 2 vols. (1919).

KERR, SOPHIE (MRS. SOPHIE KERR UNDERWOOD) (1880-). An American novelist, born at Denton, Md. She was educated at Hood College, Frederick City, Md., and at the University of Vermont. She began to write stories at 18 years of age and did newspaper work in Pittsburgh, Pa., for a few years, and then came to New York City, where she was managing editor of the *Woman's Home Com-*

panion. She contributed stories to practically all the major magazines in the United States. Her novels include: *Love at Large* (1916); *The Blue Envelope* (1917); *The Golden Block* (1918); *The See-Saw* (1919); *Painted Meadows* (1920); and *One Thing Is Certain* (1922). *The Blue Envelope* and *The Golden Block* are stories of businesswomen, written in the natural, straightforward style that distinguishes Sophie Kerr's work as a whole.

KEUTGEN, FRIEDRICH W. E. (1861-). A German historian and professor of history at the university of Hamburg. He was born at Bremen and studied at Giessen, Göttingen, and Strassburg. He was lecturer at Johns Hopkins University in Baltimore in 1904-05, and organized and became lecturer at the Kolonial Institut in Hamburg in 1910. He has written: *Die Hansa in England im Vierzehnten Jahrhundert* (1890); *Die Aufgabe der Genealogie* (1899); *Der Grosshandel im Mittelalter* (1902); *Handelsgeschichtliche Probleme* (1904); *Britische Reichsprobleme und der Krieg* (1914); *Entstehung des Britischen Weltreichs* (1915); *Das Britische Kolonialreich* (1916); and *Der Deutsche Staat des Mittelalters* (1918).

KEY, PIERRE VAN RENSSELAER (1872-). An American editor, born at Grand Haven, Mich., and educated privately and at the Chicago Musical College. For several years he was music critic on the staff of newspapers in Chicago, and from 1907 to 1919 he was music editor of the *New York World*. In the latter year he founded and became editor of the *Musical Digest*. He contributed many articles on musical subjects to newspapers throughout the country and wrote biographies of McCormack and Caruso.

KEYES, FREDERICK GEORGE (1885-). An American physical chemist, born at Kingston in Canada, and educated at Rhode Island College and Brown University. After teaching chemistry at Brown, he went to the Massachusetts Institute of Technology as research associate in physical chemistry in 1909. During 1913-16 he was chief engineer of the Cooper Hewitt Electric Company and then returned to the Institute of Technology, where in 1919 he took the advanced rank of director. His own researches have included important papers on equilibrium measurements, gas and liquid phase, thermodynamic properties of ammonia, and low temperature in connection with the kinetic theory of development, which he has published in technical journals. During the War he was director of the research and control laboratory of the Chemical Warfare Service at Puteaux.

KEYNES, JOHN MAYNARD (1883-). An English economist and publicist. He was educated at Eton and Cambridge and then became a civil servant. From 1915 to 1919 he was in the Treasury and acted as its principal representative at the Paris Peace Conference, where his work gave him world-wide distinction. Among the first to protest against the rigorous provisions of the reparations clauses of the Versailles Treaty, in season and out he castigated the attempt to shackle German industry. Toward this end he wrote *Economic Consequences of the Peace* (1919) and *A Revision of the Treaty* (1922). A chapter of the former contained the now famous vitriolic attack on the visionary character of President Wilson's programme. Other writings included *A Treatise on Probability* (1921) and *Money and Foreign Ex-*

change (1923). He was fellow and bursar of King's College at Cambridge, editor of *The Economic Journal* since 1912, chairman of the National Mutual Life Assurance Society, and chairman of *The Nation* since 1923. His economic and financial articles appeared from time to time in the *New York World* and the *New Republic*.

KEYSER, CASSIUS JACKSON (1862-). An American mathematician and philosopher (see VOL. XIII). His works published after 1914 include *The Human Worth of Rigorous Thinking* (1916) and *Mathematical Philosophy, a Study of Fate and Freedom* (1922).

KEYSERLING, HERMANN ALEXANDER, GRAF VON (1880-). A leading German social philosopher, born at Könno in Livonia. His family came from the wealthy German-speaking nobility of Baltic Russia. After his education at the universities of Dorpat, Heidelberg, and Vienna, he took a trip around the world. He interested himself in natural science and in philosophy, and before the War he was known both as a student of geology and as a popular essayist. The Russian Revolution deprived him of his estate in the Baltic, and with the remains of his fortune he founded the Gesellschaft für Freie Philosophie (Society for Free Philosophy) at Darmstadt. The mission of this school was to bring about the intellectual reorientation of Germany. Although not a doctrinaire pacifist, Keyserling believed that the old German policy of militarism was dead for all time and that Germany's only hope lay in the adoption of international, democratic principles. His political and social writings include: *Europas Zukunft* (1918); *Deutschlands Wahre Politische Mission* (1919); *Was Uns Not Tut und Was Ich Will* (1919); *Peace or War Everlasting* (1920); and *Politik, Wirtschaft, und Weisheit* (1922). His more speculative writings include: *Das Reisetagebuch einer Philosoph* (1919), *Philosophie als Kunst* (1920), and *Weisheit und Sinn* (1922).

KIAOCHOW. See SHANTUNG; JAPAN, *History*.

KIDNEY DISEASE. See NEPHRITIS.

KILLIAN, GUSTAV (1860-1921). A German laryngologist, born in Mainz, and educated at the University of Freiburg-im-Breisgau. He made revolutionary advances in the diagnosis and treatment of affections of the infralaryngeal passages, especially in the diagnosis and removal of foreign bodies in the bronchial tubes, by means of his new art of bronchoscopic control. His first college appointment was as assistant to Professor Hack of the chair of otolaryngology in Mainz. The sudden death of Hack led to his succession by Killian, although he was not made professor at the time. His revolutionary activity in bronchoscopy gained him an appointment as professor of laryngology in the University of Berlin; this was the first professorship of such scope in Germany. Killian introduced another innovation known as suspension laryngoscopy into the technic of his specialty. He wrote no monograph on the bronchoscope, and the omission has been supplied by his pupils. His book, *Die Schwebelaryngoskopie*, appeared in 1920; in collaboration with Voss was written a volume on military experience, *Gehörorgan, Obere Luft und Speisengänge* (1921). A Festschrift volume was published in 1920.

KILMER, JOYCE (1886-1918). An Ameri-

can journalist and poet, born in New Brunswick, N. J. Following his graduation from Rutgers College and studies at Columbia University, he taught for a time and then entered newspaper work in New York City. He contributed to many newspapers and magazines on many subjects, but he was chiefly distinguished for his verse and was recognized as one of the most prominent of the younger American poets. At the outbreak of the War, he enlisted as a private in the 116th Infantry (69th New York), and in August, 1918, was killed in the course of the American advance which drove the Germans from the Marne salient. His books include *Summer and Love* (1911); *Trees, and Other Poems* (1915), and *Main Street, and Other Poems* (1915).

KIMBALL, (SIDNEY) FISKE (1888-). An American architectural author, born at Newton, Mass., and educated at Harvard University and in Europe. He was assistant in Harvard and instructor at the University of Illinois from 1909 to 1913. In the latter year he was appointed instructor in architecture at the University of Michigan and was later assistant professor of architecture and assistant professor of fine arts there. In 1919 he became professor of art and architecture at the University of Virginia. He wrote much on architectural subjects and in 1916 became an editor of *Art and Archaeology*. He designed the McIntire Amphitheatre in West Virginia and many other buildings. He lectured at the Metropolitan Museum and the University of Chicago and was a member of many architectural and other societies. His writings include *Jefferson and the First Monument of the Classical Revival* (1915); *Thomas Jefferson, Architect* (1916); *A History of Architecture*, with G. H. Edgell (1918); and *Domestic Architecture of the American Colonies* (1922). He also contributed to literary and art magazines.

KINDERGARTEN ASSOCIATION, NATIONAL. The object of this organization is to provide kindergarten training for all the nation's children. It was established in New York in 1909 at a time when statistics showed that only one child in nine received kindergarten education and that 4,000,000 children were deprived of this privilege every year. The need was recognized for an organization to educate boards of education as to the value of kindergarten training. From its beginnings the Association interested itself in securing legislation requiring the organization of kindergartens on petition, and laws to this effect were secured in nine states: Nevada, Arizona, New Mexico, Texas, Pennsylvania, Kansas, Wisconsin, Illinois, and Maine. Through its field representatives, the Association established 502 new kindergartens, located in 322 towns and training 209,734 children; of this number 65 new kindergartens were organized in 1923. In 1913 the Association assisted the United States Bureau of Education in conducting a Kindergarten Division, compiling important statistics of kindergartens, and completing a careful survey of schools for training kindergarten teachers, the results of which were published in bulletins of the Bureau of Education. After 1917 it cooperated with the Bureau in preparing articles on home education which were sent to papers and magazines in this and many foreign countries. Its work was instrumental in arousing an active interest in early

education among the members of important national societies with a view to overcoming the existing indifference toward the extension of early training for children. The Association also cooperated with branches of the International Kindergarten Union, an organization made up of kindergarten teachers; in 1912 it affiliated with the National Kindergarten and Elementary College of Chicago. The movement was supported by voluntary gifts and expended about \$15,000 annually. Headquarters were maintained in New York City.

KING, (WILLIAM BENJAMIN) BASIL (1859-). An American author (see Vol. XIII). His later books are *The Side of the Angels* (1916); *The High Heart* (1917); *The Lifted Veil* (1917); *The City of Comrades* (1919); *The Abolishing of Death* (1919); *The Conquest of Fear* (1921); *The Discovery of God* (1922); *Dust Flower* (1922); and *The Happy Isles* (1923).

KINSMAN, FREDERICK JOSEPH (1868-). An American clergyman, educated at St. Paul's School at Concord, N. H., and at Keble College, Oxford. He was Protestant Episcopal bishop of Delaware from 1908 to 1919 but resigned to become a Roman Catholic and was appointed professor of modern church history in the Catholic University at Washington. He wrote: *Principles of Anglicanism* (1910); *Prayers for the Dead* (1914); *Issues before the Church* (1915); *Outlines of the History of the Church* (1916); *Catholic and Protestant* (1918); *Salve Mater* (1920).

KIPLING, (JOSEPH) RUDYARD (1865-). An English novelist and poet (see Vol. XIII). During the War he wrote much on subjects connected with the British army and nation. He wrote *New Armies in Training* (1914); *Sea Warfare* (1916); *A Diversity of Creatures* (1917); *The Years Between* (1918); *Inclusive Verse* (1919); and *Letters of Travel* (1920). His only son, Joseph Lockwood Kipling, was killed in the War.

KIRCHEISEN, FRIEDRICH MAX (1877-). A German historian, born at Chemnitz. He studied history and international law at the Universities of Leipzig and Paris and specialized in the Napoleonic era. He also distinguished himself by his geographical and literary researches. His writings include a bibliography on Napoleon which was published in German, English and French (1902); *Die Schriften von und über Friedrich von Gentz* (1906); *Napoleon: Auswahl aus Seinen Aussprüchen* (1907); *Hat Napoleon Gelebt?* (1910); *Napoleon, Sein Leben und Seine Zeit* (1914); *Napoleon im Lande der Pyramiden* (1918); *Auswahl aus J. J. Rousseaus Briefen* (1908); *Memoiren aus dem Spanischen Freiheitskampfe* (1908); *Arndt, Erinnerungen* (1908); *Gedichte* (1913); *Der Völkerring* (1915-17); and *Die Schlacht an der Marne* (1915).

KIRCHWEY, GEORGE WASHINGTON (1855-). An American legal scholar (see Vol. XIII). In 1915-16 he served as warden of Sing Sing Prison and from 1917 was head of the Department of Criminology of the New York School of Social Work. He resigned as Kent Professor of Law at Columbia in 1916. He served on various committees investigating prisons and in 1918-19 was director of the United States Employment Service. In 1917 he was president of the American Peace Society, as well as president of the American Institute

of Criminal Law and Criminology in the same year.

KIRGHIZ AUTONOMOUS SOCIALIST SOVIET REPUBLIC. See **SIBERIA AND THE FAR EASTERN REPUBLIC.**

KITCHENER, HORATIO HERBERT, first EARL OF ("KITCHENER OF KHARTUM") (1850-1916). A famous British soldier and administrator (see VOL. XIII). When England entered the War, Kitchener was at home on leave from Egypt and was appointed Secretary of State for War. He built up a great army of over 2,000,000 men. Having undertaken to help in the arming of Russian forces, he sailed from Scapa Flow, on June 5, 1916, to consult with the Czar. His ship struck a mine off the Orkneys, and he and most of his staff were drowned.

KITTREDGE, GEORGE LYMAN (1860-). An American philologist (see VOL. XIII). He has been professor at Harvard for many years and is a very prolific author. His later works include: *Chaucer and His Poetry* (1915), *Gawain and the Green Knight* (1916), *Shakespeare* (1916), *Concise English Grammar*, with F. E. Farley (1918), and *Dr. Robert Child, the Remonstrant* (1919).

KLAGENFURT BASIN. This region on the southern boundary of the Austrian Republic in the basin of the Drave, with an area about 1200 square miles, was one of the districts most stubbornly contested in the making of the peace. Although the whole region is a political and economic unit, since the valley of the Drave, enclosed by highlands, here widens out into a long corridor, its disposition nevertheless presented a peculiar problem, for the northern side of the valley was peopled by German Austrians and the southern by Slovenes. Its total population was about 150,000, the majority Slovenes but of no pronounced Slavophil sympathies; Klagenfurt, the town, had 28,958 inhabitants (1910), 25,582 of whom were Germans. The failure of the Austrian armistice terms to fix an occupation line for the province of Carinthia, and the desire of the Jugo-Slavs to push their boundaries as far north as possible, made this region the scene of turmoil and bloodshed for more than six months after the actual close of war. Sporadic fighting went on up to April, 1919, and then, in the following month, strong bands of irregular Jugo-Slav troops, strengthened by Serb detachments, pushed into the Basin, seized large stores of war materials, and occupied at least two-thirds of the area as well as the town of Klagenfurt. This turn of affairs compelled the Peace Conference to take action. On May 31 the cessation of hostilities and evacuation were ordered, and though an armistice was signed a week later, the state of war continued, with the Jugo-Slavs in actual possession. Because of the bitterness which had been aroused on both sides by this time, no solution but the holding of a plebiscite could present itself to the Peace Conference. Article 50 of the Treaty of St. Germain of Sept. 10, 1919, therefore made provision for the dividing of the basin into two zones, A and B. In the southern and larger zone (A), a plebiscite was to be held first, and the disposition of the whole region was then to be thus determined by the vote in this zone: in the event of a favorable Jugo-Slav vote, A was to go to Jugo-Slavia and a plebiscite was to be held in B; in the event of a favorable Austrian vote the whole was to go to Austria without further action. An inter-Allied com-

mission took charge of Zone A on July 21, 1920, and on Oct. 10, 1920, the voting took place. In spite of the fears entertained by Austrians for the loss of the district because of the predominantly Slovene population, about 70 per cent, and the fact that Jugo-Slavs had administered the zone from September, 1919, the vote was in favor of Austria; 22,025 ballots were cast for the Republic and 15,279 for Jugo-Slavia. The Basin, therefore, reverted to Austria. The considerations determining the result were probably the slight cultural affinity between the Slovenes of the region and their fellows to the South, distaste for military service in the Jugo-Slav army, and more important, the economic factor. Klagenfurt, in Zone B, was the market and railway outlet of the whole Basin, and with its market cut off by boundary lines the natives would have been compelled to ship their produce to Laibach, a distance of 60 miles across the Karavanke mountains.

KLIMKE, FRIEDRICH A. (1878-). An Austrian Jesuit. He was born at Golleow and studied classical philology at the university of Cracow. He became professor of philosophy and of the history of philosophy at the Universities of Cracow and Innsbruck and was later called to the Gregorian University in Rome. His writings include: *Der Deutsche Materialismusstreit im Neunzehnten Jahrhundert* (1907); *Der Mensch* (1908); *Hauptprobe der Weltanschauung* (1910); *Der Monismus und Seine Philosophischen Grundlagen* (1911); *Monistische Einheitsbestrebungen in der Katholischen Weltanschauung* (1912); *Monismus und Pädagogik* (1918); *Unsere Sehnsucht* (1922). Some of his works were published simultaneously in German and Polish.

KLOTZ, OTTO JULIUS (1862-). A Canadian civil engineer and astronomer (see VOL. XIII). He was chairman of the National Committee of Canada of the International Astronomical Union in 1920, president of the American Seismological Society during 1920-21, and delegate for Canada at Rome at the International Astronomers' Union in 1922.

KLUCK, ALEXANDER VON (1846-). A German general (see VOL. XIII). He led the campaign of the Marne in 1914, was wounded in 1915, and retired in the following year. General von Kluck wrote of his participation in the War in the volume entitled *Führung und Taten der Ersten Armee* (1920).

KNAPP, BRADFORD (1870-). An American agricultural educator, born at Vinton, Iowa, and educated at Vanderbilt University and in law at the University of Michigan. For several years he practiced law in Iowa and until 1911 was engaged in coöperative demonstration work for the Bureau of Plant Industry. In 1911 he was appointed special agent in this bureau and from 1915 to 1920 was chief of the Office of Extension Work in the South for the States Relations Service of the United States Department of Agriculture. In 1920 he became dean of the College of Agriculture of the University of Arkansas and director of the State Experiment Station. Professor Knapp wrote *Safe Farming, How the Whole Country Demonstrated*, and publications for the United States Department of Agriculture.

KNEISEL QUARTET. See **MUSIC, Chamber Music.**

KNIGHTS OF COLUMBUS. A Roman Catholic fraternal and benevolent society

founded in 1882. On Jan. 1, 1924, there were 2368 subordinate branches of the society, with 229,333 insured and 542,622 associate members. During the War this organization was active in work among the men in the army, navy, and marine forces of the United States. In 1918, 150 Knights of Columbus buildings were opened in camps in the United States and 45 huts in France. The buildings were equipped with chapels, libraries, writing desks, lounges, fireplaces, player pianos, phonographs, billiard tables, games, many kinds of stage apparatus, moving-picture machines, and other things necessary for the comfort of service men. There were 350 secretaries and 100 chaplains in charge of the work in the United States and 175 secretaries and 40 chaplains overseas. Cigarettes, cigars, smoking tobacco, pipes, chewing gum, razors, shaving cream, shaving brushes, tooth paste, tooth brushes, and many other articles were distributed by the Knights of Columbus free to enlisted men.

After the Armistice the organization opened technical schools in the larger camps, extending free instruction to those in the service. In 1919, 20,000 officers and men were receiving instruction in law, commercial science, technical subjects and modern languages. The following year the schools were extended to the larger cities of the country until 150 schools were in operation with an enrollment of 99,310 in 80 different courses. Correspondence course instruction was extended to ex-service men not able to attend the evening schools in the larger cities. In January, 1924, there were 25,000 students actively enrolled and submitting lessons for correction. In 1919, 411 college scholarships were awarded to men who rendered service with the army, navy, and marines during the War. Employment centres were opened during the demobilization period in all large cities throughout the country, and positions were found for 175,000 ex-soldiers. \$38,000,000 was spent by the Knights of Columbus for educational and welfare activities for men in the army, navy, and marine forces of the United States during the War. In 1921 the Supreme Council voted to establish an endowment fund of \$1,000,000 to finance welfare work in Italy, undertaken at the request of the late Pope Benedict XV, and in 1924 it established three large and completely equipped playgrounds in Rome. A papal medal was struck to commemorate the occasion.

KNIT GOODS. See TEXTILE MANUFACTURING.

KNOX, PHILANDER CHASE (1853-1921). An American lawyer and statesman (see VOL. XIII). He was reelected to the Senate in 1916 for the term ending 1923. He took a prominent part in debates on the Versailles Treaty and the Covenant of the League of Nations and was the author of the Knox Resolutions, which proposed the repeal of the joint resolution of Apr. 6, 1917, declaring the existence of a state of war with Germany, and in its place the declaration that the state of war was at an end, on the condition that the United States should have possession of the property of the German government in the United States, and of its subjects, until a treaty should be ratified. This resolution was defeated. Senator Knox was one of the chief opponents of the treaty in the Senate. He died Oct. 12, 1921.

KNOX COLLEGE. A coeducational institu-

tion at Galesburg, Ill., founded in 1837. The student enrollment increased from 340 in 1913-14 to 580 in 1923-24, the faculty was increased from 26 to 48 members, and the library from 10,000 to 26,413 volumes. The productive funds were increased correspondingly from \$402,601 to \$1,426,139 and the yearly income from \$53,851 to \$180,318. Seymour H. Ill, a men's dormitory, union, and commons, costing \$150,000, was erected in 1921. The college adopted a policy of owning all fraternity houses, which are leased for a long term to the fraternities; two new fraternity houses were built, and another was to be begun in 1924; three large residences were made over for fraternity purposes. President, James L. McConaughy, Ph.D.

KOEHLER, WOLFGANG (1887-). A German psychologist, born at Reval in Esthonia, and educated at the Universities of Tübingen, Bonn, and Berlin. After teaching in German schools, he found himself during the War at an anthropoid research station in German South Africa. There he conducted investigations on the perceptive capacities of chimpanzees and apes. After the War he was professor at the University of Berlin. On leave of absence in 1924, he lectured at Clark University. His researches in animal psychology led Koehler to become one of the leaders of the new school of German psychology known as the *Gestaltpsychologie* or psychology of forms. His published work comprises, in addition to a number of monographs, a remarkable volume on *Die Physischen Gestalten in Ruhe und im Stationären Zustand* (1920).

KOESTER, FRANK (1876-). An American engineer, born at Sterkrade, Germany. He received a thorough training in his profession in Germany and then came to the United States in 1902. His first engagement was with the New York Subway Construction Company, after which he served as engineer with the Guggenheimer Exploration Company, the American Smelting and Refining Company, and similar corporations. In 1911 he entered consulting practice in New York City and was lighting expert for Allentown, Scranton, and other cities in Pennsylvania. Besides patenting numerous improvements in plant engineering, he has written many articles for technical journals on his specialties and is the author of *Steam Electric Power Plants* (1908), *Hydroelectric Developments and Engineering* (1909), *Electricity for the Farm and Home* (1913), *The Price of Inefficiency* (1913), *Modern City Planning and Maintenance* (1914), and *Secrets of German Progress* (1915).

KOFFKA, KURT (1886-). A German psychologist, born at Berlin, and educated at the University of Berlin and at Edinburgh. He became professor of psychology at the University of Giessen and founded the periodical, *Psychologische Forschung*, with a new orientation for experimental psychology. His published writings include: *Experimentaluntersuchungen zur Lehre vom Rhythmus* (1908); *Ueber Vorstellungen* (1911); *Zur Analyse der Vorstellungen und Ihrer Gesetze* (1912); *Beiträge zur Psychologie der Gestalt* (1919); and *Die Grundlagen der Psychischen Entwicklung* (1921).

KOLCHAK, VLADIMIR VASILIEVITCH 1874-1920). A Russian admiral and soldier. He entered the navy in 1891 and was commissioned an officer in 1894. During the Russo-Japanese

War, he greatly distinguished himself in the defense of Port Arthur and for this received many decorations. From 1906 to 1916 he was on the general staff of the navy and took an active part in the organization of that branch of the service. During the War he displayed distinguished military gifts, and his personal gallantry won him a series of awards and promotions. He became rear-admiral in 1916. He was given an independent command in the Baltic and was promoted to be vice-admiral and commander of the Black Sea Fleet. Following the Revolution in 1917, he became an anti-Bolshevist leader, and his brilliant successes at first rapidly gained him virtual leadership. In 1919, however, he gradually lost ground, and at the end of that year, following brief successes, he was obliged to retire across the Irtysh River, where he lost his guns and supplies. He withdrew with his forces to Vladivostok, where, in January, 1920, an anti-Kolchak revolution broke out. On June 24, he surrendered to the revolutionary forces at Irkutsk and was executed. See *RUSSIA, History*; *SIBERIA, History*.

KONTI, ISIDORE (1862-). An American sculptor (see VOL. XIII). Among his later works, in his refined and decorative manner, were a fountain in Audubon Park in New Orleans, the memorial to Bishop Potter in St. John's Cathedral, New York City, and an ideal work in bronze, "The Genius of Immortality," in the Metropolitan Museum, New York City.

KOREA, or CHOSŌN. A dependency of Japan, occupying the peninsula on the mainland of Asia opposite the main island of Hondo. Area, 85,228 square miles, 82,926 being on the mainland and 2302 in neighboring islands. In 1921 the native population was 17,059,358 (13,947,474 agricultural); the Japanese population, 367,618. The principal cities were Seoul, 261,698 (188,648 Korean, 69,774 Japanese); Pyongajang, 78,621 (60,086 Korean, 17,731 Japanese); Fusan, 76,126 (41,902 Korean, 33,979 Japanese); Taiku, 46,043 (33,213 Korean, 12,515 Japanese); Chemulpo, 39,999 (26,516 Korean, 12,095 Japanese); Kaisong, 37,592 (30,242 Korean, 1201 Japanese); Gensan, 29,768 (21,532 Korean, 7620 Japanese); Chinampo, 22,667 (17,116 Korean, 5026 Japanese).

Agriculture. Rice was the principal agricultural product; 76,018,392 bushels were produced in 1918, 14,880,000 of which were exported to Japan, the balance being consumed locally. In 1913, 60,327,321 bushels were produced. Other products were: barley, 28,556,547 bushels in 1918 and 25,973,281 in 1913; millet, 28,103,169 in 1918 and 22,709,374 in 1913; soya beans, 24,159,530 in 1918 and 17,880,317 in 1913; wheat, 6,848,647 in 1918 and 6,306,958 in 1913; silk (exported), 2,073,601 pounds in 1918 and 187,695 in 1913; ginseng, 266,093 pounds in 1918 and 185,319 in 1913, with an export of some 103,008 pounds to China in 1918; American upland cotton production, for 1921, 90,476,000 pounds, and 17,785,414 in 1913; native cotton, 36,784,000 pounds in 1921 and 34,437,462 in 1913; tobacco, 32,104,000 pounds in 1918 and 31,348,000 in 1913. Live stock resources were: cattle, 1,480,037 (40,627 cattle exported to Japan, Siberia, and China as well as 2,838,000 cowhides) in 1918 and 1,211,011 cattle in 1913; 58,217 horses (1913: 50,652); 12,172 asses (1913: 13,225); 2211 mules (1913: 802); 923,979 swine (1913: 761,186); 16,650 goats (1913: 10,456); 4,913,322 fowl (1913: 4,194,335).

Horticulture: 1,139,392 pear trees (yield 13,605,121 pounds of pears; 1913: 580,236 trees and 2,296,420 pounds); 1,420,871 apple trees (yield 14,481,726 pounds of apples; 1913: 680,144 trees and 2,930,748 pounds); 348,099 grapevines (yield 2,017,403 pounds of grapes; 1913: 243,169 and 838,598 pounds); 5,251,124 chestnut trees (yield 31,412,832 pounds of chestnuts; 1913: 1,581,270 and 33,431,116 pounds). The Oriental Development Company, a Japanese land colonization company, accepted 7035 Japanese families' applications for settlement from 1910 to 1918; of these, 3457 were successful, with 15,555 members of their families settled on 17,741 acres of land.

Mining. 1918 productions were: 135,000 ounces gold (1913: 145,000 ounces); 16,000 ounces placer gold (1913: 28,000 ounces); 66,448,000 pounds gold and silver ore (1913: 11,342,000 pounds); 43,000 ounces silver (1913: 24,000 ounces); 578,000 pounds coarse lead; 2,828,000 pounds zinc ore; 635,000 pounds tungsten ore; 199,000 tons iron ore (1913: 142,000 tons), 94,888,000 pounds pig iron; 15,523,000 pounds graphite (1913: 27,120,000 pounds); 188,000 tons coal (1913: 128,000 tons); 102,396,141 pounds salt (1913: 56,201,622 pounds).

Forestry. From 1907 to 1918, 25,618 acres had been planted with 21,198,000 trees by State and local governments; 240,443 acres were leased out for afforestation in 1918.

Fisheries. The total value of the catch in 1918 was \$16,431,701, as against \$5,528,142 in 1913. The 1918 catch consisted of 198,703,000 pounds of pollack; 147,342 pounds of sardines; 68,116,000 pounds of mackerel; 68,544,000 pounds of cod; 41,176,000 pounds of herring; 39,808,000 pounds of guchi; 24,721,000 pounds of lobster, and lesser amounts of other fish.

Manufacturing. In 1918 there were 1700 factories, employing 5 people each or more, using 26,151 horse power in all, and producing products valued at \$78,400,815. Of these, 736 were owned and operated by Japanese and 605 by Koreans. They included 297 for rice cleaning, 182 for ceramics, 163 for metal ware, 117 for brewing, and 83 for dyeing and weaving. The value of products of those owned by Japanese was \$42,200,792; by Koreans, \$4,181,876. In 1913 there were only 532 factories, of the same class, using 9908 horse power and with a production of \$18,033,086.

Foreign Trade. 1921 imports amounted to \$109,138,000, consisting principally of cotton gray sheeting (\$15,868,000), coal, lumber, machinery, cotton fabrics, Chinese hemp fabrics, petroleum, sugar, and cotton yarn. 1914 imports were \$31,615,000, consisting of gray sheeting, \$2,940,000; rice, \$1,362,000; cotton yarn, \$1,035,000; cotton fabrics, \$994,000; white sheeting, \$878,000; coal, timber, paper, flour, sugar, machinery, and petroleum. Similarly, 1921 exports amounted to \$116,190,000, consisting principally of rice, \$46,406,000; beans, \$11,433,500; raw silk, including tussah silk, \$6,522,500; iron and steel, \$4,411,000; fish, ginseng, fertilizer, cotton, gold, cow hides, cattle, paper and pulp. In 1914, exports were \$17,194,000, consisting of rice, \$12,258,000, and beans, peas, cowhides, ginseng, cotton, and leather manufactures.

Budget and Finance. Total expenditures and revenues for 1923-24 were \$72,845,000 (1913-14: \$31,546,744); total debt in March 1922, was \$92,663,000 (1916: \$36,801,000).

Twenty-one ordinary banks were in operation, with \$7,475,000 paid-up capital, in 1921, in addition to the Bank of Chosen, with \$25,000,000 capital, and the Provincial Hypothec Bank, with \$7,500,000 capital. Bank-notes of the Bank of Chosen outstanding in September, 1921, totaled \$55,443,500. Total currency in circulation was \$62,978,832. By contrast, there were 15 ordinary banks with \$1,800,000 paid-up capital in 1915, in addition to the Bank of Chosen with \$5,000,000 and six Provincial Hypothec Banks with \$739,000 capital. Bank-notes of the Bank of Chosen totaled \$12,343,000 in 1915, which was the total currency.

History. Under Japanese administration the province progressed materially. Bare hill-sides were afforested, agriculture received the benefit of scientific supervision, and railways were built. Advances were startling in every line of economic activity. But the absolute character of the Japanese authority, the dominance by the military, the refusal to heed the demands for a larger measure of popular government, all contributed to a feeling of resentment which the democratic doctrines of the War finally fanned into open hostility. Throughout 1919 there were everywhere marked evidences of unrest; means of communication were cut; cities were the scenes of mob violence; public officials were attacked and some even killed. The Japanese, on the other hand, retaliated by increasing their garrisons and by employing repressive measures. By April the riots had taken on so much of the character of actual rebellion that the Japanese privy council was spurred into action. A programme of reform introduced during the year included the extension of civil government at the expense of the military and responsibility of the governor to the Japanese Ministry. Korea was made an integral part of the Japanese Empire, and Koreans were put on the same footing as Japanese, nominally at least. Members of the former Korean dynasty and cabinet received Japanese patents of nobility. A little later, in 1920, the Korean tariff was assimilated to that of Japan. Meanwhile a revolutionary party, through a committee at Shanghai, promulgated a republican constitution for the "Provisional Government of the Korean Republic." An attempt was made to interest Soviet Russia in the struggle of the Koreans for independence, while natives and friends of Korea in other countries, especially in the United States, endeavored to show sympathy for Korean aspirations by giving publicity to numerous acts of oppression, violations of the rights of pro-Korean missionaries, summary executions of Korean patriots, etc., alleged to have been committed by the Japanese in Korea. Baron Saito, the new governor, expressed the hope that ultimately Koreans would receive all those civil and constitutional liberties which Japanese possessed, but the tenuous character of the promise hardly served to assure the natives. Disorders were thus sporadic during 1920, while the military authorities deported themselves with a marked severity. By 1924 none of the political or educational hopes of the Koreans had yet been realized.

KORNILOV, LAVR GEORGIEVITCH (1870-1918). A Russian general. He entered the army in 1888 and took part with distinction in the Russo-Japanese War. He served from 1907 to 1911 as Russian military agent in China and later had various commands in Siberia. At the

beginning of the War he commanded a division of Brussilov's army with great success. He was captured during the Russian retreat in 1915 but effected his escape and reached Rumania. Returning to Russia, he commanded the 25th Army Corps. At the outbreak of the Russian Revolution in March, 1917, he became commander-in-chief of the troops in Petrograd but resigned his command on account of lack of discipline in the army and was assigned to the 8th Army. On August 1 he succeeded Brussilov as commander-in-chief and at once took strong measures for the restoration of discipline. In September, 1917, he demanded full military and civil power from Kerensky. He was thereupon dismissed and marched with his troops on Petrograd. The movement collapsed and on September 15 he surrendered. He escaped to the Caucasus, where he gathered a volunteer force of Cossacks, and was killed in March, 1918. See *Russia, History*.

KÖSTER, ADOLF (1883-). A German writer, born at Verden, and educated at the Universities of Halle, Marburg, Heidelberg, and Zurich. He was lecturer at the University of Munich, traveled in England, America, Asia and Africa, and during the War was correspondent for Social-Democratic papers. During the presidency of Wirth he was Minister of the Interior. He has written *Die Ethik Pascals* (1906); *Der Junge Kant* (1913); *Die Zehn Schornsteine* (1909); *Die Bange Nacht* (1913); *Der Tod in Flandern* (1915); *Brennendes Blut* (1916); and *Der Kampf um Schleswig* (1920).

KOWEIT. See *ARABIA*.

KRAEMER, HENRY (1868-). An American pharmacist, born at Philadelphia, Pa., educated at the Philadelphia College of Pharmacy and Columbia and Marburg Universities. He was instructor at the New York College of Pharmacy and during 1895-97 professor of botany at Northwestern University. In 1897 he accepted the chair of botany and pharmacognosy at the Philadelphia College of Pharmacy and became also director of the microscopical laboratory. These places he held until 1917, when he accepted a similar chair at Michigan, where he served also as dean. In 1920 he became director of the Kraemer Scientific Laboratory. He was editor of the *American Journal of Pharmacy*, 1898-1917, and in 1900 became a member of the committee of revision of the United States Pharmacopeia. He is the author of *A Textbook of Botany and Pharmacognosy* (1902), *Applied and Economic Botany* (1914), and *Scientific and Applied Pharmacognosy* (1915).

KRAFT, ZDENKO VON (1886-). An Austrian writer, born at Gitschin, and privately educated with special attention to drama and music. His works include: *Adagio Consolante* (1910); *Der Oesterprinz, ein Sonniges Leben* (1914); *Die Stimme von Helgoland* (1910); *Sonnenwend des Glücks* (1917); *Wikings Letzte Fahrt* (1917); *Maria Theresa* (1918); *Missa Solemnis* (1920); and a trilogy of novels or the life of Wagner, *Barrikaden* (1920), *Liebestod* (1921), and *Wahnfried* (1922).

KRALIK, RICHARD VON MEYERSWALDE (1852). An Austrian writer, born at Eleonorenheim in Bohemia and educated at the universities of Vienna, Bonn, and Berlin. He is the author of many works, which include: *Maximilian*, a drama (1885); *Deutsche Puppenspiele* (1885); *Sprüche und Gesänge* (1892); *Kraka*, a comedy (1893); *Kaiser Marcus Au-*

relius in Wien, a drama (1897); *Veronica*, a drama (1898); *Rolands Tod* (1898); *Altgriechische Musik* (1900); *Angelus Silesius* (1902); *Die Deutschen Klassiker und der Katholizismus* (1903); *Weltgeschichte und Menschnalter* (1903); *Das Veilchenfest* (1905); *Die Grals-sage* (1907); *Die Revolution* (1908); *Die Katholische Literaturbewegung der Gegenwart* (1909); *Homer's* (1910); *Geschichte von Wien* (1911); *Geschichte der Neuesten Zeit* (1914-20); *Die Neue Staatenordnung* (1918); and *Grundriss und Kern der Weltgeschichte* (1920).

KRAMER, A. WALTER (1890-). An American composer, born in New York City, Sept. 23, 1890. He studied violin with C. Hauser and R. Arnold, but in composition he is practically self-taught. In 1910 he joined the staff of *Musical America*, leaving in 1922 to go abroad. He has contributed to other periodicals. His compositions include a symphonic poem, *The Tragedy of Nan*; four *Sketches* for orchestra; a *Rhapsody* for violin and orchestra; a suite for string orchestras; *The Hour of Prayer* for baritone, chorus, and orchestra; a string quartet; compositions for organ and for piano; and songs.

KRAPP, GEORGE PHILIP (1872-). An American educator, born at Cincinnati, Ohio, and educated at Wittenberg College and at Johns Hopkins University. He served for several years as an instructor of English at the Horace Mann School and in Teachers' College. In 1907 he was adjunct professor of English at Columbia and from 1908 to 1910 was a professor at the University of Cincinnati. In the latter year he was appointed professor of English at Columbia. He was a member of many learned societies and author of *The Elements of English Grammar* (1908); *In Oldest England* (1912); *Pronunciation of Standard English in America* (1919); and *Tales of True Knights* (1920).

KRAUS, CHARLES AUGUST (1875-). An American physical chemist, born at Knights-ville, Ind., and educated at the University of Kansas, Johns Hopkins University, and the Massachusetts Institute of Technology, where he was a research associate in physical chemistry during 1908-12 and assistant professor during 1912-14. In 1914 he became professor of chemistry and director of the chemical laboratory at Clark University. The subjects of solutions, organic radicals, and vapor electric apparatus have received his attention. He has published the results of his investigations on these and similar subjects in the technical journals of his specialties.

KRAUS, EDWARD HENRY (1875-). An American mineralogist, born at Syracuse, N. Y., and educated at the Universities of Syracuse and Munich. During 1896-99 he was instructor in German and mineralogy at Syracuse, where he became associate professor of mineralogy in 1902, and in 1902-04 he was in charge of the department of science at the Syracuse High School. In 1904 he was called to the University of Michigan, where in 1919 he was appointed to the chair of crystallography and mineralogy, in addition to his positions of director of the mineralogical laboratory (1908-) and dean of the summer session (1915-). Besides many papers on chemical and physical crystallography and the optical constants of crystal at varying temperatures, he has written *Essentials of Crystallography* (1906); *Descriptive Mineralogy* (1911); *Tables for the Determination of*

Minerals, with W. F. Hunt (1911); and *Elementary Mineralogy*, also with Hunt (1920).

KRAUSKOPF, JOSEPH (1858-). An American rabbi, born in Germany. In 1872 he emigrated to the United States and received his degrees from the University of Cincinnati and the Hebrew Union College both in 1883. He was rabbi in Kansas City from 1883 to 1887 and went to Philadelphia in the latter year. He was the founder of the Jewish Publication Society of America and of the National Farm School. In 1898 he was appointed special relief commissioner to Cuba and was special commissioner and agricultural commissioner in Europe for several years following. In 1904-05 he was president of the Conference of American Rabbis and was an official of other societies. He wrote *The Jews and Moors in Spain*, *My Visit to Tolstoy*, *The Seven Ages of Man*, *The Service Manual*, *The Service Ritual*, and many volumes of lectures. From 1917 to 1920 he was representative of Jewish organizations in the Food Conservation Department in Washington.

KREGER, EDWARD ALBERT (1868-). An American army officer, born at Keota, Iowa, and graduated at the Iowa State College in 1890. He served in the Spanish-American War with the Iowa troops and in 1901 was commissioned first lieutenant of the Regular Army. He served in the Philippines and in Cuba. From 1914 to 1917 he was professor of law at the United States Military Academy and assistant to the Provost Marshal in 1917-18. In 1918-19 he was acting judge-advocate-general with the Army in France and was acting judge-advocate-general of the United States Army from 1919. He received the Distinguished Service Cross for heroism in action in the Philippines and the Distinguished Service Medal for distinguished service as acting judge-advocate-general.

KREHBIEL, HENRY EDWARD (1854-1923). An American music critic (see Vol. XIII). In 1917 he published *A Second Book of Operas* and in 1919 *More Chapters of Opera and Parsifal, an English Version for Performance*, which was used by the Metropolitan Opera Company.

KRESY. See **VILNA**.

KROEBER, ALFRED LOUIS (1876-). An American anthropologist (see Vol. XIII). His later publications include: *Zuñi Potsherds and Hohan* (1915); *Floral Relations among the Galapagos Islands* (1916); *Zuñi Kin and Clan* (1917); *Tribes of the Pacific Coast* (1917); *The History of Philippine Civilization as Reflected in Religious Nomenclature* (1918); *Kinship in the Philippines* (1919); *Peoples of the Philippines* (1919); *Yuman Tribes of the Lower Colorado* (1920); *Basketry Designs of the Mission Indians* (1922); and *Anthropology* (1923). He founded the California Academy of Sciences (1917).

KROEGER, ERNEST RICHARD (1862-). An American organist and composer, born at St. Louis. After completing his entire musical education under local teachers, he served as organist in various churches in St. Louis and as conductor of several choral societies. He traveled extensively as a concert organist. His principal compositions are the overtures, *Thanatopsis*, *Pittoresque*, *Endymion*, *Sardanapalus*, *Hiawatha*, *Atala*, and *Festival*; four string quartets, a piano quintet, a piano quartet, a piano trio; many pieces for organ and for

piano, especially in the larger forms; and over 100 songs.

KROGH, AUGUST (1874-). A Danish physiologist, born in Grensa, and educated at the University of Copenhagen. He devoted himself to the study of anatomy and physiology with special reference to comparative biology and in 1916 was appointed professor of zoophysiology at his alma mater. He has published two well-known works which have been translated into English and German: *The Respiratory Exchanges of Animals* (1916) and *Anatomy and Physiology of the Capillaries* (1922). In 1920 he received the Nobel Prize for Medicine and Physiology.

KRÜGER, FELIX (1874-). A German philosopher and psychologist. He succeeded to the chair of Wundt at the University of Leipzig on the latter's death in 1920. Best known for his *Untersuchungen über Entwicklungspsychologie* (1915), in which he studied social psychology from an historical point of view, he was also the author of several philosophical works. These include *Ist Philosophie ohne Psychologie Möglich?* (1896) and *Der Begriff des Absolut Wertvollen* (1898). From Leipzig, Kruger directed a group of researches and studies under the general title of *Entwicklungspsychologie* (Developmental Psychology).

KÜCHLER, K. F. WALTHER (1877-). A German writer, born at Essen and educated at the University of Leipzig. He was instructor in German at the University of Nancy and at Cornell, lecturer at the University of Giessen, and later professor of Romance languages at Würzburg. He is the author of *Marie Joseph Chéniers Lyrische und Dramatische Dichtungen* (1900); *Die Cent Nouvelles* (1906); *Französische Romantik* (1908); *Libussa* (1919); *Romain Rolland, Henri Barbusse, Fritz von Unruh* (1920); and *Ernest Renan* (1921).

KUHLMANN, RICHARD, BARON VON (1873-). A German diplomatist and statesman. He entered the diplomatic service in 1889 and after serving in various capacities became counselor of the German Embassy in London in 1908. He was sent as German ambassador to The Hague in April, 1915, and served at Constantinople in 1916-17. He was then appointed foreign secretary to succeed Zimmermann and held this position until his resignation in July, 1918. He was largely responsible for the treaties of Brest-Litovsk and Bucharest.

KU KLUX KLAN. An organization founded in 1915 by William Joseph Simmons, of Atlanta, Ga. While in a measure it is a revival of the society of the same name which flourished in the South during the reconstruction period, its aims and purposes are, in a larger sense, distinctly different. The organization of the modern society is claimed by Simmons to have been undertaken by him as the result of a vision. He preserved the regalia and some of the nomenclature of the original Klan, but to these he added other designations, all of which begin with the letters *kl*, e.g. *Klo-kard*, lecturer; *Kladd*, conductor; *Kleagle*, organizer; *Klavern*, meeting. The activities of the original Ku Klux Klan were directed almost entirely against the negroes in the South, for the purpose of preventing their participation in social and political affairs. The modern Ku Klux Klan, although it theoretically avoids stating such as its purpose, is hostile chiefly

to Jews and Roman Catholics. The fundamental doctrine of the Klan is "100 per cent Americanism." This, with its corollary principles of "no foreign allegiance" and "white supremacy," means in practice a campaign against Catholics, Jews, and negroes, particularly the first. The growth of the movement was slow, until after the end of the Great War, when Edward Young Clarke, a former newspaper man, conceived the possibility of organization on a large scale. He was made Imperial Kleagle and was appointed head of the propaganda department. Numerous agents were put in the field to organize in 40 States. They were called Kleagles. Each member enrolled paid \$10, of which the Kleagle received \$4 and the King Kleagle \$1; the remaining \$5 was sent to the Imperial Treasurer. As a result of these efforts the Klan spread with marvelous rapidity, and its effects were soon apparent. The organization soon began to function as a censor of personal conduct in many localities and imposed punishment as it saw fit. The result was an outbreak of lawlessness in many States under the name of discipline. This lawlessness reached a climax during the summer of 1922, when murders were charged to its members in Inglewood, Cal., and Mer Rouge, La. The latter was especially atrocious. It is described in the article LOUISIANA. There were also outbreaks of violence in various towns in Texas, Oklahoma, Pennsylvania, and other States. Governor Parker of Louisiana made a strong effort to bring about Federal action for the suppression of the Klan but was not successful. In many States, the legislators passed measures designed to remove the objectionable features. Most of these laws forbade the use of masks by any secret organization.

The entrance of the Klan into politics was a further step in its development. It is especially strong in the South and Middle West. In Texas, it was charged, Earle B. Mayfield was elected United States Senator in 1922 through the Klan's support. In Oregon the Klan was sufficiently powerful to put through legislation banning parochial schools. In Oklahoma its activities and the attempt of the governor to control them led to the latter's impeachment and removal. (See OKLAHOMA.) The organization is very influential in the mid-western States, Indiana, Illinois, Kansas, and Ohio. It has considerable strength in Pennsylvania. In New Jersey its membership is said to be greater than in any other State. In New York it has not gained a strong footing, but it is strong in Connecticut. It may be noted that the constitution or creed of the Klan is an instrument to which almost any good citizen might subscribe. It is only in its application that it has been harmful. The following are quotations from the Klansman's creed:

"I believe in God and in the tenets of the Christian church and that a godless nation cannot long prosper."

"I believe in the eternal separation of church and state."

"I do not believe in mob violence, but I do believe that laws should be enacted to prevent the cause of mob violence."

"I believe in the prevention of unwarranted strikes by foreign labor agitators."

"I believe in the limitation of foreign immigration."

"I am a native-born American citizen, and I

believe that my rights in this country are superior to those of foreigners."

All members of the Klan are sworn to secrecy and take binding oaths of obedience, fidelity and klannishness.

The Ku Klux Klan was an important issue in both the great national conventions in 1924. As its strength was greatest in the South, however, it was more of an issue with the Democratic than with the Republican party. In the Republican platform was inserted a plank which, in a general way, reprobated secret societies which functioned contrary to the Constitution of the United States. In the Democratic convention, the question was more serious. The Klan bitterly opposed Governor Smith of New York and Senator Underwood of Alabama, two of the principal candidates. Several speakers in the convention vehemently denounced the Klan. A resolution opposing the Klan and mentioning it by name was defeated by a majority of one vote, and the plank inserted in the platform did not differ from that of the Republicans. The Ku Klux Klan, under the name of the American party, nominated for its candidate for the presidency Judge Gilbert O. Nations. The total membership of the body is not known with any accuracy. It is estimated that there were about 2,000,000 members in 1924. Its organization was aggressively carried on, and there were indications that it would reach far greater proportions. The "idealism" proclaimed by the Klan resulted in the enlistment of many clergymen in its ranks, and in some places churches displayed signs welcoming members of the Klan to their services. In general, however, the movement was opposed by the churches.

In 1923 dissension arose in the order as a result of a controversy between W. J. Simmons, the so-called Emperor, and Dr. H. W. Evans, Imperial Wizard. Simmons charged that Evans interfered in the operation of the order. In the court action which followed, the administration of the Klan's affairs was placed in the hands of a commission consisting of the founder, W. J. Simmons; its leader at the time, H. W. Evans; and a municipal court marshal of Atlanta. The Imperial Wizard and directing head in 1924 was H. W. Evans. A woman's organization affiliated with the Klan is called the Kamelia.

KÜLPE, OSWALD (1862-1916). A German philosopher (see Vol. XIII). He died in 1915 before completing a treatise on psychological theory embodying the contentions of the imageless thought school. His unfinished work was published posthumously by his pupil Karl Bühler under the title, *Vorlesungen über Psychologie* (1922).

KUMMER, FREDERIC ARNOLD (1873-). An American author and playwright, born in Catonsville, Md. His best-known works include: *Plaster Saints* (1921); *When the Earth was Young* (1922-23); *My Golden Girl*, with music by Victor Herbert (1919); *The Bonehead* (1920); *The Voice*, in which William Courtenay starred (1923). He often wrote under the pseudonym of Arnold Fredericks. Besides his work for the legitimate stage he wrote many motion picture scenarios, including *The Slave Market*, *The Yellow Pawn*, *Motherhood*, *The Ivory Snuff Box*, and *The Belgian*.

KUN, BELA (1886-). A Hungarian Communist leader. He had long been identified

with Communist activities and his abilities had won him a high place in the movement. He organized a revolution at Budapest, in February, 1919, which brought about the resignation of the Karolyi cabinet. He was appointed commissary for foreign affairs in the Hungarian Soviet government in March and negotiated with General Smuts, acting for the Allied Peace Conference, in April of that year. As recognition was refused, he made a military alliance with the Russian Soviet government. The Communist government was overthrown in August, 1919, and he fled to Vienna. He was captured and interned in Austria but was released in exchange for Austrian prisoners in Russia in July, 1920. See HUNGARY, *History*.

KUNZ, GEORGE FREDERICK (1856-). An American mineralogist (see Vol. XIII). Among his later writings are *E. Roty and His Work* (1914), *Magic of Jewels* (1915), *Ivory and the Elephant* (1915), *Shakespeare and Precious Stones* (1916) and *The Ring* (1917).

KUPRIN, ALEXANDER I. (1870-). A Russian writer, belonging to the realistic school. He is an excellent story-teller. His most famous novel is *The Duel* (1905), a story of barracks life. He also wrote some delightful stories for children, as well as many sketches, and made for himself a reputation abroad. His writings include *Short Stories* (1893-1918); *The Duel* (1905); *Sulamith* (1908); *The Pit* (1909-1913); *A Bracelet of Garnets* (1911); *Leaystrygonians* (1912); *The Black Sea Coast*; *Moloch*; and *At Rest*.

KURDISTAN. A region in eastern Asia Minor comprising for the most part the Turkish vilayets of Mamuret-ul-Aziz, Diarbekr, Bitlis, Van, but also the northern section of the vilayet of Mosul in the now independent state of Iraq or Mesopotamia, and part of western Persia. It is inhabited by the Kurds, a seminomadic people related to the Persians in race and language, but belonging to the Sunni sect. The total population was estimated at 2,500,000. It had been the consistent policy of the old Turkish government to settle the Kurds among the Armenian populations, and thus, by singling them out for special favors, to create strong Mohammedan centres in these unruly vilayets. The independent spirit thus fostered naturally rendered the Kurds indifferent to the War, with the result that their participation was negligible. The Russian policy, once the Russians were in control of Erzerum and Bitlis after 1916, was designed along the same lines, and the Kurds were played off against the Armenians. The entry of the British into Mesopotamia, and the promises held out by British political officers of a Kurdish independent state, naturally made Kurdish leaders gravitate toward Great Britain. With the exception of temporary setbacks early in 1919 when the Sheik Mahmud rose against the British in southern Kurdistan, British penetration into the country was uniformly successful through 1919. The extravagant scheme of sending loosely coördinated units into a far-flung area brought reverses, for in 1920, as a result of native uprisings, the British were compelled to withdraw from the greater part of the region. By the Treaty of Sèvres (1920) provisions were made for the satisfaction of Kurdish national aspirations. An inter-Allied commission was to erect an autonomous government within the area east of the Euphrates, south of the future

boundary of Armenia, and north of Syria and Mesopotamia; a commission of Allied representatives acting with Kurds and Persians was to rectify the frontier between Kurdistan and Persia. If within one year from the coming into force of the treaty, the Kurds gave evidence to the League Council of their desire for complete independence, and if the Council approved, Kurdistan was then to be raised to the dignity of a separate sovereign state, and, in that event, Great Britain must permit the voluntary adhesion of the Kurds in Mosul, part of the Mesopotamia mandate, to the new state. The failure of the Sèvres treaty and the realignments effected in subsequent years caused the hopes of the Kurds for independence to be forgotten; the final treaty of Lausanne in 1923 made no mention of a free Kurdistan; and the Kurds remained subject to alien rule. Like prewar Poland, Kurdistan was divided among three alien nations, namely, Turkey, Persia, and Mesopotamia.

KURZ, ISOLDE CLARA M. (1853-). A German writer, born at Stuttgart, the daughter of Hermann Kurz, novelist, translator, and librarian at the university of Tübingen. She lived for many years in Florence. She is the author of *Gedichte* (1890); *Italianische Erzählungen* (1895); *Von Dazumal* (1900); *Die Stadt des Lebens* (1902); *Neue Gedichte* (1905); *Hermann Kurz*, a biography (1906); *Lebensflut* (1907); *Florentinische Erinnerungen* (1909); *Im Zeichen des Steinbocks*, a volume of aphorisms (1909); *Die Kinder der Lilith* (1909); *Cora und Andere Novellen* (1914); *Schwert aus der Scheide*, a volume of verse (1917); *Aus Meinem Jugendland*, an autobiographical work (1919); *Traumland* (1920);

and *Legenden* (1920). She also translated much from the French, English, Italian, and Russian, and received the degree of doctor *honoris causâ* from the University of Tübingen.

KUT-EL-AMARA. See **WAR IN EUROPE, Turkish Front.**

KUTSCHER, ARTUR (1878-). A German critic, born in Hannover, and educated at the University of Munich. He is the author of *Natürgefühl in Goethes Lyrik* (1906); *Hebbel als Kritiker des Dramas* (1907); *Die Kunst und Unser Leben: Grundstein zu einer Kritik* (1909); *Schiller und Wir* (1909); *Die Ausdrucksmittel der Bühne* (1910); *Hebbel und Grabbe* (1913); *Kriegstagebuch* (1915); *Frank Wedekind, Sein Leben und Sein Werk* (1921); and other works. He compiled an anthology of soldier songs, *Das Richtige Soldatenlied* (1917), edited the complete works of Frank Wedekind (1921), and made many stage adaptations.

KWANGCHOW WAN. See **FRENCH INDO-CHINA.**

KYNE, PETER BERNARD (1880-). An American novelist, born in San Francisco, Cal., and educated in the public schools and in a business college of that city. For several years he was engaged in the lumber business. He served in the Philippines during the Spanish-American War and was captain of the 144th Field Artillery during the War in Europe. His books, which are widely popular, include *Three Grandfathers* (1913); *The Long Chance* (1914); *Cap-py Ricks* (1916); *The Valley of the Giants* (1918); *Kindred of the Dust* (1919); *The Green Pea Pirates* (1920); and *Pride of Palomar* (1921). He was a frequent contributor of short stories to magazines.

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LABOR, AMERICAN FEDERATION OF. A nonsecret confederation of self-governing trade unions in the United States, Canada, Porto Rico, and Panama, comprising five industrial departments: the building trades, metal trade, union label trade, railway employees, and mining. Its paid-up membership increased nearly 300 per cent between 1910 and 1920, from 1,562,112 to 4,078,740; but after 1920 it began to fall and reached 2,926,468 in 1923. The number of local unions in 1914 was 21,460; in 1921, 36,247. Available funds in 1914 amounted to \$366,230 and expenditures to \$265,737; in 1921-22 receipts were \$761,382 and expenses \$562,588. Samuel Gompers continued to hold the presidency, being elected to that position at the 44th annual conference, in 1924, for the 43rd time. During the War the organization made every effort to work with the Government of the United States; every single act of the president and executive council in connection with the War was unanimously approved without discussion. Its loyalty was strengthened by government recognition of trade-union standards and by such appointments as that of Samuel Gompers as an important member of the Committee of Council of National Defense and that of the first vice president as member of the Commission to the Russian People. This recognition on the part of the government, and to some extent a rise in the cost of living, strengthened the leadership of the Federation during the war period. On the other hand its influence was somewhat weakened in that the Labor Board frequently dealt direct with disaffected groups, instead of through the central organization of the Federation. Later, industrial instability, together with the prevalence of high wages, drew many workers away from the unions. In 1923 efforts were redoubled for the organization of nonunion labor, with much propaganda directed against the open shop.

Throughout the decade 1914-24, the American Federation of Labor held firmly to its policy of nonpartisan political activity. Despite a serious movement beginning in 1918 to form a national labor party, and the election of two United States Senators in one State by the newly organized Farmer-Labor party, the Federation maintained its political activity on the nonpartisan basis of "reward your friends; punish your enemies." In 1924 the Federation leaders wholeheartedly endorsed the candidacy of La Follette. The organization did not abate its hostility toward socialism, syndicalism, the I.

W. W., and other radical labor movements. Although in 1920 the more radical element within the Federation triumphed over the conservative in favor of government ownership and operation of railways, carried on distinct opposition to the conservative administration through 1921, and demonstrated in 1922 over the question of recognition of the Russian Soviet government, the policy of the Federation in 1923 was wholly directed by the conservatives. The radical W. F. Davis had been expelled, the Federation taking the position that "those who seek to destroy the legitimate labor movement must do it from without." In its attitude toward social development through intervention by the State, the Federation likewise maintained its traditional policy. This may be briefly outlined, in the Federation's own words, as favoring laws to protect the helpless, to abolish special privilege and to free industry for the working out of its purely industrial problems, to make government more responsive to the needs of the people and to deprive courts of the power to rule as well as to adjudicate.

Thus the Federation worked for protective laws for women and children, for seamen and for government employees. It supported safety and health measures and adequate workmen's accident insurance legislation. It urged the advance planning of public works as an aid to combating unemployment and the development of a permanent, effective public employment service, though it was hesitant about joining in the movement for unemployment insurance, which made substantial gains in the latter few years. It applauded the decision in 1920 against the Kansas Court of Industrial Arbitration and in many ways opposed the principle of compulsory arbitration strenuously. A constructive feature of the Federation's policy was its aid to coöperative schemes and its promotion of friendliness with farmers' organizations. A legal achievement was the clause that Congress put in the Clayton Antitrust Law in 1914, a recognition of the principle that the labor of a human being is not a commodity or article of commerce, and thus a guarantee of certain rights in connection with labor organization and the use of the boycott. Among the measures of broad social import advocated by the Federation were the restriction of immigration; gradual reduction of army and navy; regulation of large industries; extension of popular control of government; limitation of the power of the Supreme Court; and an amendment to the Volstead Act permitting the manufacture and sale of beer. It pro-

tested against the ship subsidy bill and military education in the schools. It expressed an unfavorable opinion of the Ku Klux Klan as an unconstitutional organization and a detriment to labor and declared against the alleged discrimination against Jews at Harvard, although after an investigation the Federation held that such discrimination was nonexistent. In connection with negro labor, an effort was made to prevent the drawing of a color line, and a special organizer was sent to work among the negroes in the South. The Federation officially declared its sympathy with India and Ireland; it favored the entrance of the United States into the League of Nations and the World Court.

Although the Federation sent no representative to the Inter-Allied Labor Conference at London in 1918 or to the conference in Berne after the Armistice, although its proposition for an inter-Allied labor conference at Paris was not accepted, and although it could not be officially represented at the meeting of the Labor Department of the League of Nations at Washington in 1919, its international relations widened appreciably during these years. In 1916 steps were taken to cultivate friendly relations with organized labor in Mexico, South America and Japan. A Pan-American Federation of Labor Conference Committee was created in that year. In 1918 small groups were sent to Europe to confer unofficially with organized labor in Allied countries, and in 1919 the Federation was represented at the International Trade Union Conference in Amsterdam. While the peace terms were under discussion, the Federation formulated its official attitude on the matter; this was based largely on the declaration of President Wilson, which included in its suggestions that the treaty bar from shipment in international commerce all products involving the labor of children under 16 and that it declare for the basic standard of an 8-hour day. In 1923, affiliation with the International Federation of Trade Unions was strongly recommended.

LABOR ARBITRATION. The decade after 1914 witnessed an increased recognition of the imperative necessity of applying methods of arbitration and conciliation to industrial disputes. Concentrated efforts were made during that period to prevent by the wider use of arbitration the harmful effects of strikes, lockouts and other violent means of settling industrial controversies, and, although many attempts were unsuccessful, there were marked advances toward industrial peace. Public opinion at least had been awakened to the undeniable desirability of the substitution of peaceful action for violence. The more complex nature of industrial problems in the later years, the importance of unobstructed production during the War, the stronger organization and the increased sense of power of the trade unions, the unsettled industrial conditions after the War and the resulting unrest, the growing demands on the part of the workers, the steadily increasing specialization and interconnection of industries, all combined to bring about a realization of the impracticability of labor arbitration. This realization found expression not only in governmental action, but also in numerous attempts on the part of employers and employees to find a *modus vivendi* in industry. Thus the decade was characterized by a constantly increasing number of trade union agreements making pro-

vision for various methods of conciliation.

The United States. During 1914 a number of serious strikes and labor disputes were successfully settled by arbitration. The most important event of that year in arbitration legislation was the enactment by Alaska of an elaborate law relating to the adjustment of trade disputes. In 1915, a year of many strikes, the Department of Labor offered its services as mediator in 32 labor controversies, of which 24 were amicably settled, the most important being the Western Railroad case. In the same year, Colorado passed a law setting up an industrial commission with wide powers to arbitrate. John D. Rockefeller, Jr., advanced his Industrial Representation Plan, a comprehensive scheme for the handling of all relations between employers and employees. Of far-reaching importance was the effective trade agreement made in the New York clothing industry, whereby a two years' peace was established. The year 1916 brought an increase in sentiment for the amicable settlement of labor disputes, which was manifested in the various attempts to terminate by arbitration the troublesome strikes and conflicts of that year, and in the arbitration machinery agreed upon between the Boston Elevated Railroad Company and its employees, and in another case between the Hart, Schaffner and Marx Company in Chicago and the Amalgamated Clothing Workers. But the most notable event of the year was the passage by Congress of the Adamson Eight Hour Law. After unsuccessful attempts at arbitrating the disputes which threatened to bring about a strike of the four railroad brotherhoods, a law was passed providing that after Jan. 1, 1917, "eight hours shall, in contracts for labor and service, be deemed as a day's work," and empowering the President to appoint a commission of three to investigate for a period of six years the workings of the law. Opponents of the Adamson Law criticized it as being a result of intimidation by the brotherhoods and as imperiling the principle of arbitration. On Dec. 5, 1916, President Wilson made a plea for full public investigation of industrial disputes as an effective means for the prevention of strikes. With the entrance of the United States into the War, prevention of labor disputes became especially urgent and a labor policy toward that end was entered upon by the government. As a consequence, the Committee on Labor of the Advisory Commission of the Council of National Defense began in June, 1917, the establishment of local committees of mediation and conciliation, composed of representatives of the employers, the workers, and the general public. In August of the same year an important agreement was reached between the government and the international unions engaged in American shipyards. Under this compact a National Board of Adjustment was created as the final arbiter as to wages, hours, and conditions of work, and the unions agreed not to strike as long as the agreement was in force. The final step of the government in the prevention of strikes was the creation of a National War Labor Board in April, 1918. The functions of this board were to be: to bring about the settlement of labor disputes by mediation and conciliation in all industries essential to the effective conduct of the War, to establish the necessary machinery for this purpose, and in case of failure of local mediation to carry on

the arbitration themselves. The board was to be composed of five representatives of the employers' organizations, five of the A. F. of L., and two impartial chairmen, one for the employers and the other for the workers. The board served successfully as a means of settling disturbing labor troubles during the War. The year 1918 saw also the Altschuler award in the Chicago packing industry, which provided machinery for the settlement of grievances and under which the workers bound themselves not to strike pending the attempts at peaceful settlement of their disputes. The very serious industrial troubles which broke out after the Armistice led to the calling by President Wilson of the First Industrial Conference on Oct. 6, 1919, for the purpose of considering the fundamental means of bettering the whole relationship between capital and labor. After its failure the Second Industrial Conference was called, which presented on Dec. 28, 1919, a plan proposing the establishment of a National Industrial Tribunal and of Regional Boards of Inquiry and Adjustment. On Mar. 1, 1919, the conference issued its final report, in which it recommended as the best means for the prevention of industrial conflicts such agencies as had already been established in various trades; namely, shop committees and councils, work councils, etc., and, in case these failed, adjustment by the above-mentioned boards. The programme of the conference did not, however, find practical application, although mediation through the government had proved rather successful during the War. Arbitration was resorted to with satisfactory results in a number of important disputes during 1921. A case in the packing industry was adjusted by a conference in Washington of the representatives of the employers and employees and the Secretary of Labor. The executive council of the International Typographical Union decided to maintain arbitration in the printing industry in New York and to submit its wage disputes to arbitration. On Jan. 1, 1921, the Pennsylvania Railroad system set up a joint reviewing committee "for the amicable settlement, by joint conference, of all controversial questions affecting the engine and train service men." A Court of Industrial Relations on the principle of compulsory arbitration was created in Kansas, in 1920. The court affected a number of industries and was composed of three judges appointed by the governor. It was given wide powers, such as to make reasonable awards, investigate industrial conditions, bring suit in the Supreme Court of the State to enforce obedience to its orders, and to take over and run industries in case of emergency and limitation or actual suspension of production. Organized labor was strongly opposed to the court and serious difficulties arose from the conflict between the court and the trade unions in the State. In 1923, the United States Supreme Court unanimously held wage fixing by the Kansas court to be unconstitutional. (See KANSAS.) Machinery for the adjustment of labor disputes on the railroads was set up under the Transportation Act which was passed by Congress in February, 1920. The act provided for the settlement of controversies and grievances between the railroad workers and the managements by the establishment of the United States Railroad Labor Board, which is composed of nine members, appointed by the President. The Board attempted unsuccessfully

to arbitrate in the great strike of the railway shopmen in 1922. Perhaps the most comprehensive means for the peaceful settlement of industrial disputes existed in the agreements between the Amalgamated Clothing Workers and the clothing manufacturers. Especially notable here is the Trade Board established in Chicago, consisting of two representatives of the union, two of the employers, and an impartial chairman. Practically all the decisions rest virtually with the chairman.

Great Britain. Due to the powerful organization of British labor, methods of arbitration have progressed further in Great Britain than in the United States. A great advance was made in the former country by the establishment of the Industrial Council, which was composed of 13 representatives of the employers, an equal number of representatives of the workmen, and Sir George Askwith as impartial chairman. The latter arbitrated in 1914 the strike of the unskilled workers near Birmingham. At the Treasury Conference of 1915, the trade union officials and the government concluded an agreement for the purpose of regulating the relations between employers and workers for the duration of the War. The compact stipulated that all disputes should be settled by conferences between the parties or, in case they failed to agree, by three other possible means of arbitration. The miners were the only ones who remained outside of this pact. The Treasury Agreement, however, did not prevent serious unofficial strikes during the remainder of the War. The establishment of the Joint Industrial Councils during the latter part of the War and immediately after the Armistice served effectively to preserve industrial peace in a great number of trades. Probably the most important measure, however, regarding the relations between capital and labor was the Industrial Courts Act of 1918. It created a standing Industrial Court, composed of independent persons and representatives of the employer and employees, all of them appointed by the government. The court is a permanent industrial tribunal and as such has settled a great number of disputes by making awards, the most important of which was the Dockers' Court of Inquiry early in 1920. Although the court has no power to compel compliance with its decisions, the number of awards repudiated by the losing side has been negligible. The most momentous single arbitration case in Great Britain was the Coal Commission of March, 1919, which was set up on the demand of the miners for the six-hour day, higher wages, etc. It consisted of six representatives of the miners, six of the mine owners, and an impartial chairman, and dealt with wages, hours, and nationalization of mines. The interim report on wages and hours was published in three parts: The part that called for the seven-hour day, and which was signed by the chairman and three representatives of the employers, was adopted by the government. None of the reports on nationalization were put into effect. It may be said that with the trade boards, the Industrial Court, and the joint industrial councils, Great Britain had three effective agencies for the prevention of industrial disputes by arbitration. See STRIKES AND LOCKOUTS.

LABOR BANKS, UNITED STATES. That extension of the principle of coöperation (q.v.) which led to the establishment by labor of co-

operative banks did not take definite hold in the United States until 1920. The first bank in

Labor Review of the United States Department of Labor, July, 1924:

FINANCIAL STATISTICS OF LABOR BANKS
IN THE UNITED STATES

Controlling body and name of bank	Date of state-ment	Capital	Surplus	Undi-vided profits	Deposits	Assets
<i>In operation</i>						
Amalgamated Clothing Workers:						
Amalgamated Trust & Savings Bank, Chicago	1924 Mar. 31	\$200,000	\$100,000	\$17,705	\$1,895,688	\$2,257,302
Amalgamated Bank of New York	Apr. 14	200,000	75,000	43,419	2,790,651	3,114,403
Brotherhood of Locomotive Engineers:	1923					
Federal Bank & Trust Co., Birmingham	Dec. 31	125,000	12,500	8,664	515,576	664,464
Labor National Bank, Three Forks, Mont.	..do..	25,000	5,000	.....	85,013	.....
People's Cooperative State Bank, Hammond, Ind.	..do..	50,000	12,500	5,554	1,167,885	1,289,259
Engineers' Cooperative National Bank, Cleveland	1924 Feb. 20	1,000,000	236,467 ^a	(^b)	23,354,619	26,101,532
Cooperative Trust Co., New York City	Mar. 14	500,000	250,000	.....	1,400,000	2,150,000
Brotherhood Cooperative National Bank, Spokane	Mar. 31	200,000	74,941 ^a	(^b)	1,032,474	1,307,415
Nottingham Savings & Banking Co., Cleveland	..do..	75,000	.....	6,944	578,140	664,649
Transportation Brotherhoods' National Bank, Minneapolis	Apr. 1	200,000	35,574 ^a	(^b)	1,312,863	1,621,638
International Ladies' Garment Workers' Union:						
International Union Bank, New York City	Mar. 20	250,000	214,830	.....	1,401,522	1,872,461
International Association of Machinists:						
Mount Vernon Savings Bank, Washington, D. C.	1923 Dec. 31	160,000	65,000	13,114	2,276,357	.....
Order of Railway Telegraphers:	1924					
Telegraphers' National Bank, St. Louis	Mar. 31	500,000	87,732	.....	4,187,694	4,979,827
Brotherhood of Railway and Steamship Clerks:						
Brotherhood of Railway Clerks' National Bank, Cincinnati	1924 May 10	200,000	50,000	.....	1,505,000	1,835,070
Miscellaneous:						
Cooperative Bank & Trust Co., Tucson, Ariz.	1923 Dec. 31	70,000	.....	1,255	156,148	235,903
Federation Bank of New York	1924 Mar. 20	250,000	215,707	.....	4,009,348	4,510,157
Producers' & Consumers' Bank, Philadelphia	Dec. 31	203,630	21,751	10,883	1,274,401	1,669,815
San Bernardino Valley Bank, San Bernardino, Calif.	Mar. 31	175,000	15,000	8,671	1,417,394	1,617,216
United Labor Bank & Trust Co., Indianapolis	..do..	114,700	.....	1,751	262,302	388,753
Bakersfield National Bank, Bakersfield, Calif.	(^d)	(^d)	(^d)	(^d)	(^d)	(^d)
Brotherhood Savings & Trust Co., Pittsburgh	(^d)	(^d)	(^d)	(^d)	(^d)	(^d)
<i>Projected</i>						
Brotherhood of Locomotive Engineers:						
Bank & Trust Co., Boston	.....	500,000	100,000	.....	.....	.....
International Brotherhood of Boilermakers:						
Brotherhood State Bank, Kansas City, Mo.	.....	.....	.....	.....	.....	.....
Cooperative National Bank, Tacoma, Wash.	.....	.....	.....	.....	.....	.....
Farmers' & Workmen's Savings Bank, Jackson, Mich.	.....	.....	.....	.....	.....	.....
Farmers' Union State Bank, Kansas City, Kans.	.....	100,000	50,000	.....	.....	.....
Fraternity Trust Co., Harrisburg, Pa.	.....	200,000	.....	.....	.....	.....
People's Bank & Trust Co., Los Angeles	.....	.....	.....	.....	.....	.....

^a Includes undivided profits.

^b Included with surplus.

^c Has branches at Barstow and Needles, Cal. According to the *Labor News* (Eureka, Cal.) Jan. 19, 1924, this bank plans to build up a chain of banks throughout the State.

^d No data available.

^e Bank has received its charter.

^f The *Leather Workers' Journal*, May, 1924, p. 106, states that this bank is officered by union labor.

^g The April number of the *Brotherhood of Locomotive Firemen and Enginemen's Magazine* states (p. 180) that this bank was to open its doors about April, 5, 1924. Charter granted.

this country to be owned and controlled by a labor organization was the Mt. Vernon Savings Bank, Washington, D. C. (1920). In that year also, the Brotherhood of Locomotive Engineers founded at Cleveland, Ohio, what was then said to be the only national bank in which depositors shared earnings. The success of this considerable venture (in 1924 it still had the largest total resources of any single labor bank in the United States) stimulated the establishment of similar institutions. The rapid expansion of the movement in the succeeding years is shown by the accompanying table, from the *Monthly*

The labor bank is distinguished from the ordinary commercial bank chiefly in that (1) it is owned and controlled by labor; (2) it limits the dividend payable to stockholders to 10 per cent; (3) it pays a higher rate of interest on deposits (generally 4 per cent on savings, and 2 per cent on checking accounts above \$500), and computes interest from the first day; and (4) it pays to the depositor, over and above interest, dividends from its net earnings. The labor bank is chartered in the regular way, under State or Federal laws, and is subject to the usual strict examination. Control rests

with the labor union (or unions) and its membership: (a) through possession of the majority of the voting stock of the bank; and (b) through union officials and other men in sympathy with labor, who constitute the majority of the officers and board of directors. The labor union itself as an organization operates the bank, assuming the usual financial liability to depositors. Business and administrative affairs are in the hands of experienced bankers, acting with the trade union officials. The fact that labor leaders in the banks were not only legally responsible as bank officials but were also responsible to the labor organizations, made for unusual care in choosing competent bankers to administer affairs, and so for conservative policies. The temptation to take risks was further lessened by the limitation on the number of shares to be owned by an individual, usually to three. Without any known exception, labor banks up to 1924 were having considerable financial success. Notwithstanding the limitation on dividends, the market value of labor-bank stocks was above par.

In addition to offering unusual advantages to the depositors and stockholders, the labor bank was a source of strength to the trade union. For one thing, it earned for the union, on its defense and insurance funds, a profit in excess of the interest that these funds ordinarily drew from commercial banks; and not only was it able to supply funds for the sound enterprises of other unions or coöperatives which might otherwise be left unaided, it was in a position to discriminate in granting its loans between employers who were favorable and those who were unfriendly to labor. Moreover, the existence of the labor bank weakened the pressure that commercial banks might exert on individual employers during strikes, by withholding credit. A number of the labor banks were depositories of State and city governments and members of the Federal Reserve system. By the close of 1923, the sum total of labor-bank resources in the United States (exclusive of the Brotherhood Investment Company) was estimated by the *American Labor Year Book* at approximately \$50,000,000. The Brotherhood Investment Company, with a capitalization stock of \$10,000,000, was chartered in 1922 for the purpose of buying and holding stocks of banks and trust companies, and dealing in high-grade investment securities. This institution, because of the scope of its activities, could participate in large-scale financial operations. Although about 20 per cent of its stock was in the hands of other than workmen, the Brotherhood of Locomotive Engineers as an organization was in possession of 51 per cent of the voting stock.

LABOR LEGISLATION. Although America's first labor law was enacted 88 years ago, when Massachusetts set up an educational requirement for working children, and although the development has continued steadily since that time, by far the greater part of effective labor legislation is the fruit of the past decade (1914-24).

A significant forward step is the constitutional amendment recently passed by Congress which, if it is accepted by three-fourths of the States, will make it possible for that body to enact laws regulating child labor throughout the country. This came after two attempts of the Federal legislature to restrict the labor of

children, both of which were declared unconstitutional by the Supreme Court (see CHILD LABOR).

There are now eight more laws than there were in 1914 (making a total of 15), which either fix a minimum standard of wages for children and women or provide for the setting of such a standard. These laws have been passing through a period of economic trial and judicial test somewhat like that which marked the path of the early hour legislation. In fact, the constitutionality of even the Massachusetts law—which makes no compulsion but calls only for the publication of the names of those employers who do not comply with it—has recently been attacked by a Massachusetts court (see MINIMUM WAGE). There has also been progress in the regulation of the form and method of wage payments and establishment of wage preferences and mechanics' liens.

During the decade, 25 additional States, Porto Rico and the District of Columbia, have limited the number of hours that women may work or have prohibited night work, while many of the older laws have been made more stringent and more definitely enforceable. There are now only four States in the country—Alabama, Florida, Iowa, and West Virginia—that have no law whatever to regulate the hours of work for women (see HOURS OF LABOR AND WOMEN IN INDUSTRY). Legal regulation of men's working hours has by no means been confined to public works and public utilities—although during the past decade many laws have been passed regarding hours in public employments. Legislation limiting the hours of men in dangerous private employments has made a considerable advance. Oregon has recently moved on to the eight-hour day in the lumbering industry, but with a reciprocal provision that the new law goes into effect only after adjoining States have adopted the same restriction (see HOURS OF LABOR).

The first accident-reporting law dates from 1886, but most of the scientific gathering of accident statistics is the work of the past decade. The first law requiring safety devices in factories was adopted in 1887, but it is only within about 10 years that universal progress has come in accident prevention. Mining codes have also been enacted or improved, while during the year 1924, the Industrial Commission of Utah, after a mine explosion at Castle Gate which took 172 lives, adopted a set of mine safety regulations unique in its comprehensiveness and in its application of the best thought on the subject. Much public interest in industrial hygiene was manifested in the year immediately following 1910, but since 1914 most of the States have adopted new regulations of factory sanitation and ventilation or improved their former laws.

The past decade saw the successful operation of a Federal Employment Service for about a year and a half during the War, and a subsequent decline in its effectiveness through enormously reduced appropriations. It has witnessed as well the establishment of many State public employment services and a considerable development in the regulation of private fee-charging bureaus. Three States, by specific law, have officially recognized the importance of long-range planning of public works to provide employment in periods of business depression (see UNEMPLOYMENT).

Another important development during the last 10 years is the advance in legislation providing accident compensation for those injured in the course of employment. Since 1914, 22 State compensation laws have been enacted, and most of the older laws of the country have been liberalized in one way or another since they were originally passed (see **WORKMEN'S COMPENSATION**). In addition, 36 States have, within four years, voted to cooperate with the Federal government in the vocational retraining of industrial cripples.

As an outgrowth of the same social spirit within the past year, pioneer legislation in three States has established old age pensions. (See **OLD AGE PENSIONS**.) Mothers' pension systems are now in operation in 43 States and Territories while 40 States have accepted the Federal appropriation for maternity protection offered by the Sheppard-Towner Act of 1921. See **MOTHERS' PENSIONS** and **MATERNITY PROTECTION**.

The legislation affecting collective bargaining has not been of great importance. The power of the Kansas Court of Industrial Relations compulsorily to arbitrate conflicts between employers and employees was practically annulled by a recent United States Supreme Court decision. (See **LABOR ARBITRATION**.) A number of States during the War and shortly after enacted laws defining and penalizing criminal syndicalism and sabotage; but several States also officially recognized trade unions and declared human labor is "not a commodity." See **TRUSTS**.

One of the outstanding developments of the decade has been in the field of labor law enforcement and administration. All States now have some provision for the special administration of labor legislation, while most of them have some central body for the purpose. In five States, industrial commissions modeled after that of Wisconsin not only enforce the labor law but issue orders which have the compulsion of law, after the Legislature has laid down the general principles which the regulations are to follow. An industrial commission, which also makes constant investigations, is in a far better position to determine the detailed application of a statute than is a body of miscellaneous legislators meeting but once in two years.

The principal hindrances to labor legislation in the past have been (1) the opposition of business interests; (2) the after-war reaction, and (3) adverse court decisions. Fourteen times during the past 10 years, the United States Supreme Court has decided cases affecting labor by four-to-five or by four-to-four decisions.

Helpful influences in labor legislation include (1) the more general spread of knowledge of the need and practicability of legal protection; (2) the development of effective scientific propaganda organizations such as the Consumers' League, the Child Labor Committee and the American Association for Labor Legislation; (3) the more active participation of women in public activities; and (4) the application of Federal-State financial cooperation which had within three years led to the adoption of vocational rehabilitation of industrial cripples by three-fourths of the States and the rapid extension of maternity protection in an even greater number of jurisdictions.

A brief survey is sufficient to show how modern indeed is most of our labor legislation.

Probably all of it is in need of improvement today, but considering the rapidity with which fundamental changes in legislation have spread over the country during the past 10 years the prospect seems favorable for future advances wherever the need is clear and the opportunities for public enlightenment are available. See **IMMIGRATION**.

Supreme Court Decisions. Decisions by the United States Supreme Court have shown an increasing tendency to overrule legislation for the protection of labor and to curtail labor's organized activities. In the later years many important decisions were handed down by a closely divided court. A survey made by the United States Bureau of Labor Statistics of the decisions by the Supreme Court, in which cases affecting labor were involved, disclosed the fact that within 40 years there had been 21 cases decided by a vote of four to five or four to four; 13 of these, or nearly two-thirds of the total, falling within the last 10 years. It appeared that members of the Court were with increasing frequency unable to agree as to whether or not an act of legislation is "plainly and palpably, beyond all question, in violation of the fundamental law of the Constitution."

Many of the Court's decisions in the early years of the decade 1914-24 were favorable to labor, particularly in the field of protective legislation, but in the later few years measures of far-reaching importance to the welfare of wage-earning men and women were nullified by the opinions of a bare majority of the court.

Perhaps the most important favorable decisions of the Supreme Court during this period were those in favor of the constitutionality of workmen's compensation laws. In giving its final assent to this form of protective legislation the Court took the advanced ground of upholding laws providing for compulsory and exclusive State funds for workmen's accident insurance. In its decision sustaining the 10-hour day for factory employees in Oregon the court for the first time recognized the power of a State to enact laws limiting the hours of work of men in private employments as well as of women and children. In the Adamson eight-hour law decision of 1917 the court held that Congress had the power to limit the number of hours to eight for trainmen engaged in interstate commerce. A New York law prohibiting night work of women in restaurants was upheld as was also a law of Oregon establishing a minimum wage for women and minors (see **MINIMUM WAGE**).

On the other hand, the Supreme Court in a third dividend decision finally blocked the efforts of Congress to provide accident compensation for longshoremen and other local harbor workers under State laws. In two decisions it nullified attempts by Congress to abolish child labor (see **CHILD LABOR**) and in another later decision which aroused widespread interest it declared unconstitutional a Federal law providing a minimum wage for women and children in the District of Columbia.

Among the important decisions of the Supreme Court which tended to weaken organized labor in the field of collective bargaining were those in the so-called Danbury hatters' and Arkansas coal miners' cases which established the principle that labor unions and their individual members are responsible, without limit, for

the unlawful actions of the union officers and agents which they have in any manner authorized or sanctioned; the *Coppage vs. Kansas* decision which declared unconstitutional a State statute aimed to prevent an employer from forcing his employee to agree not to join a trade union during his term of service; the *Hitchman Coal and Coke Company vs. Mitchell* decision which held that where an employer has compelled all of his employees to sign a contract that they will not join any labor union, it is illegal to make any effort to organize them; the *Duplex Printing Company* decision in which the court clearly distinguished for the first time between "primary" and "secondary" boycotts, and declared that the Clayton amendment to the Sherman Antitrust law had not legalized the secondary form; the *United Mine Workers of America vs. Coronado Coal Company* decision in 1922 which held that trade unions are suable in their own names—the first case of importance in America permitting a suit against an unincorporated union.

The fact that an increasing number of far-reaching decisions of the Supreme Court in cases affecting labor had checked protective legislation and trade union activities—and had been handed down by a closely divided court—made a political issue of the contention that the Court is the chief obstacle to social progress in America and that action should be taken by Congress to limit the power of the Court to pass upon the constitutionality of laws. See *LAW, PROGRESS OF THE*.

LABOR OFFICE, INTERNATIONAL. See *LABOR ORGANIZATION, INTERNATIONAL*.

LABOR ORGANIZATION, INTERNATIONAL. One of the most significant and novel features of the Paris peace settlement of 1919 was the incorporation as Part XIII of the Treaty of Versailles of a special Labor Convention setting forth a charter of principles for labor legislation and providing for the establishment of a permanent International Labor Organization. This labor section of the treaty represented a signal triumph for the cause both of internationalism and of labor. A commission on international labor legislation, with 15 members including such prominent leaders as Samuel Gompers, the Anglo-Jewish president of the American Federation of Labor, and Vandervelde, the patriotic Belgian Socialist, was appointed by the Peace Conference in January, 1919, to formulate suitable treaty provisions for labor welfare and unemployment. The Commission made its report on March 24. Following detailed consideration and revision by the Council of Four, this report was adopted on April 11. It consisted of two parts, one creating a permanent organization for international labor legislation and the second enunciating a veritable bill of rights for labor. Recognizing that the existence in the various countries of special circumstances arising from differences of climate, habits, and customs of economic opportunity and industrial tradition made strict uniformity in the conditions of labor difficult of immediate attainment, the essential methods and principles were affirmed to be: (1) consideration of labor not as a commodity; (2) right of association for lawful purposes for both employers and employees; (3) payment of a wage adequate to maintain a reasonable standard of life; (4) adoption of an 8-hour day or 48-hour week; (5) adoption of a weekly

rest of at least 24 hours, including Sunday whenever practicable; (6) abolition of child labor and continuation of the education and proper physical development of children; (7) equal remuneration for men and women for work of equal value; (8) equitable treatment in every country of all workers lawfully resident therein; and (9) adequate systems of inspection in which women should participate, to insure enforcement of protective regulations. These aims and purposes were sanctioned in the League of Nations Covenant (Article XXIII, Section A).

The machinery of the International Labor Organization as created by the Convention embraced two major organs, a periodic International Labor Conference and a permanent International Labor Office. The Conference, composed of four delegates from each member-state, two appointed by the government and one each by the most representative organizations of employees and workmen respectively, was to meet at least once a year, to consider labor problems, to discuss standards of labor welfare, to debate feasible measures for the attainment and maintenance of these standards, and to formulate decisions either as conventions for ratification or rejection by the national parliaments of the world, or as recommendations to be submitted to and considered by these national parliaments or local legislatures. These conventions might then be executed by means of appropriate domestic legislation. Up to July, 1924, the Labor Conference had met six times. The first meeting was held at Washington, D. C., Oct. 29–Nov. 29, 1919. Though the United States was not officially represented, 121 delegates from 39 other countries were in attendance. Germany and Austria were admitted to membership by a vote of 71 to 1. Six draft conventions and six recommendations were adopted; the most noteworthy achievement was an 8-hour day convention. The other conventions dealt with unemployment, care of female workers in industry before and after childbirth, prohibition of nocturnal employment of women in industry, prescription of a minimum age of admission of children to employment, and the prohibition of night employment for children under 18. The second session was held at Genoa, Italy, in June, 1920, when 27 nations were represented by specialists competent to deal with conditions of maritime labor. Three conventions were adopted, dealing with seamen's employment agencies, payment of unemployment insurance in cases of shipwreck, and prescription of a minimum age of 14 years for employment of boys at sea; recommendations were also made on unemployment insurance, enactment of national seamen's codes, and regulation of hours of work in the piscatorial industry and inland navigation. A Permanent Joint Maritime Commission was constituted to further the work of improving maritime labor conditions. The third session of the Labor Conference held at Geneva, Switzerland, during October, 1921, dealt mainly with problems of agricultural labor. Strenuous French objections to any consideration of these problems as alien to the jurisdiction of the Labor Organization were overruled and subsequently the Permanent Court of International Justice at its first session in July, 1922, definitely established the competence of the Conference. A whole series of conventions and recommendations were adopted dealing with

labor in general and specifically extending to agriculture. Legislation had hitherto been restricted rather narrowly to urban industrial labor. These 1922 measures included limitation of hours of labor, unemployment insurance, improvement of working conditions, and protection of women and children. The fourth annual meeting, at Geneva in October, 1922, adopted a recommendation calling for more adequate and accessible information regarding transit and migration of persons from one country to another. Also adopted for submission to the League of Nations was an amendment to Article 393 of the Treaty of Versailles; it elaborated and liberalized somewhat the governing body thereby set up to control the International Labor Office. The fifth session, held in October, 1923, was principally concerned with the general principles of the organization of factory inspection. At the sixth session, in June, 1924, great satisfaction was expressed at the steadily improving industrial conditions of Europe.

The International Labor Office was subjected to the control of a governing body of 24 members appointed annually by the International Labor Conference; the 1922 amendment had proposed a body of 32 triennially selected members at least 12 of whom should be non-European. This body had the functions, first, of preparing the agenda of the Conference; secondly, of conducting the correspondence and negotiations involved in the execution of its decisions; and thirdly, of making technical investigations and collecting and disseminating general information about labor conditions in all parts of the world. Organized first at London in January, 1920, the Labor Office was in July, 1920, transferred to the seat of the League of Nations at Geneva; for the Labor Organization, although autonomous, was placed under the aegis of the League and was to be supported financially by grants of money made by the League Assembly. The first director of the Labor Office was Albert Thomas, the French Socialist and labor leader, who had been an exceedingly capable Minister of Munitions during the War. Under his able supervision an administrative staff of some 350 experts, men and women from 28 countries, was recruited and trained.

LABOR ORGANIZATIONS. See **TRADE UNIONISM.**

LABOR PARTY, AUSTRALIAN. See **AUSTRALIA.**

LABOR PARTY, BRITISH. See **GREAT BRITAIN; SOCIALISM, Great Britain.**

LABRADOR. A dependency of Newfoundland, and the most easterly part of the British North American mainland; area, 120,000 square miles; population, 3621 in 1921, as compared with 3905 in 1913. The leading activities of the population, mostly Eskimos and Indians with some whites, continued to be the fisheries and fur trapping. The Revillon Company appeared during the period to contest the supremacy of the Hudson's Bay Company in the field. The Grenfell Mission among the whites, and the Moravian Brethren among the Eskimos to the north, continued to make life supportable for the population. An attempt was made toward the settlement of the long-outstanding boundary dispute between Canada and Newfoundland in this region by the decision on the part of both governments in 1920 to submit the matter to the British Privy Council. A survey commission in December, 1920, revealed the importance

of the contested region by the discovery of rich forest lands and mineral areas.

LADD, ANNA COLEMAN (MRS. MAYNARD LADD) (1878-). An American sculptor, born in Philadelphia, Pa., who studied in Paris and Rome and in 1915 was elected an associate member of the National Society of Sculptors. One of her masters was Charles Gaffey, an able technician. In most of her figures, Mrs. Ladd is concerned with the proper disposition of light by means of the modeling. Her work has strength and originality, and her preference is for imaginative subjects. She has, however, executed many successful portrait busts and bas-reliefs. Among her sculptures are: the "Spirit of Serbia," exhibited at the Rhode Island School of Design, "Bronze Lady," at the Gardner Collection, Boston, "Wind and Spray," in the Borghese Collection at Rome and the fountains in the Boston Public Gardens. During 1918, Mrs. Ladd conducted a studio in France for portrait masks for mutilated soldiers.

LAESSLE, ALBERT (1877-). An American sculptor, born in Philadelphia, Pa., who studied at the Spring Garden Institute, Drexel Institute and the Pennsylvania Academy of Fine Arts. He was a pupil of Charles Gaffey and studied in Paris with Michel Béquine. He is best known for his studies of animal life, of which good examples are to be found in the Pennsylvania Academy of Fine Arts where three of his sculptures, "Turtle and Lizards," "Blue-Eyed Lizard," and "Chanticleer" are to be found. At the Carnegie Institute, Pittsburgh, his study, "Heron and Fish," is on exhibition. Other examples of his work are "Victory" and "Turning Turtle" at the Metropolitan Museum, New York, "Penguins" at the Philadelphia Zoological Gardens, "The Bronze Turkey" and "Billy" at the Philadelphia Art Club, and three small bronzes, "An Outcast," "Locust and Pine Cone" and "Frog and Katydid" at the Peabody Institute, Baltimore.

LA FARGE, CHRISTOPHER GRANT (1862-). An American architect (see VOL. XIII). From 1910 to 1915 he was a member of the firm of La Farge and Morris, and in 1918 became investigator and later assistant general manager of the United States Housing Corporation in Washington. He was an Associate of the National Academy and was former president of the Architectural League of New York. He was also a member of the Advisory Board of the School of Architecture of Princeton University and of the Advisory Council of the School of Architecture of the Massachusetts Institute of Technology. He was made honorary M. F. A. by Princeton in 1921.

LAFAYETTE COLLEGE. A college and school of engineering for men at Easton, Pa., founded in 1826. The institution grew steadily during the decade 1914-24, with an enrollment of 580 at the beginning of that time as compared with 970 at the close, a faculty of 50 members as compared with 80 in 1923-24, and a library of 30,000 volumes as compared with 57,000 volumes. The productive funds were increased from \$770,000 in 1917 to \$2,000,000 in 1923-24, largely through a \$1,000,000 endowment campaign in 1920; and the Helen H. P. Manson chair of Biblical literature, the Fred Morgan Kirby professorship of civil rights, the Simon Cameron Long professorship of civil engineering, and the John D. and Frances H.

Larkin professorship in chemistry were endowed during the period. Nine acres were added to the campus in 1922, and a new gymnasium costing \$325,000 was completed in 1924, as a memorial to Lafayette men in the War. President, John Henry MacCracken, Ph.D., LL.D.

LA FOLLETTE, ROBERT MARION (1855-). United States Senator from Wisconsin (see VOL. XIII). He was reelected successively from 1910 to 1923, and during that entire period dominated the Republican party in Wisconsin. He actively opposed, in 1916-17, all war preparations, and an attempt was made by the legislature of Wisconsin to deprive him of his office as Senator (see WISCONSIN). In spite of these efforts, he was reelected. Although he was absent from the Senate on account of illness for a large portion of the time in the latter part of the decade, his influence in the Senate continued to be great. In 1922, 1923 and 1924 he was able, by his control of so-called blocs in both the Senate and the House, to decisively affect the functioning of those bodies. In the Senate he controlled a group of members from the Western States who, in 1923-24, on account of the small margin between the Republican and Democratic membership, held the balance of power, and was able to affect legislation, to a large extent. This was true also in the House, where the Republican Representatives, from Wisconsin and other States, who were controlled by him were able, by combining with the Democratic party, to overthrow attempts of the Republican majority to pass important measures and to modify others. In 1924, he announced his candidacy for the presidency on an independent ticket. He had previously organized a so-called Conference for Progressive Political Action, composed chiefly of insurgent Republicans and Democrats and some members of the Farmer-Labor party. At a convention in Cleveland, in July, 1924, he was nominated for President. He also received the nomination of the Socialist party, although he had never been identified with Socialism. See UNITED STATES, *History*.

LA FOLLETTE SEAMEN'S ACT. See SHIPPING.

LAGERLÖF, (OTTLA LOUISA) SELMA (1858-). A Swedish novelist (see VOL. XIII) ranked among the greatest writers of her country. She took an active interest in communal affairs and served as member of the municipal council in her native county, Wärmland, where with the aid of the Nobel Prize, she realized the dream of her life by restoring the ancestral estate. After 1914 she published: *Astrid* (1914); *Dunnungen*, a comedy (1914); *Stenen i sjön* *Rotenen* (1914); *En Emigrant* (1915); *Silvergrievan* (1915); *Drinman* (1916); *Her Bannlyst* (1918), known in the English translation as *The Outcast* (1920); *En saga oom en saga och andre sagor* (1919); *Ingmarssönerna* (1919); *Zacharias Topelius* (1920).

LAHM, FRANK P. (1877-). An American airman, born at Mansfield, Ohio, educated in France and the United States Military Academy in America. He won the first Gordon Bennett Balloon Race at Paris in 1906 and the National Balloon Race in 1911. Also, he organized army air service in the Philippine Islands. He was on active duty in France, 1917-19, being in charge of the Air Service of the Second Army A. E. F. (1918-19). In 1922,

he was air service representative of the War Department.

LAIRD, JOHN (1887-). A British professor of philosophy. He was educated at the universities of Edinburgh and Cambridge. He became professor at Dalhousie University, Nova Scotia, in 1912 and was subsequently called to the chair of logic and metaphysics at Queen's College in the University of Belfast. He was the Mills lecturer for 1923-24 at the University of California. His writings include *Problems of the Self* (1917) and *A Study in Realism* (1920).

LAKE ERIE COLLEGE. An institution for women founded at Painesville, Ohio, in 1859. The number of students increased from 116 in 1914 to 186 in 1924, and the number of teachers on the faculty from 23 to 27. The library was recatalogued during the period and much dead timber withdrawn; it increased from 12,300 to 16,000 volumes. The productive funds rose from \$244,623 to \$365,340 and the annual income from \$59,388 to \$171,596. A gymnasium was built at a cost of \$181,863, a large residence hall was bought and converted into a dormitory, and a second was rented for the same purpose. A department of Spanish was created, and the department of psychology and education was separated from the department of philosophy. President, Vivian B. Small, LL.D., Litt. D.

LAKE FOREST COLLEGE. An institution at Lake Forest, Ill., founded in 1857. There were 230 students and 21 members of the teaching staff in 1923. The library contained 37,000 volumes. Between 1914 and 1924, there was a gain of \$400,000 in the endowment, and the Swift central heating plant was built at a cost of \$90,000. The curriculum was adapted to modern demands with the development of courses in business administration, leading to the degree of Bachelor of Business Administration. President, Herbert McComb Moore, D.D.

LAMARCK THEORY, MODERN VIEWS OF. See HEREDITY.

LAMB, ARTHUR BECKET (1880-). An American chemist, born at Attleboro, Mass. He was graduated from Tufts College in 1900, and studied chemistry at Harvard, Leipzig, and Heidelberg. He was instructor in electrochemistry at Harvard, after which he was assistant professor and professor of chemistry and director of the Havemeyer Laboratory of chemistry at New York University. In 1912, he returned to Harvard where he has held similar appointments. During the War he was the chief of the chemical defense division of the Chemical Warfare Service with the rank of lieutenant-colonel and later was also director of the Nitrogen Research Laboratory. His original studies have been varied and include researches on such topics as the dehydration of periodic acid, isomensin in conimoric acid derivatives, the potential of iron, equilibria among cobaltamines, removal of carbon monoxide from air, and active charcoal, on all of which he has published the results of his investigations. In 1917, he became editor of the *Journal of the American Chemical Society*.

LAMME, BENJAMIN G. (1864-1924). An American electrical engineer, born on a farm near Springfield, Ohio, and educated at the Ohio State University. He was one of the four greatest electricians of his time, ranking with Edison, Steinmetz, and Tesla. Beginning with the Westinghouse Company in 1889 at \$30 a

month, he became its chief engineer in 1903. He had been but six months in the employ of the company when he had designed the double-reduction gear-railway electric motor. Later he devised the great "umbrella" generators which made possible the use of the power of Niagara Falls, the high-tension system of power transmission, the alternating-current system, and many other outstanding inventions. He was also a great teacher, and inspired a vast number of investigators throughout the world and in 1923 the Ohio State University, in giving him the Joseph Sullivan Medal, pronounced him "the greatest living mathematician." During the War he represented the American Institute of Electrical Engineers on the Naval Consulting Board and was chairman of the Board's Inventions Committee.

LAMONT, THOMAS WILLIAM (1870-). An American banker, born in Claverack, N. Y. He was graduated from Harvard in 1892, and for a time was engaged in newspaper work. From 1903 to 1909, he was secretary and treasurer and vice president of the Bankers Trust Company. He joined the firm of J. P. Morgan and Company in 1911 and was also a director and official in many important financial corporations. During the Peace Conference in Paris, he was one of the chief financial advisers of the American delegation. He also took a prominent part in the discussions on reparations held in London in July and August, 1924. In 1912, he was elected an overseer of Harvard University.

LAND BANKS. See AGRICULTURAL CREDIT.

LAND GRANT COLLEGES. See AGRICULTURAL EDUCATION; AGRICULTURAL EXTENSION.

LAND RECLAMATION. See RECLAMATION, LAND.

LANDIS, KENESAW MOUNTAIN (1866-). An American jurist (see VOL. XIII). He served as judge of the Northern District of Illinois from 1905 to 1922, resigning in the latter year to accept the position of commissioner for the American and National Leagues of Professional Baseball Clubs, and National Association of Professional Baseball Leagues. In 1921, he acted as arbiter of building-trade disputes fixing the wage of all classes of building trades in Chicago.

LANDSBERGER, ARTHUR H. (1876-). A German writer, born at Berlin and educated at the universities of Berlin, Greifswald, Munich, Heidelberg and Paris. He spent some years in traveling and in 1907 joined Georg Brandes, Hugo von Hofmannsthal, Prof. Werner Sombart, Prof. Richard Muther and Richard Strauss in the establishment of the magazine *Morgen*, which during its comparatively brief existence was at the head of German periodical literature. He is the author of *Das Kind mit den Vier Müttern* (1911); *Hass* (1916); *Lache, Bajazzo* (1916); *Die Neue Gesellschaft* (1917); *Feldpostbriefe eines Englischen Offiziers* (1917); *Bei Seinen Leuten* (1917); *Teufel Marietta* (1918); *Der Fall Horn* (1918); *Abenteuer* (1918); *Frau Dirne* (1918); *Wie Satan Starb* (1919); *Miss Rockefeller Filmt* (1920); *Was die Nacht mir Zutrußt* (1920).

LANE, FRANKLIN KNIGHT (1864-1921). An American cabinet officer (see VOL. XIII). He was appointed Secretary of the Interior by President Wilson, in 1913, and during his tenure took an active part in many important measures, and was considered one of the most

efficient members of the cabinet. He gave especial attention to the conservation of public resources. He retired from office on Mar. 1, 1920, on account of ill health. Shortly after, he became vice president of the Pan-American Petroleum and Transport Company. His letters were published in 1922.

LANE, RALPH NORMAN ANGELL (1874-). An English author and lecturer (see VOL. XIII). Among his later writings are: *The Dangers of Half-Preparedness* (1916); *Why Freedom Matters* (1916); *War Aims* (1917); *The Political Conditions of Allied Success* (1918); *The British Revolution and the American Democracy* (1919); *The Economic Chaos and the Peace Treaty* (1919); *The Fruits of Victory* (1921).

LANG, COSMO GORDON (1864-). Archbishop of York. He was educated at Glasgow University and Balliol College, Oxford. After studying at the Inner Temple in London, from 1883 to 1889, he entered the church and was curator of Leeds from 1890 to 1893. He served as vicar of St. Mary's, Oxford, from 1894 to 1896, and was created Bishop of Stepney in 1900. From 1901 to 1908, he was canon of St. Paul's Cathedral, and in the latter year was appointed Archbishop of York. He visited the United States in 1918. His published writings include *The Miracles of Jesus, as Marks of the Way of Life* (1900); *Parables of Jesus* (1906); *The Opportunities of the Church of England* (1906). He received degrees from many universities.

LANGDON, STEPHEN HERBERT (1876-). An American Assyriologist. He was born in Michigan and studied at the State university, at Union Theological Seminary in New York, at Columbia University, the Sorbonne and Collège de France in Paris, Leipzig and Oxford. He was deacon of the Church of England in Paris, 1905, and after 1908 was Shillito professor of Assyriology at Oxford. He is the author of *Annals of Assurbanapal* (1905); *Les Inscriptions du Wadi Brisa* (1905); *Babylonia and Palestine* (1906); *La Syntaxe du Verbe Sumérien* (1907); *Summerian and Babylonian Psalms* (1909); *A Summerian Grammar and Chrestomathy* (1911); *Neu-Babylonische Königsinschriften* (1912); *Babylonian Liturgies* (1912); *Tammuz and Ishtar* (1914); *Summerian Epical and Liturgical Texts* (1915-17); *Le Poème Sumérien du Paradis* (1919); *Sumerian Liturgies and Psalms* (1919); and was editor of *Babyloniaca* (Paris, 1908-14).

LANGFELD, HERBERT SIDNEY (1874-). An American experimental psychologist. He was born on July 24, 1874, at Philadelphia, Pa., and was educated at Haverford College and the University of Berlin. In 1902-03 he served as Second Naval Attaché at the American Embassy in Berlin. He returned to academic work, and in 1910 became associated with the department of psychology at Harvard University. In 1919, he was appointed director of the experimental laboratory. His publications include, in addition to experimental monographs, a manual on *Experimental Psychology* (1916) and an empirical study of aesthetics *The Aesthetic Attitude* (1920).

LANGLEY AÉRODROME. See AÉRONAUTICS.

LANGLOIS, CHARLES VICTOR (1863-). A French historian, born at Rouen, and educated at the Lycée St. Louis in Paris. He was

admitted to the Ecole des Chartes, where he was graduated with honors. In 1912, he was appointed professor at the Faculty of Letters of the University of Paris and director of the national archives. He was admitted to the Institute of France in 1917 as a member of the Academy of Inscriptions and Belles Lettres. He was also member of the Commission for the Literary History of France. He was the author of: *Le Règne de Philippe III* (1887); *Les Archives de l'Histoire de France* (1891-93); *Manuel de Bibliographie Historique* (2 vols., 1896-1904); *L'Inquisition* (1902); *Histoire du Moyen Age* (1901); *Questions d'Histoire et d'Enseignement* (1902); *Histoire de l'Écriture en France* (1904); *Introduction aux Études Historiques* (1905; in collaboration with Professor Seignobos). The last-named work was translated into English.

LANGMUIR, IRVING (1881-). An American chemist, born at Brooklyn, N. Y. He was graduated at Columbia University and later studied in Göttingen, where he received his Ph.D. in 1906. He was instructor in chemistry at Stevens Institute of Technology but in 1912 became research chemist to the General Electric Company in Schenectady, N. Y., where he devoted much attention to the development of gas-filled tungsten lamps, besides electron discharge apparatus, and devised a high vacuum pump. These have gained for him the Nichols medal of the New York Section of the American Chemical Society in 1915 and in 1920, the Hughes medal of the Royal Society of London in 1918, and the Rumford medals of the American Academy of Arts and Sciences in 1920. During the War he made special experiments on devices for the detection of submarines at the Naval Experiment Station at Nahant, Mass. See CHEMISTRY.

LANDSOWNE, HENRY CHARLES KEITH, fifth MARQUIS OF (1845-). An English public official. He served as minister without portfolio in the Coalition Cabinet in 1915-16. At the end of the War he took a moderate attitude in regard to peace, and published several proposed plans, parts of which were incorporated in the Treaty of Versailles.

LANSING, ROBERT (1864-). An American lawyer and public official (see VOL. XIII). Shortly after assuming the office of counselor for the State Department, he succeeded William Jennings Bryan as Secretary of State, holding that office until 1920, when he was dismissed by President Wilson for alleged usurpation of the latter's authority by calling cabinet meetings during the latter's illness. He was a member of the American Commission to Negotiate Peace at Paris in 1919 and published *The Big Four and Others at the Peace Conference* (1921) and *The Peace Negotiations* (1922). Following his retirement from the cabinet, he practiced law in New York City.

LANSING-ISHII AGREEMENT. See JAPAN, History.

LAOÑ. See WAR IN EUROPE, Western Front.

LAOS. See FRENCH INDO-CHINA.

LAPARRA, RAOUL (1876-). A French composer, born at Bordeaux. He studied at the Paris Conservatoire under Fauré and Massenet, and won the Prix de Rome in 1903 with a cantata, *Ulysse*. He gained international reputation with his opera *La Habañera* (Paris, 1908; Boston, 1910; Metropolitan Opera Company,

1924). Also operas are *Peau d'âne* (Bordeaux, 1899), *La Jota* (Paris, 1911), and two not yet produced (1924), *Amphitryon* and *L'Aventure pittoresque*. He also wrote incidental music to *El Conquistador*, a violin sonata, and interesting pieces for piano.

LARDNER, RING W. (1886-). An American writer, born at Niles, Mich. He served as a sports writer for many different newspapers, including the *Chicago Tribune* and *Boston American*. His books include: *Bib Ballads* (1915); *You Know Me, Al* (1915); *Gullible's Travels* (1917); *Own Your Own Home* (1917); *Treat 'Em Rough* (1918); *The Real Dope* (1918); *The Young Immigrants* (1919); *The Big Town* (1921), and *How to Write Short Stories* (1924). As a fictionist he was first known for his humorous and slangy genre sketches of the sporting world, his baseball players and Broadway hangers-on being depicted with fidelity and kindness. His *How to Write Short Stories* seemed to be approached in the same light spirit, but the stories which composed the volume indicated a matured artistic attitude and a seriousness of purpose, in the handling of his typical American lower middle-class characters, that at once prompted critics to group the work with Masters's *Spoon River Anthology* and Anderson's *Winesburg, Ohio*.

LASKI, HAROLD J. (1893-). An English political philosopher, born at Manchester, and educated at New College, Oxford. During 1916-20 he was a lecturer at Harvard University and gained wide attention in the United States for the freshness of his point of view and his remarkable erudition. In 1920 he returned to England to join the London School of Economics, and in 1923 he became political science reader at the University of London. His works on the problem of sovereignty in the modern state, with their insistence on political and economic decentralization—*The Problem of Sovereignty* (1917), *Authority in the Modern State* (1919), and *Foundations of Sovereignty* (1921)—were hailed as the most important contributions to the political thought of the period. He showed his familiarity with the history of political thinking in his masterly summary, *Political Thought from Locke to Bentham* (1920). He edited a volume of Burke's *Letters* (1920) and Morley's *Essay on Burke* (1924).

LASKY, JESSE L. (1880-). An American moving picture producer, born at San Francisco, Cal. He was educated in the schools of San Francisco and was for a time reporter on newspapers in that city. After experiences in Alaska and Hawaii, he entered the theatrical business with Henry B. Harris in New York City. In 1914, he organized and became president of the Jesse L. Lasky Feature Play Company, which was afterwards merged with the Famous Players-Lasky Corporation, and with large studios at Hollywood, Cal. He was one of the most important figures in the development of moving pictures.

LASSITER, WILLIAM (1867-). An American soldier, born in Petersburg, Va. He graduated from the United States Military Academy in 1889, and was commissioned in the artillery, in which he served during his military career. He saw service in the Spanish-American War and was on duty with the General Staff in 1911 and 1913. He was commis-

sioned brigadier-general in the National Army in 1917, and major-general in the following year. He was chief of artillery for the 1st Corps in 1918 and served in the same capacity with the 2d Army later in the same year. He was commander of the 32d Division in 1918-19, and was chief of artillery of the 3d Army in April, 1919. In August of that year he returned to the United States. From 1921 on he was chief of staff in charge of operations and training.

LATANÉ, JOHN HOLLIDAY (1869-). An American educator, born at Staunton, Va. He graduated from Johns Hopkins University in 1892 and after serving as acting professor of history and economics in the Baltimore City College, he became master of history and English at the Military College at San Rafael, Cal. From 1898 to 1902, he was professor of history and economics at Randolph-Macon Woman's College, and from 1902 to 1913, professor of history at Washington and Lee University. In 1913, he became professor of American history and head of the Department of History at Johns Hopkins, and in 1919, dean of the college faculty. He was a member of many learned societies and wrote *From Isolation to Leadership* (1918) and *The United States and Latin America* (1920).

LATOURETTE, KENNETH SCOTT (1884-). An American educator, born at Oregon City, Ore. He was graduated at Yale in 1906 and was a member of the faculty of that university until 1909. For a time he served as traveling secretary of the Student Volunteer Movement of Foreign Missions, and from 1910 to 1917 was a member of the faculty of the college of Yale in China. In 1914, he became a member of the faculty at Reed College, Portland, Ore., afterward going to Denison University. In 1921, he became professor of missions at Yale. He was ordained to the Baptist ministry in 1918. Among his works are: *History of Early Relations Between the United States and China, 1784-1844* (1917); *Development of Japan* (1918); *The Christian Basis of World Democracy* (1919).

LATTER-DAY SAINTS. See REORGANIZED CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS.

LATVIA. One of the Baltic Succession States arising out of the War, formerly part of the Russian Empire. It is made up of the former Russian province of Courland, the southern half of the former province of Livonia, and the western part, amounting to about one-third, of the former province of Vitebsk. It covers 25,402 square miles of territory, with a coast line of 338 miles and a total frontier line of 1040 miles, bounded by Esthonia on the north, Russia on the east and Lithuania on the south. Total population, 2,552,000 in 1914; 1,885,870 in 1923. Capital, Riga. For adminis-

trative purposes it is divided into four districts. The census of Jan. 1, 1923, divided the population into the following ethnic groups: 72.6 per cent Letts, 5.7 Russians, 5.0 Jews, 4.2 White Russians, 3.6 Germans, and 3.3 Poles. Of the total population, 76 per cent was rural. Density per square mile was 74.5. By occupations: 56 per cent agricultural, 18 per cent in industry, and 6 per cent in trade. About 60 per cent of the population was Protestant. Catholic majorities were to be found in Latgale and parts of Courland. Population of chief towns, 1923: Riga, 280,000 (517,552 in 1913); Libau, 71,700; Dunaburg, 39,000; Mitau, 24,000; Windau, 10,000.

Production. Total rural area, 16,435,000 acres. Of this, arable land, about 4,500,000; meadows, 2,200,000; pasture land, 2,400,000; forests, 4,791,000; waste land, 2,544,000. By the agrarian law of Sept. 16, 1920, the largest estates were nationalized for partition among the great landless peasantry. By 1922, the distribution was as follows: larger estates or farms, numbering about 200,000, occupying 7,449,140 acres; peasant holdings, about 50,000, with 6,093,620 acres; state lands, 1,550,500 acres; church lands, 167,330 acres. The country was only slowly recovering from the effects of the War, as shown by the crop statistics. In 1923, there were 338,000 horses (320,000 in 1913); 900,000 cattle (912,000 in 1913); 484,000 swine (557,000 in 1913); 1,461,000 sheep (996,000 in 1913).

Industries showed steady expansion. In 1921, there were 1709 industrial enterprises, employing 28,643 people; in 1922, 1906 with 74,000 h.p. and 31,827 employees; in 1923, 2130 with 83,807 h.p. and 33,961 employees. In 1914, in Riga alone, 65,000 workers were employed. Lumber yards employed 6973 hands in 1923; metal working establishments, 6545; foodstuffs manufacturing enterprises, 5558; textile mills, 4267; paper mills, 3938. There were about 100 incorporated concerns, with approximately 50,000,000 lats stock capital.

Trade. The volume of trade was growing year by year, as shown by the following comparison:

Year	Imports (In lats; 1 lat=\$0.193)	Exports
1921.....	70,697,355	29,264,991
1922.....	107,370,110	101,992,006
1923.....	211,872,025	161,929,052

The chief articles of import in 1923 were: Manufactured, semimanufactured goods, i.e. wool and woolen yarn, iron and steel products, hides and leather, petroleum; manufactured goods, i.e. cotton and woolen goods, machinery, implements; foodstuffs, i.e. grain and flour, sugar, herring, tobacco. Chief among commodi-

PRINCIPAL CROPS OF LATVIA

Crops	Area in acres			Production in thousands of bushels		
	1909-13 (average)	1922	1923	1909-13 (average)	1922	1923
Rye	866,300	583,600	800,700	12,828	6,851	10,760
Oats	755,700	675,300	928,000	19,225	18,178	17,649
Barley	471,700	387,000	531,000	7,933	6,765	6,397
Wheat	80,500	70,400	88,100	1,413	957	1,265
Potatoes	196,500	170,600	214,400	23,434	24,777	19,522
Flax and flaxseed	172,000	93,100	169,300	55,672	31,351	41,517

* Metric Tons.

ties exported were: lumber, 42,165,000 lats; other wood materials, 13,650,000 lats; flax and flax tow, 41,559,000; precious metals, 10,154,000; butter, 9,272,000. By countries of origin, 1923 imports were distributed as follows: Germany, 95,850,000 lats; United Kingdom, 36,087,000; Lithuania, 11,345,000; Netherlands, 10,381,000; Poland, 8,319,000; Russia, 7,553,000. Main countries of destination of exports: United Kingdom, 74,967,000; Belgium, 31,961,000; Germany, 12,281,000; France, 10,719,000; Russia, 5,963,000.

Transportation. Length of railroads, 1839 miles (1923). Number of locomotives 320, freight cars 5324, passenger cars 467. At the beginning of 1924, Latvia's shipping included 31 steamships of 38,310 registered tons, 56 sailing vessels of 9129 tons, and 9 motor ships of 993 tons, making a total of 96 ships, aggregating 48,432 tons. This represented a long stride toward restoration of the country's prewar merchant fleet, which on Jan. 1, 1914, comprised 59 steamers of 77,626 registered tons, and 274 sailing and motor vessels of 49,093 tons, but which by the end of 1921 had decreased 75 per cent, or to 34,021 tons. Vessels entering Latvian ports in 1923: 3577, of 1,442,130 net tons capacity; cleared, 3571, of 1,431,500 tons.

Finance. For the year 1921-22 the budget balanced at 9,855,893,800 Latvian rubles (about \$32,852,800); for the year 1923-24, it balanced at 174,383,390 lats (roughly \$33,664,747, at the exchange rate of 1 lat to \$0.193). On Oct. 1, 1922, it was stated that the national debt was as follows: to United States, \$2,521,870; to American Relief Administration, \$2,610,418; to Norway, 6,737,558 crowns; to Great Britain, £20,169; to France, 1,741,516 francs; to private banks, £178,400. In the middle of 1923 the total foreign debt amounted \$6,620,460. The internal debt amounted to \$96,500. There were in circulation, Dec. 31, 1923, 23,000,000 lats. On Nov. 1, 1922, the Bank of Latvia, in which the government was the chief stockholder, was opened. In June, 1922, the lat (\$0.193) became the unit of currency, and during 1922 and 1923 the government maintained it at par.

Education. At the beginning of 1922, there were 1725 elementary schools with 165,598 pupils and 5530 teachers. There were 107 secondary schools with 15,080 pupils. By the census of 1920, it was established that 70 per cent of the population could read. National minorities were taught their native languages in government schools, which numbered 410 of the total 1725 elementary schools. In 1919, the Riga Polytechnic was raised to be the Latvian University. In 1922, there were 5421 students and 161 instructors.

History. Early in 1918, as a result of the uncertainty engendered by the Russian Revolution and the threatening gestures of the peasants, German forces were invited by the Baltic barons to occupy Latvia. The Bolshevik troops were compelled to retire, and German troops invested the country. A German army of occupation was allowed to remain even after the Armistice, for the Allies were not yet prepared to guard the country against Russia. (See **BALTIC PROVINCES**.) Immediately after the Armistice, on Nov. 18, 1918, independence was declared and a government formed by the moderate, or peasant, element. Bolshevik troops at once invaded the new state, captured Riga early in January, 1919, expelled the Latvian

government, and set up a Soviet government. War was waged intermittently throughout the year, the chief Latvian force being a Baltic *Landwehr*, officered by Germans. In May, the Bolsheviks were driven from Riga, but the fear of German preponderance made the native Letts seek aid from the Allies. The Ulmanis government (the peasant parties) was recognized and an Englishman was placed in charge of the *Landwehr*, which thus became the official Lettish force. Latvia now (1919) became a battleground as a result of the Allied determination to attack Russia by way of the Baltic provinces. A "White" Russian-German force overran the country, ostensibly to engage Bolshevik troops along the Narva and the Duna lines. There was fighting late in 1919 in which Letts, German mercenaries, "White" and "Red" Russians were engaged. Riga was besieged for four weeks in October-November, 1919; the Letts were compelled to take up arms against the German army under General Bermond; Mitau was evacuated by the "White" Russian-German forces; and finally in January, 1920, after months of pillaging, the German troops consented to evacuate Courland. Another blow was struck for Latvian independence when the Lettish national *Landwehr* defeated the Bolsheviks in Latgallia. Thus, by 1920, the native Letts for the first time were in sole occupation of their territory. Negotiations with Russia soon commenced and on Aug. 11, 1920, a Russo-Latvian treaty was signed at Riga. Its main provisions were: an ethnographic frontier for Latvia; a large timber concession to Latvia; nonliability for Russian state debts; disarming of anti-Bolshevik troops in Latvia; free transit for Russian goods across Latvian territory; payment to Latvia of 4,000,000 gold rubles.

A Constituent Assembly, called in 1920, completed a national constitution on Feb. 15, 1922. A parliament (*Saeima*) elected by universal suffrage and based on proportional representation, which chooses the state president, was provided for. The prime minister, in turn, was to be designated by the state president. The first Parliament, elected on Oct. 7, 1922, was controlled by a Social Democrat bloc, with the peasant and minority parties in the opposition. Of the last there were no less than 17 distinct groups having a total of 41 members. A new government formed June 10, 1923, was supported by a coalition of the Peasants' League, Democrats of the Centre, and Right Socialists, with the premiership held by the head of the Peasants' League. After recognition of Latvia by the Supreme Council, the country was admitted to the League of Nations on Sept. 22, 1921.

Russian influence in Latvia became marked again late in 1922, when a Baltic Alliance was formed between Russia and her Succession States. This understanding provided among other things for an economic alliance, disarmament, and agreement on customs, consular, and trade matters in order to facilitate the Russian transit trade via the Baltic ports (see **ESTHONIA**). There was thus, as a result of a peaceful foreign and domestic policy, every indication in 1924 that the country was proceeding along the right road to economic well-being. The government's attitude toward the new farmers was paternalistic; a stabilized currency encouraged industrial growth; social conditions, e.g. housing, wages, sanitation, were favorable; and by commercial treaties negotiat-

ed with Czecho-Slovakia, Hungary, England, and France, the movement toward the consolidation of the trade frontiers was gaining headway.

LAUSANNE CONFERENCE AND TREATY. See PEACE CONFERENCE AND TREATIES; TURKEY, etc.

LA VERNE NOYES FOUNDATION. See EDUCATION IN THE UNITED STATES.

LAW, ANDREW BONAR (1858-1923). A British statesman see (VOL. XIII). On the formation of the first Coalition Cabinet in 1915, he was appointed Secretary of State, and in the first Lloyd George ministry in 1917, he became Chancellor of the Exchequer, and in this capacity introduced the budget in May, 1919. Owing to the constant absence of the Prime Minister in 1916-19, he acted as leader of the House during that period. He was also a member of the War Cabinet. In 1919, he was the plenipotentiary to the Peace Conference. After the general election of December, 1918, he became Lord Privy Seal and leader of the House. He headed the Conservative revolt from the Coalition Cabinet in 1922, and contributed largely to the victory of the Conservative party, in October of that year, and was chosen Prime Minister and head of the Conservative government. He resigned on account of ill health and died on Oct. 30, 1923.

LAW, INTERNATIONAL. See BLOCKADE.

LAW, PROGRESS OF THE. Law may be said to be the totality of rules prescribed by the proper authority for the regulation of society. One of the inherent qualities of law is its stability. The permanency of the content of law is generally attributable to two factors: (1) the recognition that there are basic principles in the legal order which are final and immutable, and (2) the practical expediency which necessitates an adherence to settled rules. As Blackstone expressed the first element: "These are the eternal, immutable laws of good and evil to which the Creator Himself in all His dispensations conforms; and which He has enabled human reason to discover, so far as they are necessary for the conduct of human affairs." Out of this acceptance of a natural law is derived the doctrine of natural rights which has played an important part in shaping the course of American constitutional law. There is also a practical reason for the rigidity of positive law. The common law is a barrier against arbitrary decisions of the judiciary. Safety demands certainty in the administration of law. But the doctrine of *stare decisis* and the force of precedent are not alone based upon the assumption that individualization is unwise; society postulates a body of legal rights and duties which are predictable, vested interests which are determinable and fixed.

It does not follow, however, that the law is a static and unchangeable picture. Law must possess a considerable degree of rigidity, but it also possesses elasticity and adaptability in order to meet current social and economic changes. Courts and legislatures are constantly at work altering, amending and adding to legal rules. The growth of industry, the increase of poverty, the shortage of homes and similar emergencies of the time and place must be faced and solved as they arise. The automobile, the radio and the airplane, to mention only a few modern inventions, bring about novel complications which are rapidly translated into legal problems. The pronounced centralization in urban

communities increases friction and conflict of societal relations which are frequently absent in rural life. It is the task of the jurist and the legislator to view these penetrating influences of the day and to readjust the juristic machine to meet the current changes in the social order.

We therefore find that the law is made up of the contrasted forces of permanency and change. One of the most troublesome questions of juristic science is to apportion the contesting principles of certainty and flexibility in the growth of law. How far should the courts be permitted to go in the readjustment of law to fit the particular case? Is it preferable to have a settled rule or discretionary power in the administration of justice? At the present time, the movement of law seems to be in the direction of an enlargement of discretion, an extension of the so-called individualization of law. Courts are manifesting a keener interest in the practical effect of social and economic changes upon the established principles, and a willingness to upset these legal formulas in certain cases. The expansion of discretion is evident in the creation of administrative boards and commissions which have taken over functions formerly exercised by the judiciary. These extra-judicial groups are given considerable latitude in the decision of particular cases. But the common-law emphasis upon stability as a barrier against the whims of capricious judicial and administrative action is still a substantial ingredient in the progress of American law. Natural law with its assumption of basic norms to test the validity of given laws, while rejected by pragmatic philosophers of law, may be noted in the current language of the courts.

The scope of this article embraces a general survey of recent developments in the major branches of law. It attempts to outline the current tendencies of juristic science; its partial acceptance of the need of readjustment of legal principles to meet changing conditions in society; its stern insistence upon the retention of the doctrine of *stare decisis* as a check against arbitrary decisions; and the proposals of reform which are intended to perfect the law as an instrument to accomplish justice.

Constitutional Law. The panorama of constitutional law portrays the course and progress of law in general. Basic principles of the Constitution are so closely interwoven into the fabric of American law that contemporaneous evolution, particularly in statutory law, usually raises questions of constitutional usurpation. Novel experiments of legislation introducing changes in the customary law inevitably must be weighed and tested by the clauses of our organic law before their validity is finally determined.

Of late there is growing up among the justices of the United States Supreme Court a difference of opinion regarding the scope of judicial review in gauging the constitutionality of State and Federal legislative acts. On the one hand, there is the assumption that the Supreme Court is empowered to investigate the "reasonableness" of the given statute and to analyze the necessity, utility and efficacy of the proposal. On the other hand, this broad power of review is contested by a minority of the Supreme Court on the ground that such latitude virtually makes the Supreme Court a super-legislature; and that the Supreme Court can-

not impose its own views of the wisdom of legislation in cases where the law does not offend any clause of the Constitution. A concrete and striking illustration of this division of judicial opinion may be noted in the important Minimum Wage Case, decided in 1923. The primary question was the constitutionality of the Act of Congress establishing a Minimum Wage Commission in the District of Columbia for the purpose of fixing a minimum wage for women and children. The majority of justices declared that the statute was unconstitutional because it violated the guarantees of due process of law. Their prevailing opinion analyzes the social, ethical and economic validity of the minimum wage, rejects the opinions of social workers as "only mildly persuasive" and draws the subtle distinction between the limitation of the hours of labor and establishment of a living wage. This range of judicial inquiry is strongly resisted in the minority opinions in the Minimum Wage Case. It is argued therein that it is not within the province of the Supreme Court to hold Congressional acts invalid simply because they contain economic formulas which members of the Supreme Court believe to be unwise or unsound.

Whatever may be the ultimate outcome of this present divergence of judgment in the matter of constitutional interpretation, it may be safely stated that the flexible clauses of the Constitution necessitate a considerable degree of individual infiltration in the solution of new problems of social and economic reform. The political, ethical and economic theories of the judges cannot be entirely eradicated in the application of the generalizations of the Constitution. Changes in the personnel of the Supreme Court, following resignation or death, sometimes result in the retardation of social legislation. Thus it has been asserted that the Minimum Wage decision was an accident of time; that an earlier hearing would probably have sustained the constitutionality of this law. This does not imply that the opinions of the Supreme Court involve the stubborn and willful assertion of individual prejudices. But it does mean that the latitude of the clauses of the Constitution inevitably permits a rather generous display of personal judgment regarding the meaning of the given section of the organic law.

Due Process of Law. One of the most frequent sources of constitutional litigation is the "due process of law" clauses of the Fifth and Fourteenth Amendments. The State and Federal governments are herein prohibited from depriving any person of "life, liberty or property" without the orderly and settled usages of law. The all-embracing language defies exact and indelible definition, but its inherent importance makes it the basis for frequent attacks upon current legislation. The decisions interpreting the due process clause may be divided into two classes: (1) those pertaining to life and liberty, and (2) those particularly applicable to property rights. This classification, while convenient, is not strictly accurate, since many decisions involve at once an alleged invasion of personal and property rights.

Life and Liberty. The right to be free from unlawful physical restraint is of the essence of life and liberty. This right is scrupulously upheld unless the exercise of it interferes with the public welfare. A limitation of the right of freedom of the person is found in the case of

compulsory vaccination, which has been held to be constitutional and not violative of the liberty of the individual. But liberty means not only the right to be free from physical duress but also to use freely one's faculties in lawful ways, to live and to work, to make contracts without undue interference from the State. It is said that liberty of contract is the rule and its curtailment is the exception. But the general rule has suffered many invasions which have been declared to be constitutional. Many recent laws have been passed restricting the freedom of contract in the interest of the public. The whole compass of workmen's compensation legislation, laws regulating the hours of labor, statutes restricting the power of the husband to mortgage household goods or assign wages, regulation of the insurance by the State, are current types of laws which invade the former generalization, liberty of contract.

Some of the modern literature of law maintains the view that liberty of contract is a fiction of judicial minds which has been read into the Fourteenth Amendment, a result of the "innocuous generality" of liberty to follow the ordinary callings of trade. It has also been claimed that this concept of liberty is due to the acceptance of Sir Henry Maine's doctrine that the evolution of law discloses a progress from status to contract. While it is true that the expression, "liberty of contract," is not found in the Fourteenth Amendment and that the common law has made inroads into the Sir Henry Maine formula, it is equally certain that there are individualistic tendencies in the common law, and more particularly in American law and traditions, that compel the courts to move slowly in overthrowing this freedom of individual action in commercial pursuits. We may follow this hesitancy of the courts in the judicial nullification of legislation which invades the right of contract. In 1910, the New York Court of Appeals declared the workmen's compensation law to be unconstitutional and a minority of the Supreme Court of the United States held a similar view as late as 1920. The correct principle, at least the present legal formula, seems to be that liberty of contract is embraced within the definition of liberty in the Fifth and Fourteenth Amendments. But there exists the potential and limited right to curtail this liberty of contract when the invasion is justified by the public interest and the social welfare.

This endeavor to balance the right of free contract and the police power of the State is visible in recent pronouncements of the Supreme Court. The State may prescribe conditions of employment on public works because this is work of a public character, but the State cannot determine wages between employer and employees in private employment, even when the legislature declares that a business is affected with a public interest. This distinction was sharply drawn by the Supreme Court in its analysis of the Kansas Industrial Court insofar as the Kansas Industrial Court attempted to regulate wages in industrial enterprises. The State may regulate insurance rates, since this business directly touches the public welfare, but the State cannot establish a minimum wage for women because, in the words of Mr. Justice Sutherland, it is "not a law dealing with any business charged with a public interest."

Property Rights. The conservation of the right of property is clearly within the purview

of the due process clause of the Constitution. This right, however, is not absolute, but may be partially or even completely extinguished when the public interest requires it. The most striking example of the relativity of property rights, excluding the right of eminent domain, may be noted in the operation of the Eighteenth Amendment prohibiting the manufacture and sale of intoxicating liquors. This Amendment automatically prevented the use of property and instrumentalities for the forbidden purposes and thereby materially lessened the value of these properties without compensation. Similar laws and statutes restricting or prohibiting the sale of food products have been held to be constitutional since they were passed to safeguard the public health. A familiar restriction is the "blue-sky" law which conditions the sale of securities without a State license. Laws regulating the height of buildings, "zoning" laws and ordinances prohibiting or taxing the use of land for billboards, all of which have been declared to be constitutional, are modern illustrations of the lawful invasion of the individual's property rights.

Equal Protection of the Laws. The Fourteenth Amendment, in addition to its provision establishing and guaranteeing due process of law, provides that all persons within the jurisdiction of the State shall be accorded "equal protection of the laws." This important phrase secures equal treatment to all persons in the enjoyment of their rights and privileges. Equal protection does not prevent the State from classifying portions of the people according to their particular relations, but this classification must be based upon some real difference which separates the class affected from the other groups in the social order. This constitutional guarantee was originally incorporated to secure to the colored race, then recently emancipated, the complete enjoyment of their freedom, but the Amendment is not confined to racial inequalities. Within its original purpose may be noted the cases that consider the constitutionality of legislation which establishes separate schools for white and colored children, separate coaches and stations in railroad service. These statutes have been validated on the ground that equality of laws does not necessitate intermixture of the races socially, provided that both races are given similar accommodations. But when a State passed a law prohibiting a colored person from buying property in a white district, and imposed the same restriction upon a white person purchasing property in a colored section, the Supreme Court held that this provision, although aimed to lessen racial strife, exceeded the power of the State and violated the guarantee of equal protection of the laws.

Laws that classify distinct groups in the community are valid provided that the distinction is not arbitrary or unreasonable. For instance, the State may pass special regulatory statutes controlling insurance companies, banks, grain elevators and mines. Such legislation may impose various forms of licenses, different rates of taxation and varied modes of control without offending the equal-protection clause. The employer-employee relation has been especially subject to particular legislation. Laws control hours of labor, working conditions and safety appliances. But arbitrary discrimination will be inhibited in industrial legislation. In a recent case the Supreme Court held a statute of

Arizona to be unconstitutional which prohibited the use of injunctions in labor disputes, although a vigorous dissent to this decision was registered by four justices.

Police Power of Government. The police power inherent in government balances and limits the liberty of the citizen for the common good. The boundary of the police power is shadowy and uncertain. It sometimes includes a consideration of the limits of legislative power, sometimes a discussion of the conflict of State and Federal authority, and frequently the vague definition of the public welfare and individual right. Police power lies at the base of all those laws which curtail the freedom of contract, regulate the conduct of business, impose restrictions upon the use of property and protect the health and safeguard the morals of the citizenry.

This necessary power of government is broad and flexible. It was recently invoked to curb the property rights of landlords during the housing shortage by the passage of emergency rent legislation. Congress was exercising the police power when it passed the temporary wage scale for railroad employees in connection with the Adamson Eight-Hour Law. The States also are possessed of a similar power which the Federal government must respect within its proper limits. The dividing line between the State and Federal police power is sometimes rather uncertain. The Congress may not, under the guise of taxation or regulation of interstate commerce, usurp the police power of the State. An important application of this principle of the separateness of the police power may be seen in the Child Labor Cases. In these cases, Congress attempted to bar from interstate commerce in the first case, and to tax in the second case, the products of child labor in the States. Obviously the primary purpose was not to regulate commerce or to tax, but simply to reach out and to control intrastate affairs. Both statutes were declared to be unconstitutional as an invasion of State sovereignty.

The strong stand of the Federal judiciary against the covert entry and domination of State business by Congressional acts is wise and necessary. The palpable need of child labor laws is generally conceded. But the duality of our scheme of government negatives the right of Congress to infringe upon the reserved police power of the States to accomplish a worthy end. If this pronounced trend toward centralization were to continue, local government would become a mere name. The Federal government could through the extension of the power to regulate commerce virtually dominate the remote activities of the State. These excursions into States' rights have reached the peak, and the attitude of the Supreme Court gives support to the belief that further encroachments will not be successful.

But the police power of the State is not without limits even in its local environment. The exercise of the police power must bear a tangible relation to the governmental power and a due recognition of individual rights. Thus a State may lay a tax upon or forbid the manufacture and sale of obnoxious and harmful foods such as oleomargarine, or the use of benzoate of soda in nonfermented beverages. A wide latitude even to the point of caprice has seemingly been allowed in State legislation. But the line against excessive and arbitrary pro-

hibition is still drawn, although the separation is often difficult to define. The German language cases, decided in 1923, illustrate the possible misuse of police power by the State. Several States passed laws forbidding the instruction in any foreign language of any children under a certain age or school grade. Without questioning the power of the State to compel attendance and to make reasonable regulations for all schools, the Supreme Court held that the restriction was beyond the power of the State and violative of individual rights. A more extreme form of the same radical exercise of State control is the Oregon Compulsory Public School Law, which prohibits the instruction of children between the ages of 8 and 16 in private schools and compels attendance in public schools. Reinforced by the attitude of the Supreme Court, in the German language cases, the United States District Court for the District of Oregon declared that the Oregon Compulsory School Law infringed upon the liberties of the parents, invaded the property rights of the private institutions affected and usurped the natural and inherent rights of parochial and private schools to teach. These laws indicate in the field of State legislation a present tendency to strain the powers of sovereignty to the breaking-point, and to transgress unduly the reserved rights of the people in accordance with the Bill of Rights, most of which are found in the first 10 amendments to the Federal Constitution.

The Eighteenth Amendment. The advent of Prohibition as a national policy has presented many important and original legal questions. The Supreme Court upheld the validity of the Eighteenth Amendment and the constitutionality of the National Prohibition Act which was passed to enforce the Amendment. The enforcement of the law at once raised the question of the territory subject to the provisions of the Act. Did it extend to foreign or domestic ships in territorial waters of the United States? It was decided by the Supreme Court that the Amendment prohibited "transportation" and "importation" of intoxicating liquor into the United States "and all territory subject to the jurisdiction thereof." This territorial control, it was held, included a marginal belt of three geographic miles from the coast line, and extended to all ships, whether foreign or domestic, entering this zone; but it was also held that the National Prohibition Act did not extend to domestic vessels when outside the territorial waters of the United States.

The Eighteenth Amendment provides that Congress and the several States shall have concurrent power to enforce this Amendment by appropriate legislation. Pursuant to this concurrent jurisdiction many States passed local enforcement laws. This dual administration of prohibition raised the question whether an individual could be punished twice for the same violation, once by the Federal and again by State authorities. The question was answered by the Supreme Court to the effect that the Eighteenth Amendment was a limitation and not a grant of power to the States, and that the same act may be an offense against both the State and Federal governments without offending the "double jeopardy" provision of the Fifth Amendment.

Contracts. Social, economic and commercial changes cause corresponding changes in

the branches of the law immediately affected. In an era of expanding commerce and industrial growth based upon credit and confidence, it is inevitable that contracts should enter into a majority of mercantile transactions. The preliminary agreement, the sale of goods, the conveyance of land, the issuance of instruments of credit, the guarantee of payments, the formation of partnerships and corporations, all these business relations necessitate the passing of promises which form the central field of contract law. Due to the fluctuating problems of commerce, the law of contracts discloses renewed signs of activity. The fundamental questions of offer and acceptance, consideration and the like are being reopened and debated in the light of modern business requirements. One of the litigated enigmas of contracts is the definition of the real elements of a promise which will render the promisor legally liable to the promisee. Is it necessary for the promisee to give or to promise to give an equivalent value to the promisor? Or is it sufficient that the parties make a business bargain independent of the relative value of the respective promises or acts? Or does it suffice that a promise is made which is relied on by the promisee without the promisor's assumption of any affirmative obligation?

These queries outline the conflicting theories of the nature of consideration. Dean Roscoe Pound has styled them respectively as (1) the equivalent theory, (2) the bargain theory, and (3) the injurious-reliance theory. The leading theory to-day is the bargain theory, which validates all promises which arise out of a give-and-take bargain. Under this view, it is not fatal that the more exacting requirements of the equivalent theory are missing. But there is a perceptible effort being made by the courts to enlarge the scope of contractual liability according to the mandates of the so-called injurious-reliance theory. This latter theory may seem to be too idealistic in that it seeks to impose a liability for a promise which is not balanced by a corresponding promise from the other party to the agreement. But it is predicated upon the sound ethical doctrine that it is not right for a man to violate his promises even when they are gratuitous. Certainly it is unfair to do so when the promisee acts upon the assumption that the promise will be fulfilled and suffers damage by reason of his reliance. Despite the undercurrent of support for the reliance theory, the prevalent definition of consideration includes the element of mutual undertakings by both parties.

Standardization of the law of contracts has made appreciable progress in certain branches. Insurance contracts have been made uniform by legislation. Negotiable instruments, sales, bills of lading, warehouse receipts, stock certificates and partnerships have been subjects which are governed by uniform acts in many States. Ambitious attempts have been made in a few States to reduce the whole field of contract law to a code; but the attempts have been premature and generally unsuccessful. Codification must involve a restatement of the law; and the difficulty is that one cannot restate that which has not yet been definitely stated. The conflicting theories must first be evaluated and weighed before a complete code can be successful.

Torts. A tort has been defined as "a wrong independent of contract." It may be said that

the law of torts embraces the liability of individuals for the invasion of the rights of others when this liability is not based upon a contract. It includes the invasion of noncontractual rights of person and property whether the transgression is willful or negligent. One of the marks identifying a common-law tort has heretofore been the proof of some fault on the part of the defendant. A tortious wrong connoted a wrongdoer. Assuming no personal culpability, no willful or negligent action or inaction, the common-law rule was that there could be no liability without fault. If the damage was purely accidental, the maxim *damnum absque injuria* applied.

Exceptions are being engrafted upon the cardinal principle of no liability without fault. It is no longer true that liability presupposes a wrongdoer. Laws frequently impose absolute duties which eliminate the necessity of proving fault as an ingredient. A typical example is workmen's compensation legislation, now generally operative in the United States, which fixes liability on the employer for injuries to his employees incurred in the course of their employment. The absence of due care of the employee or the absence of negligence on the part of the employer are of no consequence. The employer is an insurer and must reimburse the injured employee. Apart from statutes, many American courts have broken down the common-law rule by holding that a person may be liable for damages due to his keeping instrumentalities which are inherently dangerous if they escape. If these agencies actually cause damage, liability follows without any proof of concurrent fault on the owner's part. Other courts stubbornly resist the expansion of the principle of liability without fault and assert that it is hostile to the course of the common law.

The pragmatic school of jurisprudence, arguing for a sociological interpretation of law, disputes the contention that liability should be premised on fault. It is said that the correct approach to the question of legal liability should be the balancing of the whole circle of conflicting social interests and the recognition of the predominant claims of society. If social progress and economic interests will be advanced by the enlargement of individual responsibility, there is no barrier against the consequent liability. The elevation of social interests, prominent in the tenets of modern legal philosophy, is a reaction against the rigid individualism of the nineteenth century. It has a proper place in the formulation of rules of legal liability. But it is possible that in our zeal to promote the general welfare we may unduly submerge the individual welfare. Excessive paternalism is just as dangerous as excessive individualism. In the judgment of many we are rapidly approaching the danger point of unwise and futile attempts to correct human failings by the compulsion of law. So also it may be suggested that the complete abandonment of the common-law principle of no liability without fault is fraught with potential harm.

It is generally stated that there is liability when there is fault accompanied by actual damage; but this proposition is sometimes debatable. A lively controversy exists regarding the right to recover damages for mental fright due to the negligent conduct of another when no di-

rect physical impact is present. Some courts contest the existence of any right to recover damages owing to the difficulty of tracing the damage and the dangers of malingering and falsification. If this practical objection can be removed, it is arguable that the form of the damage should not be an obstacle to legal redress. Medical science is progressing to the point where it is possible to distinguish between real and feigned nervous disorders. The result is noticeable in the gradual enlargement of cases allowing recovery for fright negligently or willfully caused by the defendant's conduct. A somewhat similar question arises when an unborn child is alleged to have been injured by the negligence of the defendant before birth. Has the unborn child a right to sue for damages? The almost unanimous view of the courts is that no recovery will be allowed. The practical objection is that it is impossible to prove the source of the injuries. It is also said that the unborn child is not a legal entity at the time of the injury. But this treatment of the child yet unborn as beyond the pale of legal rights has been subject to established exceptions in the criminal law and the law of property. If the cause of the damage is certain and can be traced to the willful or negligent acts of another, it is somewhat artificial to find the law protecting the property rights of an unborn child, punishing criminally prenatal killing of the child, and denying a civil remedy to the child after birth.

Property. The initiative and enterprise of man are dependent upon the recognition of his right to the fruits of his labor, the privilege of acquiring property from his accumulations and the guarantee that the State will protect his goods from unlawful aggression. Hence property law has its proper place in the legal order. In the development of the law of property, changes are less frequent than in other branches. There is manifest an emphasis upon certainty and rigidity in the rules governing the acquisition, enjoyment and transfer of property. This stability is necessary in order that the legal consequences of action concerning property may be definitely determinable.

But even the law of property is not wholly free from the force of external changes in the march of events. No longer can we say with Blackstone that the rights of private property cannot be invaded even for the general good of the whole community. Property is losing its individualistic coloring and is gradually becoming socialized. This does not portend the overthrow of private property, but it indicates rather the realization that the ownership of property is a trusteeship in which society has a latent interest. The owner of property is subject to the control by the State in the acquisition, use and disposition. Charitable corporations are frequently restricted as to the quantity of land which they may acquire; the use of land is dependent upon the effects of such user upon the public; and the disposition of property is subject to stringent rules against entangling provisions which tend to suspend its transferability. The "dead-hand" influence is reprobated by statutes which prohibit stipulations preventing alienation. These limitations are of ancient lineage, but their principle is visible in more recent extensions of the same fundamental principle.

The shortage of homes, incident to the War,

resulted in the passage of emergency rent legislation which took from the owners the right to fix the rental value of their properties and transferred this property right to administrative boards with power to adjust controversies between landlords and tenants. This power, operating to diminish materially the rights of ownership, was upheld as necessary in view of the public need. But it was plainly limited to the present emergency and the Supreme Court of the United States refused to continue its provisions in the absence of proof that the emergency still existed in the District of Columbia.

An event which is not without considerable interest in the development of the law of property in America is the comprehensive and fundamental codification of the English Property Law of 1922. This law aims at simplification and clarification of property rights, reduces materially the number and complexities of common-law estates and renders obsolete a great part of the classic rules of property. It is symptomatic of the general recognition that the law has lagged behind the progress of society and requires a thorough overhauling to bring it down to date. The success of the English experiment will be followed with interest in the United States and will probably arouse American jurists to initiate similar reforms.

Law Reform. The progress of law is indicated not only by the course of decisions and legislation but also by the movements to reform the law which are visible in society. A study of law reform serves two purposes: it portrays current shortcomings in the administration of law, and it discloses the tangible form of the proposed remedies. Four major tendencies or agencies which are destined to shape juristic development are prominent at the present time: (1) the American Law Institute, (2) uniform State legislation, (3) reformation in legal education, and (4) law enforcement.

The American Law Institute. One of the most widely held criticisms of the law is its present uncertainty and confusion of principles which impede the orderly and exact application of law. It is often difficult for lawyers to predict the outcome of lawsuits owing to the multiplication of diverse and overlapping rules and the inconsistent principles in different States, and sometimes even in the same State. Useless litigation is frequently the result of this confusion, or the compromise of valid claims. The remedy is to simplify and to clear away the accumulated mass of contradictory precedents; to make a new start by building up a body of legal formulas that will restore the power of predictability. The proposal is theoretically sound, but its practical accomplishment offers many difficulties.

The American Law Institute was formed to face these problems and to attempt their solution. The object of the Institute is: "To promote the clarification and simplification of the law and its better adaptation to social needs, to secure the better administration of justice, and to encourage and carry on scholarly and scientific legal work." Its members include the leading judges, lawyers and law teachers of America, and in addition an active corps of specialists who are assigned particular topics of the law for intensive study. The perplexities of the task of restating the law in clearer form are frankly admitted by the members of the Institute. But the need of the restatement

has inspired the organization to make every effort to insure the success of the work. The Institute was formally organized at a meeting held in Washington, Feb. 23, 1923. Many years must elapse before the concrete results of this important reform can be definitely determined.

Uniform State Legislation. The work of the National Conference on Uniform State Law deserves special mention in the consideration of legal reforms. This conference, comprising delegates from all the States, meets annually for the purpose of promoting uniformity in State laws. This is accomplished by the drafting, after careful study and analysis, of uniform statutes covering particular parts of the law. The acceptance of the drafts and their enactment by the State legislatures is purely voluntary, but the response, particularly in the field of commercial law, has been gratifying. Since these uniform acts contain many simplifications in the common-law and statutory principles, they have exercised considerable influence in ameliorating and unifying American law.

Reformation in Legal Education. Law schools, as the training centres of future lawyers, wield a potent influence upon the moral and intellectual calibre of the bench and bar. To an appreciable degree the standards of the lawyer and judge are formulated during their law-school course. Agitation for the elevation of the scholastic requirements in the law schools is a result of this close relation between legal education and legal practice. The American Bar Association has recommended that the study of law should be preceded by at least two years of college work. The proposal aroused some opposition on the ground that it would result in closing the doors of the law school to ambitious students; but the majority of the profession accepted the validity of the recommendation and the law schools, with few exceptions, are requiring this additional period of study.

Law Enforcement. It cannot be doubted that disregard of law and disobedience to law have greatly increased in recent times. This unfortunate situation is still increasing, if we may judge by statistical proof and careful surveys of the times. In an attempt to determine the causes and to find a remedy, the American Bar Association appointed a Special Committee on Law Enforcement. This committee sent out a country-wide questionnaire to prominent members of the bar and bench. The collated answers point to many causes for this breakdown of law enforcement: the demoralizing influence of war, the passage of legislation which the State is unable to enforce, the spread of irreligion, the disintegration of family life, the political influence in the administration of justice and the tardiness and technicalities of legal processes.

These multiple and varied influences complicate the task of law enforcement. Indeed, it may be safely stated that one of the primary difficulties is that the law has gradually been burdened with duties which properly should be, and in the past have been, borne by other agencies of social control. There are limitations on the efficacy of law as a means of rectifying and leveling the inequalities and hardships of societal existence. The home, school and church have their respective parts to perform in upholding the respect for authority and obedience to law. If the home is invaded with the evils of divorce, if the school fails to implant moral

principles in the youth, if the influence of the church is weakened by internal dissension, it is futile to transfer to the State the obligation of social reformation.

There are, however, regions where the law has failed to do its part. In the province of criminal law we are in need of a general simplification of procedure and substantive law. The law's delay is a potent factor in bringing about the present distrust of law. Time is of the essence in criminal and civil actions. A delay in the establishment of rights or the punishment of crimes is often as fatal as their nullification or destruction. The English practice combines speed and certainty in the detection and trial of criminal offenses. Its adoption in America would result in considerable improvement in the direction of law enforcement.

The future development of law is problematical and doubtful. There is abroad the settled conviction that the law is approaching a critical stage which necessitates a thorough reorganization. It is a hopeful augury that the legal profession recognizes the current shortcomings in the legal order and is offering concrete proposals to simplify and to clarify juridical principles. But the cooperation and support of the people are needed to restore and sustain the orderly progress of law. The sanctity and primacy of law rest upon the willing acquiescence and submission of the people, their spirit of obedience to lawful authority, no less than upon the successful installation of the stated devices of law reform. The problem for the future is not merely one of legal reformation; it also includes the preliminary and important task of social, domestic, industrial and political purification. In these larger spheres the law can assist, but it alone cannot cure the failings of humankind.

LAWRENCE, D. H. (1886-). An English novelist, born at Eastwood, on the border-line between Nottingham and Derbyshire. Due partly to his own precociousness and partly to his mother's determination, he was able to attend the Nottingham High School, and when 16 years old became a teacher. He later matriculated at the Nottingham Day Training College, and taught in London. Mr. Lawrence's works, all of them illustrations of a profound study of the reactions of human nature, possess originality and the earmarks of a literary genius. His publications, too numerous to be all mentioned here, include: *Love Poems and Others* (1913); *Tortoises* (1921), a creative animal study; *The Widowing of Mrs. Holroyd* (1914), and *Touch and Go* (1920), plays; *Twilight in Italy* (1916); *Sea and Sardinia* (1921); *Psychoanalysis and the Unconscious* (1921); *The Fantasia of the Unconscious* (1924); also the novels, *The White Peacock* (1911); *Sons and Lovers* (1913); *Women in Love* (1920); *Aaron's Rod* (1922).

LAWRENCE COLLEGE. An institution comprising a college of liberal arts and a conservatory of music, at Appleton, Wis., founded in 1846. The student enrollment increased during the decade 1914-24 from 439 to 873 in the College, and from 175 to 510 in the Conservatory of Music, and the faculty was increased from 47 to 69 members. The endowment increased also from \$905,423 to \$1,710,000, the value of the plant from \$490,110 to \$1,193,173, and the total income from \$134,527 to \$378,537. The library, in 1923-24, contained 42,892

volumes. During the 10 years, a chapel with seating capacity of 1600, a dormitory for women costing about \$160,000, and a heating plant were built by the college, and the campus was enlarged by the purchase of adjacent property. Chairs were established in politics, sociology, and religious education, a department of commerce with two full-time and one part-time teacher was founded, and a chair of Spanish added to the faculty. President, Samuel Plantz.

LAWRIE, LEE OSKAR (1877-). A sculptor born in Rixdorf, Germany. He was brought to America in infancy and was educated at the public schools and Yale University and studied sculpture under St. Gaudens and Martiny. He is a member of the National Society of Sculptors and in 1921 was awarded a gold medal by the American Institute of Architects. His work includes the sculptural decorations in the United States Military Academy at West Point, reliefs and statues for many churches throughout the country, including the Church of Saint Vincent Ferrer, for the large reredos of St. Thomas' Church, New York, and the Harkness Memorial Tower and Archway, Yale University.

LAZZARI, SILVIO (1858-). A French composer, born at Bozen, Switzerland. Abandoning the study of law, he studied at the Paris Conservatoire under Franck and Guiraud. In 1885-94, he wrote for various French journals advocating the cause of Wagner. He later lived in Paris, devoting his entire time to composition. On the occasion of the world première of his *Le Sauteriot* (Chicago, 1918) he visited the United States. His other works include: the operas *Armor* (Prague, 1898) and *La Lépreuse* (Paris, 1912); a pantomime, *Lulu*; a ballet, *Melænis* (Paris, 1923); a symphonic poem, *Effet de nuit*; an orchestral suite, *Impressions*; a *Konzertstück* for piano and orchestra; a string quartet, an octet for woodwind and a violin sonata; piano pieces; choruses, and songs.

LEA, FANNIE HEASLIP. See AGEE, FANNIE HEASLIP LEA.

LEACOCK, STEPHEN BUTLER (1869-). A Canadian writer and educator (see VOL. XIII). His later works include: *Arcadian Adventures with the Idle Rich* (1914); *Moonbeams from the Larger Lunacy* (1915); *Essays and Literary Studies* (1916); *Further Foolishness* (1916); *Frenzied Fiction* (1917); *The Hollenzollern in America* (1919); *The Unsolved Riddle of Social Justice* (1920); *Winsome Winnie* (1920); *My Discovery of England* (1922); *Over the Footlights* (1923); *College Days* (1923).

LEAD. In the decade 1914-24, there were many changes and developments in the lead industry, which embraces the mining of the ore and its smelting and refining. The industry was called upon during the War to supply lead for munitions, but the uses of this metal in times of peace were far more important, and were constantly growing with the ordinary development of industry. In the order of importance in 1924, one might rank the industrial uses of lead as pigments, storage batteries, lead sheets, cables and plumbing supplies, though of course other uses, such as printing type, could be readily suggested.

Lead is produced in many countries of the world (see Table), but the principal sources of supply are the United States, Mexico, Australia,

Spain and Germany, and of these the United States easily leads. In the United States, Missouri, Idaho, Oklahoma and Utah were the leading sources of production in 1924. Missouri supplied the soft lead ores which are comparatively free from silver, while the lead-silver-zinc ores come from Idaho. Oklahoma also supplies soft ores.

The production of red lead was a decreased production from the maximum of 1920, when the amount of red lead produced was 34,431 short tons, valued at \$7,523,089. In 1920, however, there were produced 62,329 short tons of litharge, valued at \$12,386,185. This year also witnessed the maximum imports of lead, which totaled 197,029,527 pounds. The maximum for

WORLD'S SMELTER PRODUCTION OF LEAD, 1913 AND 1917-1922 *

[In metric tons, by countries where smelted, but not necessarily refined. Figures in black-faced type are official.]

Country	1913	1917	1918	1919	1920*	1921	1922
Australia	110,444	144,950	163,376	83,408	5,474	51,452	107,645
Austria	22,312	29,381	4,743	1,764	3,973	3,347	3,725
Belgium	53,590	22,745	20,630	4,225	16,040	29,750	36,000
Canada	17,202	20,709	17,005	16,143	13,733	28,274	40,798
France	28,817	21,235	12,778	10,928	12,000	10,000	12,000
Germany:							
Upper Silesia	41,300	32,960	23,960	18,580	18,008	13,743	85,000
Other Germany	143,667	53,268	40,617	39,006	41,000	58,000	
Great Britain	18,420	11,430	11,083	10,441	11,136	5,241	3,000
Greece	18,309	1,422	4,093	3,841	5,016	5,575	4,700
Hungary	1,137	5,000	(a)	(b)	(b)	(b)	(a)
India (Burma)	5,951	17,233	19,380	19,396	24,203	34,258	39,843
Italy	21,674	16,237	18,332	16,530	15,947	12,494	10,500
Japan	3,777	15,807	10,684	5,771	4,167	3,138	3,000
Mexico ^c	57,488	89,005	83,705	76,384	82,480	58,586	114,235
Poland	(d)	(d)	(d)	636	1,500	1,010	1,000
Rhodesia	295	3,722	9,935	12,859	14,836	17,969	20,831
Rumania	(e)	(e)	(e)	7,544	7,601	7,582	(e)
Russia	1,523	(e)	(e)	(e)	(e)	(e)	(e)
South America	2,476	4,148	4,781	6,565	6,264	4,664	5,937
Spain	198,829	176,309	169,709	125,721	175,196	135,881	97,000
Sweden	1,235	3,174	2,241	827	863	488	400
Tunis		18,590	16,533	5,800	11,407	12,225	13,200
Turkey	13,900	3,000	2,500	1,000	1,000	1,000	8,345
United States (refined)	385,643	511,942	503,702	391,982	440,221	367,718	437,845
	1,151,000	1,152,000	1,140,000	852,000	905,000	863,000	1,040,000

* Table from United States Geological Survey.

^a Statistics not available.

^b See Rumania.

^c Mexican output as reported by American Bureau of Metal Statistics, less bullion smelted in the United States from Mexican ore.

^d See Russia.

^e See Hungary.

^f Fiscal year, Apr. 1 of year given to Mar. 31 of following year.

PRODUCTION OF REFINED PRIMARY LEAD IN THE UNITED STATES

	1918	1919	1920	1921	1922	1923
	(Short tons)	(Short tons)	(Short tons)	(Short tons)	(Short tons)	(Short tons)
Domestic desilverized lead	282,024	208,701	220,327	187,962	185,191	304,595
Domestic soft lead	210,463	147,744	189,854	157,513	209,250	190,749
Domestic desilverized soft lead	47,418	67,938	66,668	52,747	74,305	61,364
Total	539,905	424,433	476,849	398,222	468,746	556,708
Foreign desilverized lead	100,290	57,787	52,808	50,367	63,916	61,300
Total refined primary lead	640,195	482,220	529,657	448,589	532,662	618,008
Antimonial lead	18,579	13,874	12,535	10,064	8,075	14,190

In 1913, the United States produced 462,460 short tons of primary lead from domestic and foreign ores; in 1923, there was refined 629,073 short tons of primary lead, and of this amount Missouri was responsible for 169,350 short tons, or nearly 30 per cent of the total; followed by Idaho with 134,036 short tons, and Utah with 107,949 short tons. In the smelting and refining industry, the summary from the Bureau of the Census indicates the condition of the industry in the years 1914, 1919 and 1921, when the Census of Manufactures was taken.

white lead was 194,991 tons in 1922, valued at \$35,513,395.

The Pittman Act, which put a price on silver produced in the United States, until its expiration in 1923, naturally stimulated the production of lead where this metal was an important by-product.

In 1923, the United States imported a total of lead valued at \$14,613,071, distributed as follows: ore and matte, 66,882,850 pounds, valued at \$3,170,190; bullion or base bullion, 161,496,495 pounds, valued at \$8,532,423; pigs, bars

LEAD SMELTING AND REFINING INDUSTRY (Value in thousands of dollars)

Year	Number of establishments	Persons engaged	Salaries and wages	Cost of materials	Value added by manufacture	Total value of product
1914	22	8,036	\$7,629	\$154,014	\$17,564	\$171,578
1919	25	7,354	11,281	179,373	17,421	196,794
1921	23	5,088	7,264	134,061	16,532	150,593

and other forms, and old lead, 42,198,848 pounds valued at \$2,384,191; manufactures of lead, excepting type metal, 400,418 pounds, valued at \$94,657; type metal, 7,353,463 pounds, valued at \$431,610.

LEAGUE OF NATIONS. The greatest constructive achievement of the Peace Conference at Paris was the organization and establishment of a definite agency of international co-operation designed to further concerted action both in the preservation of the future peace of the world and in the promotion of general human welfare—the League of Nations. For the origins of this significant institution, one is obliged to seek far beyond the council chambers of Paris.

During recent centuries, irresistible material forces greatly intensified by the never-ending Industrial Revolution, had broken down the last barriers of local isolation and self-sufficiency, created a world market for capital, raw materials, finished products and labor, and, by rendering all regions and all nations increasingly interdependent, had laid broad and deep the economic foundations for the possible erection of a political superstructure of internationalism. The cultural interdependence of nations was no less marked. Despite distinctive languages and national folkways, the peoples of the world had gradually developed a genuine community of intellectual and æsthetic interests strikingly revealed in periodical world conventions of distinguished physicists, chemists, biologists, historians and economists. Religious, democratic, trade-union, socialist and feminist movements were international in scope and influence. Everywhere there was a more than perceptible tendency to adopt uniform standards of clothing, food and architecture, as well as of literature, science, and politics. "Thirty nations formed the Universal Telegraph Union (1875); 23 adopted a convention regarding the common use of the metric system of weights and measures (1875); 60 adhered to the Universal Postal Union formed in 1878 with headquarters at Bern, Switzerland; five joined the Latin Monetary Union (1865); 20 ratified the Bern Convention of 1883 for the standardization of patent laws; and 12 signed the Bern Convention of 1887 providing for practically uniform copyright laws." Not unnaturally, under these circumstances, there arose in the various countries a host of pacifists who denounced war as a relic of barbarism, unmoral, un-Christian, and inimical to modern cultural progress, to normal economic intercourse and to sound political development. Peace societies first organized in England (1816), the United States (1828), Italy (1828), and France (1841), multiplied rapidly after 1878, until by 1914 there were about 160 with numerous branches and large membership. "International Peace Congresses, assembling intermittently and spasmodically between 1843 and 1889 became regular annual events after the latter date, and in 1891 permanent headquarters of the international peace movement were established at Bern." To optimistically minded pacifists, the First and Second Hague Peace Conferences (1899, 1907) seemed extremely auspicious—"the real beginning of an organized international state, with its capital in The Hague, with its regular congresses, with its statutes and codes, with its permanent court of arbitration." They failed to perceive the essential anarchy and increasing

tension of international relations, the ominous forces of nationalism, imperialism, militarism, secret diplomacy and systems of alliances potentially operating to disrupt the state-system and to produce the most stupendous catastrophe in all history—the great war of 1914-18. The precipitation of this vast conflict was a shock and a disillusionment, but to hundreds of thousands in the Allied countries, the protracted struggle gradually took on the aspects of a great and disinterested crusade for eternal peace and righteousness. It became "the war to end war."

Statesmen in all Allied countries gave voice to idealistic pronouncements regarding war aims. Premier Asquith spoke of a "real European partnership" and the passing years saw increasing coöperation on the part of the Entente governments. Of particular importance was the series of lofty addresses delivered by President Woodrow Wilson of the United States during the years 1916, 1917, and 1918. On May 27, 1916, speaking before the American League to Enforce Peace, he laid down three general principles which prefigured his international aims during subsequent years: (1) every people has a right to choose the sovereignty under which it shall live; (2) the small states of the world have a right to enjoy the same respect for their sovereignty and for their territorial integrity that great and powerful nations expect and insist upon; and (3) the world has a right to be free from every disturbance of its peace that has its origin in aggression and disregard of the rights of peoples and nations. Here was Wilson's fundamental programme enunciated a year before America entered the War; his subsequent addresses represented merely the elaboration and refinement of details. Speaking before the Senate on Jan. 22, 1917, he demanded the replacement of the old system of alliances by a general concert of powers. His war message of Apr. 2, 1917, emphasized American determination to fight for a "universal dominion of right by such a concert of free peoples" as should bring peace and safety to all nations. Finally, the project for a league was incorporated in his address of Jan. 8, 1918, as the Fourteenth Point, viz., "A general association of nations must be formed under specific covenants for the purpose of affording mutual guarantees of political independence and territorial integrity to great and small states alike." At the time of the Armistice this stipulation, among others, was accepted by Germany and by the Entente Powers as the basis of the future peace settlement. Wilson resolved to attend the Paris Conference in person to make sure that his project would be realized.

Organizations such as the American League to Enforce Peace and the British League of Nations Association had long been engaged in drawing up plans for keeping the peace. Men like ex-President Taft, Elihu Root, Lord Robert Cecil and Lord Bryce had given the matter careful study, examining with a fresh interest the famous schemes propounded in previous centuries by Pierre du Bois, St. Thomas Aquinas, Marsiglio of Padua, King Henri IV, the Quaker William Penn, the Abbé St. Pierre, the philosopher Immanuel Kant, Czar Alexander I, and others. A league was made part of the war-aims of the Inter-Allied Labor and Socialist Conference of February, 1918. In the spring of 1918, a committee of international lawyers

headed by Lord Phillimore, which had been appointed by the British government to study the subject, made a report formulating in legal, diplomatic phraseology what was deemed to be the practical substance of the multifarious suggestions already before the world. The report favored a guarantee of peace through compulsory arbitration or conciliation, as did the American League to Enforce Peace, but its scheme of organization for the proposed league lacked definiteness. Copies of this report being sent to the British War Cabinet, to the Dominion prime ministers, and to the President of the United States, gave rise to numerous revised drafts. During the early summer of 1918, President Wilson's confidential adviser, Col. E. M. House, rather elaborately revamped the British committee's report, providing a permanent secretariat and a court of international justice, but eliminating the sanction of military force. After considering House's plan, Wilson prepared his own first draft, conspicuously omitting the court and restoring the sanction of physical force. This draft he took with him to Paris where in addition to receiving certain suggestions from his Secretary of State, Mr. Lansing, who championed the theoretical equality of all states and favored legalistic methods of settling international disputes, he was confronted with two new projects, both British, both based in large degree upon the Phillimore report, but each with characteristic features of its own—one by General Smuts of South Africa and the other by Lord Robert Cecil. Profoundly impressed by Smuts's plan, Wilson utilized it in revising his own, taking over a whole new scheme of organization establishing a smaller executive council in addition to the general conference and secretariat proposed by previous plans, more definite ideas concerning limitation of armament, arbitration and its guarantees, and also a mandatory system for the supervision and control of conquered territory. The Inter-Allied Labor and Socialist programme of 1918 had looked forward to the international administration of all colonial empires, but Smuts, to whose mind the mandatory concept had thus been suggested, limited its scope to territories dismembered from the Russian, Habsburg, and Ottoman Empires. Wilson, attracted to the central idea which had such deep roots in historic American policy (e.g. Cuba, etc.), advocated its application to the former German colonies. Cecil's plan, which proposed domination of League activities by an executive council composed exclusively of the Great Powers, did not so much influence the President, but powerful currents of world opinion represented by the labor movement and Jewish propaganda caused Wilson to insert in his second draft provisions according more recognition to the interests of labor in the determination of world affairs and requiring all new states to grant equal rights to their "racial or national minorities." In compliance with Wilson's request, this second draft as printed and circulated on Jan. 10, 1919, brought forth a number of comments and criticisms, some of which (e.g. those submitted by General Bliss and David Hunter Miller) impelled him to prepare a new revised draft. Certain vital differences between this third Wilsonian draft and an official plan transmitted to him from the British delegation (January 19) led to the collation of the two into a composite plan by the legal advisers of the two

delegations. This so-called Hurst-Miller draft, though wholly satisfactory to neither side, provided a broad basis of agreement between them.

"Practically nothing—not a single idea in the Covenant of the League was original with the President. His relation to it was mainly that of editor or compiler, selecting or rejecting, recasting or combining the projects that came in to him from other sources. He had two great basic convictions: that a League of Nations was necessary; that it must be brought into immediate existence. . . ." In December, 1918, Premier Clemenceau of France had openly expressed his desire to retain the old system of alliances; at the same time, Winston Churchill, of the British cabinet, mouthpiece of reactionary militarism, had declared that the League was no substitute for British sea power. At Paris, the European Allies and Japan wanted the territorial, military, and economic settlements made first and in accordance with the provisions of the old secret treaties, before any attempt should be made to establish a league. The French, in listing the subjects to be considered by the Conference, placed the League last. Wilson, however, placed it first and insisted with determination that a League of Nations should be made "an integral part of the general treaty of peace." A resolution to that effect, passed by the Council of Ten on January 22, was accepted by the second plenary session three days later and a commission was appointed, composed of two representatives from each of the five great powers (United States, Great Britain, France, Italy, and Japan) and one from each of five, later nine, small powers. President Wilson became chairman of this commission, the membership of which, as ultimately constituted, embraced such leaders as Premier Orlando of Italy, Baron Makino of Japan, Cecil and Smuts of the British Empire, House of the United States, Bourgeois and Larnaude of France, Venizelos of Greece and Wellington Koo of China. Using the Hurst-Miller compromise plan as a basis of discussion, in preference to drafts submitted by the French and Italians respectively, the commission held 10 meetings, February 3-13. The French desperately endeavored to convert the projected league into a buttress of French security by advocating an international army directed by an international general staff which should execute the decisions of the League and supervise all military affairs including reduction of armaments. The Italians vehemently opposed any attempt to incorporate a provision for the abolition of conscription. The Japanese, supported in this sole instance by the Chinese, insisted upon explicit recognition of the principle of racial equality. Both the French and Japanese suggestions were rejected, however, the most important single alteration being the reinsertion of an article calling for the establishment of a Permanent Court of International Justice. A complete tentative draft of the Covenant was submitted to the second plenary session of the Conference February 14, and adopted unanimously. Meanwhile a keen struggle in the Council of Ten (January 23-30) had resulted in the reluctant acceptance of a resolution providing for the application of League mandates to the administration of former German colonies rather than cessions in absolute sovereignty as demanded by the British, the French, the Italians and the Japanese.

The struggle over the League was by no means at an end. Wilson's visit to America in late February and early March acquainted him with Senatorial opposition to the Covenant, and after consulting with his Democratic advisers and certain leading pro-League Republicans including Taft, Root and Lowell, he returned to Paris determined to secure three amendments designed to cover American criticism. They included: (1) specific recognition of the Monroe Doctrine; (2) provision for voluntary withdrawal of any state (e.g. America) from the League upon stipulated notice; and (3) specific exclusion of domestic questions from purview of League activity. Arriving at Paris, March 14, Wilson quickly repudiated the attempt which had been made during his absence to impose preliminary general peace terms upon the enemy without immediately establishing the League. His desire to have the Covenant amended reopened the former struggle with the French and Japanese over their respective plans for an international military organization and recognition of racial equality. Even the British keenly opposed specific recognition of the Monroe Doctrine but they were eventually won over and, through a personal understanding with Clemenceau over the other French claims before the Conference, Wilson secured sufficient backing to have his amendments adopted and French and Japanese proposals rejected. After five night sessions held from March 22 to April 11 during the most critical period of the Conference, revision of the Covenant was finally completed by the Commission, and on April 28 it was accepted by the fourth plenary session for subsequent incorporation as the first section in each of the major treaties of peace.

The Covenant of the League of Nations as thus framed was a comparatively brief document setting forth in 26 articles the rights, obligations, and privileges of the member states. The 32 Allied and Associated Powers convened at Paris (see PEACE CONFERENCE AND TREATIES), of whom the United States, Ecuador, and Hedjaz alone subsequently refused to join, were designated as original members, and 13 neutral states, viz, Argentina, Chile, Colombia, Denmark, the Netherlands, Norway, Paraguay, Persia, Salvador, Spain, Sweden, Switzerland, and Venezuela, were invited immediately to accede to the Covenant. The desire of the British and Americans forthwith to admit the enemy powers was frustrated by the opposition of France and Belgium. Certain other states—notably Russia and Mexico—whose governments had not been formally recognized by the Powers generally were also temporarily excluded. Provision was made for the admission of any fully self-governing state, dominion or colony as a new member by a two-thirds vote of the General Assembly of the League, and for the withdrawal from the League of any member on two years' notice, "provided that all its international obligations and all its obligations under this Covenant shall have been fulfilled." In accordance with the former provision, Austria and Bulgaria as well as Finland, Luxemburg, Costa Rica and Albania were admitted to membership in December, 1920; Estonia, Latvia, and Lithuania in September, 1921; Hungary in September, 1922; and Abyssinia and the Irish Free State in 1923. The nine principal sovereign states still outside the League in June, 1924, were Afghanistan, Ecuador, Egypt, Germany,

Mexico, Russia, Santo Domingo, Turkey and the United States.

Three organs of administration and control and one judicial organ were to be established; namely, an Assembly, a Council, a Permanent Secretariat and a Permanent Court of International Justice. The Assembly was to meet at stated intervals at the seat of the League and was empowered to deal with any matter within the purview of the Covenant, each member state, including the British Dominions, being entitled to only one vote in its meetings though privileged to send at most three representatives. The Council was to consist of representatives of nine states comprising, first, five permanent members—the United States, the British Empire, France, Italy, and Japan—and secondly, four others to be selected or superseded by the Assembly "from time to time at its discretion," the first nonpermanent members being provisionally designated by the Covenant as Belgium, Brazil, Spain, and Greece. Each state represented on the Council was to have only one delegate and only one vote. Additions to either of the two classes of members—permanent and nonpermanent—might be made by the Council if such action secured the approval of the Assembly, and it was also stipulated that any member of the League might be represented at meetings of the Council whenever any matter specifically affecting its interest should come up for consideration. Parties to disputes were to have no vote, however, and decisions by the Council normally had to be unanimous. The Permanent Secretariat, comprising a Secretary General and such secretaries and staff as might be required, was to be established at Geneva, the first seat of the League.

The purposes of the League as set forth in the preamble to the Covenant were "to promote international coöperation, and to achieve international peace and security." The Covenant embodied pointed endeavors to mitigate or eliminate the general forces alluded to above as operating to cause wars in the state system, namely nationalism, militarism, imperialism, secret diplomacy and systems of alliances, and also to provide agencies for the settlement of specific disputes between nations. To this end the signatory powers pledged themselves (Article X) "to respect and preserve as against external aggression the territorial integrity and existing political independence of all members of the League." The members of the League recognized that the maintenance of peace required the "reduction of national armaments to the lowest point consistent with national safety and the enforcement by common action of international obligations." To the Council was intrusted the important function of formulating decennial plans for the reduction of armaments, which having once been accepted by the particular governments concerned were not to be changed without the consent of the Council. The Council was also empowered to suggest means for preventing the evils attendant upon the manufacture by private enterprise of munitions and implements of war. Members of the League undertook to interchange full and frank information as to the scale of their armaments and their military, naval and aeronautical programmes.

Any war or threat of war, whether directly affecting any member or not, was declared to be a matter of concern to the whole League,

and at the request of any member, a meeting of the Council should be summoned forthwith. Each member possessed the friendly right of calling the attention of the Assembly or of the Council to any circumstance threatening international peace or good understanding. Members of the League were pledged to submit all potentially dangerous disputes, which could not be satisfactorily settled by diplomacy, either to arbitration or to inquiry by the Council and in no case to resort to war until three months after the award of the arbitrator or the report of the Council. The Permanent Court of International Justice, for whose establishment provision was made, was to be endowed with power to determine any international dispute submitted to it by the contestants and also to give an advisory opinion on any matter referred to it by the Council or by the Assembly. Dangerous disputes not settled by diplomacy, or submitted to arbitration, were to be referred to the Council or through it to the Assembly, and if all efforts at conciliation failed, the facts and recommendations were to be published. Members obligated themselves not to go to war with the party to the dispute which accepted the suggestion of the conciliating agency, but any member resorting to war in violation of its covenants was *ipso facto* to be deemed to have committed an act of war against all other members, who bound themselves immediately to sever all commercial, financial and personal relations with the nationals of the covenant-breaking state and to prevent any intercourse between that state and any other state whether a member of the League or not. The Council was invested with the duty of recommending what effective contribution each member of the League should contribute to the armed forces to be used to protect the covenants of the League. In the event of a dispute between a member of the League and an outside state, or between two or more nonmember states, the League was to offer its services; and if the invitation should be rejected and a member of the League attacked, all other members were to come to its aid.

The Covenant expressly affirmed the validity of international engagements, such as treaties of arbitration or regional understandings like the Monroe Doctrine, for securing the maintenance of peace, but all other obligations or understandings inconsistent with the terms of the Covenant were to be abrogated, the Assembly being empowered to advise the reconsideration of treaties which had become inapplicable. A blow was dealt to secret diplomacy by the requirement that henceforth every new treaty or international engagement should be forthwith registered with the Secretariat and published by it; and no such pact was to be considered binding until so registered.

As territorial greed and colonial rivalries had been prolific causes of war in the past, the Covenant provided a new system for controlling the German colonies and dismembered portions of the Turkish Empire which were not to be divided among the victors as spoils but administered as sacred trusts of civilization for the benefit of the peoples concerned. The various areas were to be intrusted to various members of the League under mandates prescribing the degree and kind of authority that they might exercise, guaranteeing certain rights to the natives and requiring annual reports from the

mandatories. In other ways the League was inextricably interwoven with the general peace settlement. To it were intrusted the administration of international areas, such as the Saar Basin (q.v.) and the Free City of Danzig (q.v.) and the conduct of certain plebiscites such as those in North Schleswig, Allenstein and Marienwerder, and Upper Silesia (qq.v.).

Members of the League pledged themselves to cooperate in the reciprocal establishment of freedom of transit and equitable treatment for commerce in the improvement of labor conditions, the international prevention of disease and mitigation of suffering, the suppression of the arms traffic, the traffic in women and children, and in opium and other dangerous drugs. To the League were to be transferred all international bureaus and commissions. Provision was made for the amendment of the Covenant at any time by a unanimous vote of the Council and by a majority of the Assembly, though the somewhat faulty drafting of the Covenant was manifested by omission of any reference to ratifications.

The League of Nations formally came into existence on Jan. 10, 1920, with the exchange of ratifications of the Treaty of Versailles. During the years 1920-24 League activities developed along three main lines: (1) establishment and operation of its organs of administration and control; (2) the promotion of general international welfare; and (3) the partial elimination of general causes of war and the attempted solution of certain specific disputes arising between nations.

First convened on Jan. 16, 1920, the Council, up to June, 1924, held 28 sessions in various places. Official rules of procedure were early adopted and the Council rapidly demonstrated itself to be a flexible organ of action well adapted to the requirements of a constantly changing situation. The passing years witnessed a notable expansion of its agenda from three items at the first session to about 75 in 1924. In 1922, with the subsequent approval of the Assembly, the Council increased its nonpermanent membership from four states to six, the permanent members, due in part to the continued abstention of the United States, being thus outnumbered six to four. It became the practice of the Assembly to elect its representatives to the Council annually, though the same state might be reflected indefinitely. Greece was on while Venizelos was in power; Sweden's election (1922) indicated that Premier Branting represented a widely held point of view; China, designated in 1920, was dropped when Wellington Koo returned to Peking; and Czechoslovakia was added (1923) because Eduard Benes exercised influence and commanded confidence outside of his own country. The states elected at the fourth annual meeting of the Assembly (September, 1923) were Belgium, Brazil, Czechoslovakia, Spain, Sweden and Uruguay. In September, 1923, the Council decided that henceforth regular sessions would be held quarterly, in March, June, September, and December.

The Assembly first met during November and December, 1920, at which time it was decided that future sessions should be held annually in September. Though not possessing the flexibility and initiative of the Council, the Assembly came to occupy a place of considerable importance in the League. Its membership has

embraced men of experience in public affairs, often endowed with keen powers of criticism and in some cases real constructive ability—premiers, foreign ministers, members of parliaments and diplomatic corps. By prescription in the Covenant and by practice the Assembly came to perform three duties exclusive to it, i.e. passing the annual budget, admitting new members, and electing nonpermanent members of the Council. Annual reports of the work of the Council and Secretariat submitted to the Assembly for review, criticism, and approval, elicited discussions constituting an extremely useful appraisal of international progress and a challenging conspectus of world opinion upon important questions.

By an annex to the Covenant, Sir Eric Drummond, of Great Britain, was named first Secretary General and during the next four years an elaborate but highly efficient and flexible Secretariat was developed under his direction. The Secretariat was charged with the task not only of preparing the work and executing the decisions of the Council and Assembly, but also of placing at their disposal extensive, detailed, specific, and up-to-date information upon the various topics and problems confronting one or the other. An admirable organization was developed to direct the multifarious and intricate activities falling under its supervision, the Secretariat being divided into 10 technical sections and six administrative departments with a technical staff comprising about 300 experts of 30 different nationalities. Nearly 500 public and private international agencies and commissions had also been placed under the ægis of the League.

In February, 1920, an advisory commission of 12 eminent international jurists was appointed by the Council to draft a statute organizing the Permanent Court of International Justice authorized by the Covenant (Article 14). With the exception of the provision for obligatory jurisdiction and certain minor details, their report was approved by the Council during the summer of 1920 and adopted by the Assembly at its first meeting. Thirty-six nations made a futile effort to secure compulsory jurisdiction for the new court, but the Great Powers refused to engage themselves to submit all justiciable disputes thereto, although subsequently numerous smaller states signed an additional optional clause for compulsory jurisdiction, or entered into mutual agreements to that effect. "The jurisdiction of the Court," ran Article 36 of the statute creating it, "comprises all cases which the parties refer to it and all matters specially provided for in the Treaties and Conventions in force." The new court was designed to be an impartial, permanent judicial organ, capable of settling international disputes of a purely legal character without the intrusion of political considerations. It was not intended to duplicate or supersede the Court of Arbitration created by the First Hague Peace Conference (1899). The two courts continued to exist side by side, the old court having the function of "arbitrating" a difficulty, the new one the function of deciding what law applied in any given case. It was not intended, as were the Council and Assembly, to devise arrangements, adjustments, and compromises as a method of harmonizing conflicts between states, but simply to interpret, explain, and apply international laws and conventions. Following a

suggestion made by Mr. Root of the United States, the statute provided for the election of judges for a term of nine years by an absolute majority in the Council and Assembly voting separately, thereby appeasing the demands of both large and small states for commensurate powers of choice. In September, 1921, 11 judges including Prof. John Bassett Moore of the United States, and four deputy judges were chosen in this way. The first regular session of the Court was opened at its permanent seat (The Hague) on June 15, 1922. During the first two years of its existence it functioned very satisfactorily, rendering nine opinions on difficult controversies submitted to its jurisdiction. Eight of these decisions were technically "advisory opinions" on contentious questions submitted by the Council of the League of Nations, viz.: (1) Whether Netherlands had complied with article 389 of the Versailles Treaty in nominating a workers' delegate to the International Labor Conference (decision, affirmative); (2) Whether the competence of the International Labor Office (q.v.) extends to agricultural labor (decision, affirmative); (3) Whether the competence of the same body extends to methods of agricultural production (decision, negative); (4) Whether the British-French dispute regarding French nationality decrees in Tunis and Morocco was a domestic matter which France under Article 15 of the Covenant could refuse to arbitrate, or an international matter subject to arbitration (decision, in favor of France); (5) Whether articles 10-11 of the Treaty of Dorpat placed Russia under legal obligation to Finland regarding the autonomy of Eastern Karelia (as Russia had not accepted its jurisdiction, the Court refused to give any opinion); (6) Whether Poland had the right to oust certain German colonists (decision against Poland); (7) Whether the Minority Treaty signed by Poland entitled the League to deal with Poland's refusal of Polish nationality to certain German residents (decision, affirmative); (8) Whether the decision of the Conference of Ambassadors, July 28, 1920, settling the boundary between Poland and Czechoslovakia in the Jaworzina (Zips) district was definite and final (decision, affirmative). Of different nature was the suit for 165,749.35 francs damages brought by England, France, Italy, and Japan against Germany for refusing to allow the steamship *Wimbledon* to pass through the Kiel Canal; the decision, unfavorable to Germany, awarded the plaintiffs 25,000 francs less than they had claimed, and was of considerable significance for the future regulation of international canals in time of war.

Up to 1924, perhaps the chief service performed by the League of Nations had been the promotion of international welfare. Its humanitarian work proved varied and efficient, and by extensive technical investigations it threw much light upon unsolved social and economic problems. In restricting the traffic in opium and other dangerous drugs, in convoking an international assembly to deal with the white slave traffic and establishing an advisory committee to supervise the enforcement of the convention adopted, in creating a commission on intellectual coöperation, and perhaps most notably of all in organizing international coöperation to combat epidemics and promote medicine and sanitation, the League so well demonstrated the practicability of humanitarian international-

ism that some nonmembers gave their full coöperation and even the United States, though opposed to the League, accorded quasi-official collaboration. More important, perhaps, in general estimation, was the success of the League in the economic reconstruction of bankrupt Austria, a success followed by plans for League control of Hungarian finance. The function of eliminating the general causes of war and of settling specific disputes between nations had been less successfully fulfilled. In its endeavors to secure a reduction of armaments the League was handicapped by the intransigence of certain Great Powers, though its investigations and recommendations on the subject proved enlightening and helpful (see WASHINGTON CONFERENCE). The supervision of mandated territories (see PEACE CONFERENCE AND TREATIES) proved moderately beneficent and efficient. A controversy between Finland and Sweden over the Aland Islands (q.v.) was successfully adjusted; the intervention of the League in the Albanian question was rewarded by a considerable measure of success (see ALBANIA), as were also its services in partitioning Upper Silesia between Poland and Germany. A dispute between Poland and Lithuania over Vilna (q.v.) was less satisfactorily dealt with, though a dispute between the same two nations over the port of Memel (q.v.) was decided in March, 1924. The League was practically defied by Italy (q.v.) during the Corfu incident (August-September, 1923), and its services were not utilized in connection with the two major armed conflicts which had raged since 1919—the Russo-Polish War and the Græco-Turkish War. The explanation for the undoubted impotence of the League in these and other instances is to be sought in the fact that the Allies strove, rather unsuccessfully, to deal through the Council of Premiers rather than through the League, with questions arising from the peace settlement.

With the advent to power of new governments in Great Britain (q.v.) and France (q.v.) the outlook for the League of Nations perceptibly brightened, for the Socialist premiers, MacDonald and Herriot, announced their intention of making more extensive use of its services. Simultaneously, the widespread accordance of *de jure* recognition to Soviet Russia paving the way for eventual admission to the League, the probability that Germany might shortly be admitted, and the appearance of a strong movement in the United States favoring adhesion to the Permanent Court of International Justice and possible entrance into the League itself; all seemed to prefigure a more auspicious future for the newly devised instrument of international coöperation. See PEACE CONFERENCE AND TREATIES; LABOR ORGANIZATION, INTERNATIONAL; UNITED STATES; GERMANY; GREAT BRITAIN, etc.

LEATHER. The leather industry in the United States in the period from 1914 to 1924 underwent many vicissitudes in which the production of live stock, the demands due to the War and the general change in business and industrial conditions figured. The United States ranked first among the nations of the world in the production of leather, inasmuch as its total production of finished leather was estimated to be equal to that of all the rest of the world combined. However, the production of cattle-hides, calf-skins and sheep-skins did

not increase proportionately with the demand for leather, and American tanneries were forced to import a considerable amount of material. For example, in 1923 while there was a large production of hides, yet almost 45 per cent of the raw material entering into the manufacture of leather was imported, with the exception of goat-skins, of which 98 per cent were imported. Normally, in the United States there is a greater production of leather than the domestic markets can consume and this production must be taken care of by substantial exports, which in 1919 reached a peak value of \$218,783,300. It is apparent, therefore, that the condition of this industry is more or less connected with world conditions, and in few American industries are there such serious fluctuations as in those connected with the production of leather.

In the United States, the finished product of the tanning industry consists of whole hides, sides, backs, bends, butts and offal, or skins, and the four main groups of finished leather products divided into: (1) sole, belting, side, upper, patent, harness, back and upholstery; (2) calf and kip upper leather; (3) goat and kid upper and fancy leather; (4) sheep and lamb upper, lining and fancy leather. The tanning industry, according to the Bureau of the Census, 1921, ranked 10th among the 14 leading industries of the United States when considered from the viewpoint of the total value of the product. As already stated it is necessary for the United States to import approximately 50 per cent of the calf-skins, 30 per cent of the calf-hides, 99 per cent of the goat-skins and 63 per cent of the sheep-skins used in its tanning industry; or, in other words, fully 50 per cent of the hides and skins entering into international trade are taken by the United States, exclusive of those originating in the country.

In 1922, the American tanning industry consumed approximately 132,000 hides and skins, of which 81 per cent was used in the production of shoe leathers, 9.8 per cent in fancy book-binding and kindred leathers, 6 per cent in glove leather and 3.2 per cent in belting, bag, harness and upholstering leather. The consumption of the various hides and skins in 1922 was as follows: cattle hides, 274,000; calf- and kip-skins, 15,835,000; goat- and kid-skins, 48,814,000; sheep, lamb and cabretta, 39,886,000, and other hides and skins, 3,248,000.

The American leather production in the period from 1914 to 1922, as summarized by the Bureau of the Census, is given in the table.

COMPARATIVE TABLE OF AMERICAN
LEATHER PRODUCTION
(Figures represent thousands)

Classes	1914	1920	1921	1922
Sole leather, sides.....	18,075	18,392	18,062	17,700
Belting leather, butts....	647	1,677	1,195	991
Side upper and patent, sides	10,036	16,216	14,872	22,976
Harness leather, sides..	2,777	1,153	811	1,380
Bag, case, and strap, sides	1,004	826	820	1,286
Upholstery, hides.....	654	827	413	720
Calf and kip, skins.....	16,067	10,900	14,888	15,634
Goat and kid, sides....	37,775	(*)	35,058	48,814
Sheep and lamb, skins..	42,038	29,987	29,320	40,951

* Production figures not available for this year.

The only comment necessary in connection with this table is the statement that the production of hemlock sole leather had declined from 10,-

000,000 sides in 1904 to 70,000 sides in 1922, owing largely to the development of the tanning and shoe industries in the British Colonies and Dominions, which rendered unnecessary this leather that was formerly used chiefly in shoes for the British Colonial trade. On the other hand, there had been increased production in oak and union sole leather. From 1904, when nearly 4,400,000 sides were used in harness leather, or 12 per cent of the total sides tanned, there was a decline, so that in 1922 harness leather amounted to but 1,380,000 sides, or 3 per cent of the total sides tanned, owing obviously to the decreasing production of harness leather on account of the use of automobiles and tractors and the liquidation of war stocks. See **BOOTS AND SHOES**.

LEBANON, GREATER. See **SYRIA**.

LE BARON, WILLIAM (1883-). An American editor and playwright, born at Elgin, Ill. He studied at the University of Chicago and at New York University, and served as editor of *Collier's Weekly* and of Cosmopolitan productions. He was the author of several successful plays, including *The Very Idea*; *Her Regiment*; *Back to Earth*; *Apple Blossoms*; *Nobody's Money*; *The Scarlet Man*, and *The Love Letter*.

LE BON, GUSTAVE (1841-). A French anthropologist (see VOL. XIII). His most important recent works are: *La Vie des Vérités* (1914); *Enseignements Psychologiques de la Guerre Européenne* (1915); *Premières Conséquences de la Guerre: Transformation Mentale des Peuples* (1916); *Hier et Demain: Pensées Brèves* (1918); *Psychologie de l'Education* (1917); *Psychologie des Temps Nouveaux* (1920).

LE CHATELIER **PRINCIPLE.** See **CHEMISTRY, PHYSICAL**.

LECOINTE, SADI (?-). A French airman who made a new altitude record in 1923 (October 30) at Issu-les-Moulineaux, France. He rose 36,555 feet in a Nieuport Delage plane *Hispano*, breaking the 1921 record made by Lt. J. A. Macready, U. S. A. To the middle of 1924, Lecoite had made 19 world's records. He was an Officer of the Legion of Honor.

LEE, JAMES MELVIN (1878-). An American editor, born at Port Crane, N. Y. He was graduated from Wesleyan University in 1900 and in 1901-02 taught at the Western Reserve Seminary in Ohio. He then entered the newspaper business and was editor of many periodicals, including *Outing*, *Leslie's Weekly*, and *Judge*. He was lecturer on journalism at the New York University in 1910-11, and in the latter year became director of the department of journalism in that university. He wrote *How to Be Self-supporting at College* (1903); *History of American Journalism* (1917); *Opportunities in the Newspaper Business* (1919).

LEEWARD ISLANDS. A group of islands in the British West Indies, constituting a colony. They comprise Antigua, Montserrat, St. Christopher and Nevis (usually called St. Kitts), a part of the Virgin group, Dominica, and their dependencies. Total area, 715 square miles; population, 122,242 in 1921 (127,193 in 1911). The leading products continued to be sugar, molasses, lime-juice, coconuts, and fruits. Imports for 1913-14, 1920 and 1921 were £588,362, £1,527,880, and £1,050,312. Exports for the same years totaled £563,963, £1,781,361, and

£970,694. Revenues and expenditures of government follow for 1921-22 (1913-14 figure in parentheses): revenue, £260,671 (£174,331); expenditure, £303,575 (£171,128); public debt, on Mar. 31, 1922, £250,850 (£244,689).

LE GALLIENNE, EVA (1899-). An actress born in London, England, the daughter of Richard Le Gallienne. She was educated in France at the Collège Sevigné and started her stage career in London at the Prince of Wales Theatre there in 1915 in *The Laughter of Fools*. The next year she went to New York and gave her first American performance in *The Melody of Youth*. Other successes included: *McLazarus* (1916-17); *Off Chance* (with Ethel Barrymore 1917-18); *Not So Long Ago* (1920-21); *Lilom* (1921-22); *The Swan* (1923).

LEGINSKA, ETHEL (real name LEGGINS) (1883-). An English pianist, born at Hull. After studying four years at the Hoch Conservatory in Frankfurt, she continued her studies with Leschetizky in Vienna for three years more. Her successful début in London was followed by extended tours of Europe. She made her American début in New York (January, 1913), but did not establish herself as a really great pianist until the next year, when she began to play colossal programmes, well calculated to show her transcendent technic and masculine power. Overwork brought on a nervous breakdown in 1917, obliging her to retire temporarily from the concert stage. During her convalescence she became fired with the ambition to win laurels as a composer, and for this purpose studied composition with Ernest Bloch in New York. She returned to the concert stage in 1921, but her appearances after that time were rather infrequent. Her compositions, which are decidedly futuristic, consist of songs, pieces for piano, *Four Poems* (after Tagore) for string quartet, and a symphonic poem, *Beyond the Fields We Know*.

LEGION, AMERICAN. A society of veterans of the War in Europe, organized Mar. 17, 1919, in Paris, France, by members of the Army and Marine Corps serving with the American Expeditionary Forces. On Sept. 16, 1919, it was incorporated by Act of Congress, declaring itself to be "patriotic, nonpartisan, nonpolitical, nonmilitary, and permitting no distinction due to rank or place of service." Membership was open to any soldier, sailor, or marine who served honorably between Apr. 6, 1917, and Nov. 11, 1918, and women enlisted or commissioned in any branch of service during that period. The Legion held its first national convention at Minneapolis, Minn., Nov. 10-12, 1919. It adopted a constitution, elected Franklin D'Olier, of Philadelphia, national commander, and began its career as an established body.

It immediately entered on an aggressive campaign against political radicalism, draft evaders, slackers, and propagandists of subversive political doctrines. This activity brought it into frequent clashes with the radical element in which several Legionnaires lost their lives. For a time there was an estrangement between the Legion and several branches of organized labor, but this breach was healed. In 1920 Samuel Gompers, president of the American Federation of Labor, endorsed the Legion and urged union members to join it. In 1919 it began a campaign for a military policy based on the selective draft in time of war, with a navy

second to none and a small Regular Army in time of peace, but with an organized and completely officered peace-time reserve capable of expansion to a strength of 4,000,000 in war time. This was the basis of the Defense Act which became a law in 1920. In 1924 the Legion advocated legislation controlling prices in war time and effecting an industrial mobilization calculated to minimize profiteering. In 1922 the Legion conducted an investigation of war-time profiteering which resulted in many prosecutions and the recovery of several millions of dollars from war contractors to the public treasury. It made special efforts for the relief of wounded and disabled veterans and for the dependents of its deceased members. It condemned the government agencies dealing with these problems in 1919 and 1920 as incompetent and neglectful and in some instances built its own hospitals for veterans. It recommended the consolidation of scattered government agencies of relief into one body, which was done in 1921 when the United States Veterans' Bureau was created. It organized and maintained a nationwide organization, with representatives in every State to inspect hospitals, sanitoriums, and training centres in which disabled veterans are recuperating, and to act as counsel for veterans presenting claims before the Veterans' Bureau.

The Legion was instrumental in organizing veterans' associations in other Allied countries. In Great Britain five veterans' societies united to form the British Legion, modeled closely on the American organization. The Legion was instrumental in forming and extensively financed the Fédération Interalliée des Anciens Combattants, a union of veterans' societies of the Allies. The chief aim of the F. I. D. A. C. is to promote international peace by gradual mutual disarmament among nations. The American Legion urged drastic restriction of foreign immigration until such time as America's present foreign population can be taught the English language and brought into conformity with American traditions, ideals, and standards of life. It favored the perpetual total exclusion of Orientals. At its first convention it demanded of the government measures that should relieve service men and women of financial disadvantages incident to their service. This was the inception of the Legion's fight for an adjusted compensation or bonus law, which finally was passed over the veto of President Coolidge in 1924.

The Legion's second national convention was held at Cleveland in 1920. Frederic W. Galbraith, Jr., of Cincinnati was elected national commander. Mr. Galbraith was killed in a motor car accident at Indianapolis in June, 1921, and John G. Emery, of Grand Rapids, Mich., was selected to complete his term, by the National Executive Committee of the Legion, the ruling body of the organization between national conventions. In 1921 the Legion's national convention was held in Kansas City. Hanford MacNider, of Mason City, Iowa, was elected national commander. The American Legion Auxiliary, composed of mothers, wives, sisters, and daughters of Legion members or of deceased veterans, was organized, and Mrs. Lowell F. Hobart was elected president. In 1923 the fourth national convention was held at New Orleans. Alvin M. Owsley, of Denton, Texas, was elected commander and Mrs.

Kate Waller Barrett of Alexandria, Va., president of the Auxiliary. In 1924 the fifth convention was held, at San Francisco. John R. Quinn, of Delano, Cal., was chosen commander, and Mrs. Franklin Lee Bishop of Leicester, Mass., was elected president of the Auxiliary. The national headquarters of the Legion were in Indianapolis, Ind. In 1924 the organization embraced 68 departments located in the 48 States, the District of Columbia, and 19 outlying possessions and foreign countries. In these departments were situated 11,100 posts, the smallest units of the organization. Departments and posts chose their own officers. National membership in the Legion was granted to all paying national dues yearly, as distinguished from post and department dues. National membership in 1919 was 450,000; 1920, 800,000; 1921, 750,000; 1922, 700,000; 1923, 665,000; 1924 (estimated), 725,000. M. James has chronicled the organization in his *History of the American Legion*.

LEGUIA, AUGUSTO B. (1863-). A Peruvian statesman (see Vol. XIII). In 1919, he was chosen President of Peru for the term 1919 to 1924, succeeding Dr. José Pardo who was made prisoner by the Peruvian troops as the result of the disputed election of May 18. Although assuming the position by a *coup d'état* on July 4, 1919, Leguia's election was afterwards confirmed and legalized by the Peruvian Congress. He was accused by some of his countrymen of being a despot.

LEHIGH UNIVERSITY. A nonsectarian institution for the higher education of men at Bethlehem, Pa., founded in 1866. The student enrollment increased from 672 in 1914 to 1056 in 1923-24, the faculty from 75 to 107 members and the library from 133,200 to 155,000 volumes. The productive endowment in 1914 was \$1,314,000, and the income \$240,000, as compared with an endowment of \$3,000,000 and an income of \$551,085 in 1922-23. Taylor Gymnasium, and Coppée Hall, named in memory of the first president of the university, Dr. Henry Coppée, were built in 1914, an extension to the chemistry laboratory was completed in 1920, and the Alumni Memorial Administration Building, a memorial to the men of the university who died in the War, was completed in 1924. Evening schools in business administration and naval architecture were established in 1920, and in 1923 a university health service, providing dispensary service and annual physical examination for all students, was opened. An endowment campaign for \$4,000,000 was started in 1923. Charles Russ Richards, M.M.E., Eng.D., LL.D., succeeded Henry Sturgis Drinker, LL.D., E.M., as president in 1922.

LEITH, CHARLES KENNETH (1875-). An American geologist, born at Trempealeau, Wis. He studied at the University of Wisconsin, and in 1900, became assistant geologist with the United States Geological Survey, which position he held until 1905. Meanwhile he was called to the University of Wisconsin, where in 1903 he became full professor of geology. In 1905, he became lecturer on pre-Cambrian geology at the University of Chicago. Dr. Leith specialized on pre-Cambrian, structural, metamorphic, and economic geology, and is an accepted authority on the iron districts of the United States and on the origin of iron ores. During the War he was an adviser on minerals to the United States Shipping, War Trade, and

War Industries Boards (1918) and later (1919) to the American Commission to Negotiate Peace in Paris.

LELAND STANFORD JUNIOR UNIVERSITY. See STANFORD UNIVERSITY.

LEMBERG. See GALICIA; UKRAINE.

LENGLEN, SUZANNE. (?-). Tennis player, born near Paris, France. She won the women's Olympic singles championship in 1920 and has since been recognized as the greatest woman tennis player the game has ever known. Because of ill health she was unable to defend her laurels in 1924 either at the English championships at Wimbledon or the Olympic Games at Paris.

LENIN, NIKOLAI (VLADIMIR ILYITCH ULYANOV) (1870-1924). A premier of Russia and leader of the Bolsheviks. He was born at Simbirsk on the Volga, the son of a councilor of state of the Government of Simbirsk. He was Greek Orthodox by religion, educated at the Simbirsk Gymnasium and the University of Kazan, and became prominent after 1890 as a leader of the radical Social Democrats. In 1897, he was exiled to Siberia for three years, and in 1900 left Russia, becoming a member of the Central Committee of the Social Democratic party, and a leader of the Russian émigrés. In 1914 he went to Switzerland, and from there advocated sabotage and armed revolt against the War. He returned to Russia, and when the Kerensky régime was overturned in November, 1917, assumed control of the government of the People's Commissars. The Russian people wanted peace, and he promised it to them. They wanted revenge for wrongs suffered by them and were bent on destroying everything. Lenin told them to take the land and the buildings for themselves—that they were the real owners. The people would not destroy their own property, and in this way about 75 per cent of Russia's wealth was saved. Later, because of the ignorance of the peasants, he encouraged individual initiative in agriculture and industry. At the end of 1921, Lenin became very ill, and for two years was unable to take active part in the administration of the government, and others governed in his name. He died early in 1924. Lenin published several books and pamphlets which attracted much attention. Among his earlier publications are *Two Tactics* (1905) and *Materialism and Empiric Criticism* (1909). See RUSSIA.

LENTELLI, LEO (1879-). A painter and sculptor born in Bologna, Italy, who is instructor of drawing at the Art Students' League, New York. He is best known for his figure of the Savior and 16 figures for the reredos of the Cathedral of St. John the Divine, New York. He also designed groups for the Panama-Pacific International Exposition in San Francisco in 1915. Among his awards was the gold medal for sculpture offered by the New York Architectural League in 1922. He became a member of the National Society of Sculptors in 1907.

LEONARD, ADNA WRIGHT (1874-). An American bishop, born at Cincinnati, Ohio. He was graduated from New York University in 1899 and from the Drew Theological Seminary in 1901. In 1889, he was ordained to the Methodist Episcopal ministry and held pastorates at Porto Rico, Rome, and several cities in Ohio. From 1910 to 1916, he was pastor in Seattle, Wash. In the latter year he was elected bishop.

He is the author of *The Shepherd King* and *Evangelism in the Remaking of the World*.

LEONARD, BENNY (1896-). Professional boxer born in New York City. He began his boxing career in 1912 and five years later won the world's lightweight championship through his defeat of Freddy Welsh of England. He has taken part in two hundred bouts and for six years has successfully defended his world's title against all comers.

LEONARD, WILLIAM ELLERY (1876-). An American educator, born at Plainfield, N. J. He was graduated from Boston University in 1898 and took postgraduate courses at Harvard, at Boston University, and in Germany. He served as instructor and principal in several high schools in New York and in Massachusetts, and in 1906 was appointed instructor of English at the University of Wisconsin. He was successively assistant professor and associate professor of English in that university. He was a member of many learned societies and was the author of *Sonnets and Poems* (1906); *The Poet of Galilee* (1909); *The Lynching Bee and Other Poems* (1920). He also translated many important plays and works from foreign languages.

LEONI, FRANCO (1864-). An Italian composer, born at Milan. He studied at the Milan Conservatory under Dominiccetti and Ponchielli. In 1892, he moved to London. He owes his reputation mainly to his very successful opera *L'Oracolo* (London, 1905; New York, 1915). His other operas are *Raggio di Luna* (Milan, 1888), *Rip Van Winkle* (London, 1897) and *Ib and Little Christina* (London, 1901). He also wrote the cantatas *Sardanapalus*, *The Gate of Life* and *Golgotha*, and composed many songs.

LEPROSY. Within the decade 1914-24, an attempt was made to place leprosy almost among the curable diseases, although for centuries it has held its position as one of the 100 per cent fatal maladies. This attitude must not be misunderstood, for the numerous leper hospitals and asylums of the world still contained their normal quota of incurable patients, and doubtless this will be the case for a generation or more to come. The comparatively hopeful attitude was based on several truths, the importance of which was realized fully. Mild incipient cases in young subjects show a certain tendency to self-limitation and the application of combined hygienic resources is alone sufficient to produce the arrest and relative cure of certain cases. In the third place, the drug chaulmoogra oil, and more recently its active principles when isolated, seem to possess a specific virtue against the disease. It is therefore possible to isolate a fractional portion of lepers in whom the prognosis is by no means hopeless, and it ought to be possible to get hold of incipient cases in the relatively young and subject them to early treatment. The problem then bears a resemblance to that of tuberculosis, where the same possibility obtains. The other fraction of lepers will continue to inhabit the leproseries and with time this fraction should become progressively less in numbers and possibly finally be wiped out. A system of parole prevails among the cured lepers in some localities, and the number that return for treatment gives an inkling as to the success of the latter; thus, of the paroled lepers in the Hawaiian Islands under charge of the United

States government, only 8 per cent return for further treatment.

LE ROY, EDOUARD (1870-). A French philosopher, born at Paris. His family were devout Catholics, and the future thinker grew up with a strong mystical vein in his intellectual constitution. He was admitted to the Ecole Normale Supérieure in 1892, and devoted himself first to mathematics and then to philosophy. He received his doctorate in the mathematical sciences in 1898. After serving as professor of mathematics in various lycées, he was called to take Bergson's place in the Collège de France in 1914. In 1919, he was elected to the Academy of Moral and Political Sciences, and in 1921 was formally appointed to the chair of philosophy at the Collège de France. In 1923, he was visiting professor at Columbia University, New York. In his general philosophy, Le Roy, like Bergson, opposed the stereotyped formal intellectualism, which was fashionable at the end of the nineteenth century. He held that there was no essential distinction between the mathematical and physical sciences, that both dealt with facts recognized and organized by the spirit. He also held that there was no essential distinction between scientific rationalism and the religious aspiration for salvation and perfection. He was preparing (1923) three works on these lines; the first dealing with the mathematical sciences, the second with the empirical sciences, and the third with the idealistic aspirations of philosophy.

In addition to studies published in the *Revue de Métaphysique* and in the *Annales de Philosophie Chrétienne*, Le Roy published in 1911 an exposition of the Bergsonian method in philosophy, *Une Philosophie Nouvelle: Henri Bergson*.

LEUSCHNER, ARMIN OTTO (1868-). An American astronomer, born at Detroit, Mich. He was graduated at the gymnasium at Cassel, Germany, and in 1888 from Michigan, and received his Ph.D. from the University of Berlin (1907). He was an instructor of mathematics at the University of California, where in 1907 he became professor of astronomy and in 1913 dean of its graduate school. During the War he was connected with the Chemical Warfare Service with the rank of major and was also associated with the division of physical sciences of the National Research Council. Dr. Leuschner gave much attention to the perturbations of the Watson asteroids and for his studies on this subject he received in 1915 the Watson medal of the National Academy of Sciences. He also made valuable improvements in the methods of determining preliminary orbits of comets and planets, and published various papers on theoretical astronomy.

LEVERMORE, CHARLES HERBERT (1856-). An American educator and peace advocate, born at Mansfield, Conn. He was graduated from Yale in 1879, and after serving as teacher in history in several schools, he became professor of history at the Massachusetts Institute of Technology in 1888, serving until 1893. From 1896 to 1912, he was president of Adelphi College, Brooklyn, and from 1913 to 1917, director of the College and University Bureau of the World Peace Foundation. He was a member and official in many other peace organizations and lectured much on subjects relating to peace. In 1924, he was awarded the

Bok Peace Prize of \$100,000 for the best plan for insuring peace among the nations. He is the author of *The Academy Song Book* (1895); *Students' Hymnal* (1911); *American Song Book* (1917).

LÉVI, SYLVAIN (1863-). A French Orientalist (see VOL. XIV). He is a highly esteemed contributor to periodicals devoted to Orientalism and the author of a number of books, among them: *Literary History of Buddhism*, with Winternitz and Huber (1920); a translation with introduction of *La Légende de Nal et Damajanti* (1920); *Contes et Légendes du Bouddhisme Chinois* (1921).

LEVINTHAL, BERNARD LOUIS (1866-). An American rabbi, born at Vilna, Russia. He was educated in the schools of Russia and came to the United States in 1891. In the same year, he was minister of the United Orthodox Hebrew Congregations of Philadelphia, and was the founder and president of the Orthodox Rabbinical Association of America. He was a member of the delegation of the American Jewish Congress to the Peace Conference in Paris in 1919.

LEVITZKI, MISCHA (1898-). A Russian pianist, born at Kremenchug. Having begun his musical studies under A. Michailovski in Warsaw, he continued under S. Stojovski at the Institute of Musical Art in New York (1907-11). The next four years he studied, at irregular intervals, with E. Dohnányi at the Königliche Hochschule in Berlin, winning the coveted Mendelssohn prize. Although he had played in public as an infant prodigy, his career as a full-fledged pianist dates from his début at Antwerp (1912). He then made tours of Belgium, Germany, Austria, Hungary, and Scandinavia. His American début took place in New York (Oct. 17, 1916). In 1921, he made a tour of Australia. He is recognized as one of the masters of the keyboard.

LÉVY-BRUHL, LUCIEN (1857-). One of the leading French philosophers of the sociological school. He was born in Paris and was educated at the Ecole Normale Supérieure. In 1899, he was called to the faculty of the Sorbonne, and in 1918 he was elected to the Institute (*Académie des Sciences Morales et Politiques*). Originally attracted in the direction of idealistic metaphysics, Professor Lévy-Bruhl swung over to the sociological and objective study of the moral sciences. The publication of his book *La Morale et la Science des Mœurs* (1903) created a philosophic furor, owing to the boldness with which he attacked all attempts to rest ethics on metaphysics. He pleaded for the recognition of the relativity of moral laws and customs to the structure of societies. In pursuit of the sociological programme, M. Lévy-Bruhl undertook an interpretation of the mental life of primitive peoples, and published two important works on that subject, *Les Fonctions Mentales dans les Sociétés Inférieures* (1910) and *La Mentalité Primitive* (1922. Eng. trans., 1923). His other works are: *L'Idée de Responsabilité* (1883); *L'Allemagne depuis Leibnitz* (1890); *La Philosophie de Jacobi* (1894); *Lettres Inédites de John Stuart Mill à Auguste Comte* (1899); *History of Modern Philosophy in France* (1899).

LEWIS, CLARENCE IRVING (1883-). An American logician. He was born in California and was educated at Harvard University. Aft-

er teaching at the University of California, he was called to Harvard in 1920. He is the author of a comprehensive *Survey of Symbolic Logic* (1918).

LEWIS, GILBERT NEWTON (1875-). An American chemist, born at Weymouth, Mass. He was graduated from Harvard University and studied at Leipzig and Göttingen. He taught chemistry at Phillips Academy and was instructor at Harvard during 1899-1900 and 1901-06, being on leave during 1904-05 to take charge of weights and measures at the government laboratories in the Philippines. In 1907, he became connected with the physical chemistry research work of the Massachusetts Institute of Technology, where in 1911 he was made professor. In 1912 he became professor of chemistry and dean of the School of Chemistry at the University of California. During the War Professor Lewis was chief of the defense division of the gas service with the rank of lieutenant-colonel, and chief of the training division of the Chemical Warfare Service. He published papers resulting from his studies on the thermodynamic theory and its application to chemistry, electric potentials of the common elements, specific heat of electrons, the structure of the atom and the molecule and the theory of valence. The French government conferred on him the Legion of Honor.

LEWIS, ISAAC NEWTON (1858-). An American soldier and inventor, born at New Salem, Pa. He was graduated from the United States Military Academy in 1884 and was commissioned second lieutenant in the Second Artillery. By successive promotions he rose to the rank of colonel in 1913, and was retired in that year for disability incurred in line of duty. He early made himself an authority on ordnance and was sent to Europe in 1900 to study that subject, his report resulting in the re-armament of the field artillery. The machine gun bearing his name was invented by him and after its rejection by the United States was accepted by the British government. During the War it was used by the Allied armies, by the United States Navy, and the airplanes of the United States and Allies. The royalties, amounting to at least \$1,000,000 on guns made for the United States after it entered the War, were declined by him. His other inventions have included a time-interval clock and bell system of signals, a replottting and relocating system for coast batteries, an automatic sight, quick-reading mechanical verniers for use in coast defenses, electric car lighting, and windmill electric lighting systems.

LEWIS, JAMES HAMILTON (1866-). An American legislator (see VOL. XIV). He served as United States Senator from Illinois from 1913 to 1919, as Democrat. He was candidate for governor of Illinois in 1920 but was defeated. In 1914, he served as United States Commissioner representing the United States Senate at London to execute treaty laws for safety at sea. He wrote *The Two Great Republics: Rome and the United States* (1913), and *History of International Law*. In 1918, he was engaged in special war work in France.

LEWIS, SINCLAIR (1885-). An American author born at Sauk Center, Minn. He received his bachelor's degree from Yale University in 1907 and worked on newspapers in New Haven, San Francisco and other cities. He was successively assistant editor of the *Trans-*

atlantic Tales, *Volta Review*, *Adventure*, Publishers' Newspaper Syndicate, and editor with the Geo. H. Doran Co. to 1916. He became universally known in 1920 through his novel *Main Street*, which for the first time in the history of the novel in the United States treated with utter seriousness and perspicuity life in a small town in the Middle West. This was the manifesto for a new school of Western writers which had been growing since shortly before the War, and the Middle West assumed a dignified and assured place in the literature of this country. His *Babbitt* (1922) treats of the development of a man's bourgeois soul in the Middle West, his one attempt at revolt, and his subsequent return to the respectable fold. Other novels are: *Our Mr. Wren* (1914); *The Trail of the Hawk* (1915); *The Job* (1917); *The Innocents* (1917); *Free Air* (1919); *Dr. Arrow-smith* (1924). He also wrote a play, *Hoboemia*, which was produced in New York City in 1919, and has contributed short stories to the *Century*, *Saturday Evening Post*, and other magazines.

LEWIS, SIR THOMAS (?-). A British physician and leading authority on heart disease. Born in Cardiff, Wales, he was educated in the local university, and received the degree of M.B. in 1905 from the University of London. He subsequently lectured on cardiac pathology in his Alma Mater and when the periodical *Heart* was established became its editor. He was knighted in 1921. Lewis has written much on the heart, his major publications comprising *The Mechanism of the Heart Beat* (1911); *Clinical Disorders of the Heart Beat* (1912); *Clinical Electrocardiography* (1913); *Lectures on the Heart* (1915); *The Soldier's Heart and the Effort Syndrome* (1919); *The Mechanism and Graphic Representation of the Heart Beat* (1921).

LEWIS, WARREN KENDALL (1882-). An American chemist, born at Laurel, Del. He was graduated in 1905 from the Massachusetts Institute of Technology, and in 1908 received his Ph.D. at Breslau. In 1908, he became a research associate in the laboratory of applied chemistry at the Massachusetts Institute of Technology, where in 1910 he became professor of chemical engineering. During the War, he was an assistant in charge of defense problems of the research division of the Chemical Warfare Service. Dr. Lewis contributed articles on chemical technology to Thorp's *Outlines of Industrial Chemistry* and also to various scientific journals.

LEWISOHN, LUDWIG (1882-). An American author born in Berlin. He came to the United States with his parents in 1890, and received his education in the public schools and at Columbia University. He taught German in the University of Wisconsin (1910-11) and at Ohio State University (1911-19). During his teaching years he devoted much time to writing and in 1919 was dramatic editor for the *Nation*, in 1920, becoming associate editor of that magazine. He made several translations from the German, chief among which are the dramatic works of Gerhart Hauptmann (1912-17). His best known book is *Upstream* (1922), an autobiography in which is set forth a searching criticism of the intellectual and artistic life of this country. His novel, *Don Juan*, which appeared in 1923, deals with the problem of divorce. Others of his works are: *An Introduc-*

tion to the Study of German (1910); *The Modern Drama* (1915); *The Spirit of Modern German Literature* (1916); *Poets of Modern France* (1918); *The Drama and the Stage* (1922); *The Creative Life* (1924).

LEXER, ERICH (1867-). A German surgeon, known especially for his efforts in transplanting joint surfaces and other plastic work of the same kind. Born in Würzburg, he received his medical degree from the university of that city in 1890 and was made professor of surgery at the University of Jena in 1910. His first work on surgery was his *Lehrbuch der Allgemeinen Chirurgie* (2 vols., 1904-05, republished, 1914). At a later period, with Garré and Küttner, he brought out the *Handbuch der Praktischen Chirurgie*, which was reissued in six volumes, 1921-23. He also summed up his war and post-war experiences in his *Wiederherstellungschirurgie* (1920).

LEYEN, FRIEDRICH VON DER (1873-). A German writer and professor of Old German philology at the University of Cologne. He was born at Bremen and studied at Marburg, Leipzig, and Berlin. Included among many works he published are: *Des Armen Hartmann Rede vom Glauben* (1897); *Indische Märchen* (1898); *Das Märchen in der Göttersage der Edda* (1899); *Götter und Göttersagen der Germanen* (1900); *Das Märchen* (1911); *Die Deutschen Heldensagen* (1912); *Das Studium der Deutschen Philologie* (1913); *Deutsche Volkskunde und Deutscher Unterricht* (1915); *Eindrücke aus Amerika* (1915); *Aufgaben der Goethe-Gesellschaft* (1916); *Das Deutsche Märchen* (1917); *Die Deutsche Dichtung* (1918). He also edited works of Herder, Schlegel, Wackenroder, Hertz and others.

LIBERIA. A Negro republic on the west coast of Africa. Area variously estimated at 40,000 square miles. The population was estimated at 1,500,000, of whom American Liberians numbered 12,000; the capital, Monrovia, had 6000. In 1922, the enrollment in all the Liberian schools was placed at only 9000. Agricultural methods were still primitive and the country's economic resources, e.g. minerals, ivory, hardwoods, had hardly been tapped. Leading products included cocoa, cotton, coffee, piassaba fibre, palm oil, and kernels. Imports were rice, gin, tobacco, cotton piece goods, building materials. Trade was mainly with the United Kingdom, Liberian exports in 1913, 1920, and 1923 being £56,709, £537,362, and £57,311, and imports for the same years, £90,258, £271,992, and £115,581. Trade with the United States in 1913 and 1923 was: imports, \$96,900 and \$175,032; exports, \$2319 and \$17,790. In 1912-13, revenues were \$618,800 and expenditures \$529,548. In 1917-18, these had dropped to \$273,000 and \$255,700. For 1921, revenues totaled £90,395 and expenditures £107,109. In 1918, customs duties brought in \$162,120; in 1920, \$314,690; in 1921, \$197,139. In 1918, the total debt was \$2,131,700 made up of: \$1,608,000 refunding loan of 1912; \$423,128 internal floating loan; \$84,603 due the Bank of British West Africa; \$15,969 owed by the post office. The customs office was administered by an official appointed by the United States. The police force, maintained for the security of the revenue, cost \$72,000 in 1918. The only means of inland communication was a motor road 20 miles long. There were no railways or telegraphs. There were two wireless stations at

Monrovia and cable lines from there to Europe and New York.

The entry of the United States into the War paved the way for Liberian participation. In August, 1917, Liberia declared war on Germany and seized the opportunity to eject the Germans, who up to that time had controlled more than 75 per cent of Liberia's trade. In 1918, a German submarine, in retaliation for the seizure of German property, shelled Monrovia and sank the single vessel which constituted the country's navy. Beginning with 1920, the United States began to occupy the leading rôle in Liberia's affairs. The direct occasion for this move was the fact that, in 1918, the United States had placed to the credit of Liberia for war expenditures the sum of \$5,000,000. Only \$26,000 was used before the War terminated with the result that a proposal was made that the whole be carried as a government loan to Liberia. Difficulties in closing the terms brought a Liberian mission to the United States. The United States, in order to advance the economic development of the country and at the same time to secure the proposed loan, sought to gain control over the administration of customs, posts, commerce, road building, etc. In spite of President Harding's approval, the loan failed of passage in the Senate (September, 1922), as a result of the attack made on it by Senator Borah who charged that undue influence was being exerted by American financial interests that held worthless Liberian securities. The rejection of the loan seemed to please many Liberians and the Liberian government declined to accept the same amount from private sources upon the conditions demanded by the American government. However, it was evident that the failure of the loan left Liberian finances in a very precarious position, and endangered the security of the funds advanced in 1912. In 1923, Liberia was on the verge of bankruptcy. Government salaries had not been paid; the administration was borrowing from British banks in hand-to-mouth fashion; English and German interests had gained control of shipping, and France of the cables and wireless. The president for 1916-20 was Daniel E. Howard; for 1920-24, C. D. B. King.

LIBERTY LOANS. See UNITED STATES, History.

LIBERTY TUNNEL, PITTSBURGH. See TUNNELS.

LIBRARY ASSOCIATION, AMERICAN. During the War the Association organized and administered library service for the army, navy, and marine corps at the request of the United States government, mobilizing several hundred libraries for the work. Five million dollars and several million books and magazines were collected. Fully equipped libraries were maintained in the principal camps and stations, with small branches in recreation buildings. Collections of books and magazines were sent to small camps and posts, to naval ships and army transports. A reasonably adequate service was rendered to troops overseas, with special emphasis in 1919 on the educational work. Hospital library service became an important feature in 1919-20. At the end of the War, the Army and Navy Departments took over the service, and later, the Veterans' Bureau took over the highly organized library service for men in hospitals.

In 1919-20, the Association prepared a great

extension programme, but the financial campaign was not fully organized and resulted in donations of less than \$100,000 for the new work. Some increase in the Association's extension service was made possible, however, and the publicity for the campaign greatly stimulated general interest in the development of libraries. In 1924, a commission was appointed to investigate the need and the demand for adult education, the work of agencies now offering this, and especially the work of libraries in this field; to formulate recommendations concerning new methods for increasing the library's usefulness, and new schemes to enable libraries and schools to teach the habits of reading and study more successfully.

The council at its meeting on June 30, 1924, created a permanent Board of Education for Librarianship, the first important effort to standardize education for the library profession. The Committee of Five on Library Service had completed the preliminary work of its survey of library practice and methods.

The cost of a union list of the holdings of periodical files in American libraries was covered by advance subscriptions from libraries and by a gift from the Laura Spellman Rockefeller Memorial. A gift of \$50,000 from the American Committee for Devastated France made possible the establishment and operation for two years of a library school in Paris, offering summer and winter courses in American library practice, adapted to French needs. Gifts were received by the Association from the Laura Spellman Rockefeller Memorial in 1923 and 1924 for the purchase of American books for libraries in European countries whose depreciated currency made impossible the purchase by them of American publications, and books and periodicals were being supplied, in response to requests, to Germany, Austria, Hungary, and Poland; while American libraries contributed from their duplicate collections several thousand volumes for the American Library in Paris and other European libraries, and for libraries destroyed by the earthquake in Japan. Beginning in 1922, the Children's Librarians' Section made an award annually for the most distinguished book for children published in America during the year, the award being made possible by a gift from Frederic Melcher of New York. Other important gifts received during the latter years were: from the Carnegie Corporation of New York, \$164,100 for various studies, publications and current activities; and from the Carnegie Endowment for International Peace, \$5000 for American books on public law, including international law, for European libraries.

The Association published many books and pamphlets on library work, not for profit but in the interest of library development. There were also several reading courses, reading lists, publicity leaflets, posters and other minor publications, and a series of textbooks for use in library training agencies and a new series of reading courses for adults was begun. *The Booklist*, the librarian's guide to new books, was issued monthly, except in July and August.

Annual conferences were held in different parts of the country, the largest in 1921 at Swampscott, Mass., with an attendance of about 1000. The membership of the Association increased from 2905 in 1914 to more than 6000 in 1924.

LIBRARY PROGRESS. The decade 1914-24 was noteworthy in American library affairs. The library war service of the American Library Association (q.v.) gave wide publicity and new impetus to the library movement. Few cities and large towns were without libraries in 1924. Many counties had established and were maintaining library service for rural as well as urban populations. Most universities and colleges had organized libraries. Nearly every high school had a library of some sort, and some of them were well organized for effective service. Perhaps the most important features of library progress during the 10 years were (a) the great increase in the number of libraries and of library buildings, and (b) the development of new types of library service.

Grants of nearly \$11,000,000 were made for library buildings from 1914 to 1922 by the Carnegie Corporation of New York, most of it for the erection of comparatively small buildings. Many small buildings were erected from other private donations and from public funds. Several large buildings had been or were being erected from public (or in a few cases private) funds, notably the central public libraries in Philadelphia, Brooklyn, Detroit, Cleveland, Richmond, Savannah, Indianapolis, Providence, Wilmington (Del.), St. Paul, Houston, Sacramento, San Francisco, Los Angeles, and Montreal; and libraries at a good number of colleges and universities. The Henry E. Huntington Library was erected in Pasadena, and the great Morgan Library opened to the public in New York City. The Carnegie Corporation discontinued the giving of money for library buildings during the latter years "in the belief that so many of these have been provided, and so many communities have received the impulse for library facilities, that the purpose which Mr. Carnegie had in view has been in large measure accomplished."

In the latter few years there was growing up a new respect and a greater demand for adult education, and libraries were finding in this new interest an opportunity to increase the service they had always rendered and to develop new types of service. The Chicago Public Library in 1923 created a Reader's Service Bureau whose function was to increase the usefulness of the library to men and women who wish to continue their education out of school. This Bureau aimed to prepare outlines for the study of any nonvocational subject for patrons interested in following a definite course of reading, while the library undertook to supply the books prescribed in sufficient quantity to meet promptly all reasonable demands. Many other libraries had readers' assistants rendering similar service to the serious individual student. The Milwaukee Public Library made a survey of all adult education classes in the city and was attempting to make the library serve these classes. The Cleveland Public Library was attempting to make appropriate connections between the library and the adult student. The Indianapolis Public Library organized a new department to give special attention to the educational needs of young men and women and older boys and girls out of school. Adult education was the main theme of the American Library Association conference in 1924.

During the later years several States passed laws and issued regulations requiring the maintenance of adequate libraries in schools

and the teaching of the use of books and libraries as a part of the curriculum. In a few States accredited high schools were required to employ trained librarians after a fixed date. The county library was coming to be accepted as the best form of library service for reaching rural as well as urban residents, except in those few eastern States where the county is an unimportant unit of government. In 1924, more than half the States had laws permitting counties to establish libraries and to levy taxes or make appropriations for their support. The actual establishment of county libraries, however, was moving slowly. California led in the movement. After the War there was a fairly general recognition of the therapeutic value of books in hospitals. The War and Navy Departments, the Public Health Service, and the Veterans' Bureau had come to recognize the necessity, not only of reading matter, but of skilled library service in hospitals. Many public libraries were organizing library service for the private and public hospitals in their communities. Gradual progress was also being made in the development of library service for men in penal and correctional institutions. Special libraries in business houses, industrial plants, banks, bond houses, insurance offices, etc., were increasing in number from year to year in spite of the set-back during the depression of 1920-21. The library service for the merchant marine, originally a feature of the Library War Service of the American Library Association, was taken over in 1921 by the American Merchant Marine Library Association, 82 Beaver St., New York, N. Y., organized for that purpose.

Other important developments in the latter few years were: Greater emphasis on library publicity; increased attention to education for library work; a growing recognition of the importance of special training for scholarly bibliographical work (as indicated by the establishment of a chair of bibliography at Yale); and more international library interests. It was estimated that there were between 8000 and 10,000 public, college, school and special libraries in the United States, and between 20,000 and 25,000 library workers. An excellent book on the subject is Bostwick, *The American Public Library*, published by Appleton.

LIBYA. An Italian colony on the north coast of Africa, between Tunis and Egypt. It consists of the two provinces of Tripolitania and Cyrenaica. Its area is estimated at 406,000 square miles; its native population (census of Dec. 1, 1921) was 569,093. The total estimated population was put at 1,000,000 divided racially into 30 per cent Arabs, 40 per cent Negroes, 23 per cent Jews, 7 per cent Europeans. The civil European population in 1921 numbered 28,364, made up mostly of Italians and Maltese. Tripoli, the capital of Tripolitania, had 73,000 inhabitants; Benghazi, capital of Cyrenaica, 35,000. The country is largely desert, but in the coastal region and in the highlands, agricultural and pastoral activities are carried on. Barley was chiefly grown, but henna and dates were also cultivated. Other articles of trade consisted of sponges, tunny fish, ostrich feathers, potatoes, matting, fats, honey, and hides of camels, oxen, sheep, and goats. For want of irrigation, agriculture was necessarily restricted. The caravan trade into the Sudan, formerly very important, was being diminished because of the

French occupation of Timbuktu and the presence of the Kano-Lagos railway in British Nigeria. Principal exports into Sudan were cotton and woolen goods, blankets, rugs, tea, coffee, sugar, paper. Imports from the Sudan were ivory, ostrich feathers, hides and skins, leather objects. Imports by sea into the colony included wines and liquors, oils, sweetmeats, chemical products, cotton, woolen, and silk yarn, iron and steel manufactures, tobacco and matches. Total exports in 1912 for both provinces were \$777,597 (a lira converted at \$0.193); for 1921, they were \$1,476,300 (lira converted at \$0.04). Total imports for 1912 were \$5,361,926; for 1921, \$7,192,700. In 1914, the budget balanced at \$13,795,100; for 1922-23, the budget estimate for expenditures was \$12,477,950 (lira converted at \$0.048). In the latter year the state contribution toward revenues was \$9,738,144. The Italian government maintained 13,000 men in Tripolitania and 9600 men in Cyrenaica for defense purposes. There were in all 163 miles of railway in operation to supplement the principal means of communication, i.e. caravan routes. By the Treaty of Lausanne (Oct. 18, 1912) the Turkish evacuation of Libya paved the way for Italian occupation. The pacification of Tripolitania proceeded without difficulty so that by 1915 the coastal region was well under Italian control. In Cyrenaica, however, great difficulties were encountered. The Senussi continued in possession of the interior and stubbornly contested the scheme of Italianization. Fighting went on during 1914 and 1915 and so successful were the insurgents that the inland garrisons had all to be abandoned and Italy was once more reduced to her coastal possessions. In 1916, with Turkish aid, the Senussi brought the fighting into the coastal region, and but for the failure to unite all the insurgent forces, almost succeeded in expelling the Italians entirely. The end of the War found the local chieftains unable to effect a common understanding among themselves. To gain over the local tribes the Italians, after the War, deemed it necessary to grant autonomy. A parliament was set up, and as a result of peace being established with the Senussi in November, 1920, the Italians were able to resume once more their penetration with only occasional molestation. By arrangement with France in 1919, the western frontier of Tripoli was laid out to extend in a curve from west of Ghadames to south of Tummo. Similarly, as a result of an understanding with Great Britain, Jarabaib, on the Egyptian frontier, was ceded to Italy.

LICHNOWSKY, KARL · MAX, PRINCE (1860-). A German diplomat. He served in important capacities in several embassies, and at the outbreak of the War was German Ambassador in London. He endeavored, by every means in his power, to prevent the outbreak of war, and on its outbreak, left London and went into retirement. Here he wrote an account of his "mission to London," which was privately circulated. Extracts appeared in a Swedish newspaper, in March, 1918, and shortly afterwards were published in book form. In this he brought serious charges against Germany. The book made a great sensation and provoked the consternation of Germany. Although Ludendorff urged that proceedings be taken against Lichnowsky, nothing was done.

LIEBKNECHT, KARL (1871-1919). A

prominent German Socialist (see VOL. XIII). Called to the army in 1915, he served on the western front, which brought upon him violent censure from his party. Attacking the militarism of the government in open session of the Diet in 1916, he was expelled and soon after convicted of high treason for participation in a Socialist May Day celebration. He was sentenced to four years of penal servitude and loss of civil rights, but was released in October, 1918. Engaging at once in revolutionary activities, he was killed by the Nationalists in the Berlin revolt of Jan. 16, 1919. Among his later works are: *Gegen den Bürgerlichen Militarismus* (1920); *Politische Aufsätze aus Seinem Nachlasse* (1921); *Reden und Aufsätze* (1921); *Studien über die Bewegungsgesetze der Gesellschaftlichen Entwicklung* (1922). See GERMAN, *History*.

LIECHTENSTEIN. One of the smallest independent European states lying between the Austrian province of Vorarlberg and the Swiss cantons of St. Gallen and Graubünden. Its area is 61.4 square miles; its population (1912), 10,716. The budget for 1922 balanced at 384,500 francs. In October, 1921, a new constitution providing for a diet of 15 members, elected by direct vote on the basis of universal suffrage and proportional representation, was adopted. In 1921, the principality, heretofore the ward of Austria, joined the Swiss Customs Union and turned the administration of its posts and telegraphs over to Switzerland.

LIENHARD, FRIEDRICH (1865-). A German poet and novelist (see VOL. XIV). He published after 1914: *Der Einsiedler und Sein Volk* (1914), a volume of short stories; *Lebensfrucht*, his collected verse (1915); *Jugendjahre*, recollections of his youth (1918); *Westmark*, a novel (1919); *Der Meister der Menschheit* (1919); *Wer Zuletzt Lacht* (1921); *Aus Taulers Tagen* (1924). He edited *Der Türmer*, a magazine published in Weimar.

LIGGETT, HUNTER (1857-). An American army officer, born at Reading, Pa. He was graduated at the United States Military Academy in 1879 and was made a second lieutenant in the 5th Infantry. By successive promotions he reached the rank of major-general in 1917 and was retired in 1921. He served in campaigns against the Indians and during the war with Spain was in Cuba, with the rank of major of volunteers. Later he was in the Philippines, and subsequent to his return to the United States, after various duties, he was sent to the Army War College, where he was graduated in 1910 and of which he was president in 1913. In 1914, he served on the Mexican border and in 1917 commanded the Department of the Philippines. During the War he was in France as commander of the 41st Division (1917-18) and then with the 1st Army Corps (1918-19) with the rank of lieutenant-general. Later he was on the Rhine in command of the 3d Army (1919). He took part in the second battle of the Marne and participated in the engagement at St. Mihiel and in the Meuse-Argonne campaign. On his return to the United States he was assigned to the command of the Western Department with San Francisco as his headquarters. For his services in the War he received the Distinguished Service Medal of the United States, the decorations of the Legion of Honor from France, the Order of Leopold from Belgium, and the

Order of St. Maurice and St. Lazarus from Italy.

LIGHT. See PHYSICS.

LIGHT, MEASUREMENT OF. See ELECTRIC LIGHTING.

LIGHTHOUSES, AND OTHER AIDS TO NAVIGATION. It was quite natural that but little attention should be paid to lighthouses and other aids to navigation during the War, although in the United States progress in installation and development was fairly steady except during the period of the country's actual engagement in hostilities and its readjustment to peace conditions. With the restoration of normal conditions came important developments in most of the countries of the world, rather in the provision of improved illuminants and signalling devices, in increasing the number of such marks as gas buoys, and particularly in installing radio apparatus for signals and for communications. In the construction of notable light towers or other structures not much of importance was done between 1914 and 1924, but the improvement of equipment in the interest of better navigation as well as general efficiency and economy was significant. Thus the improvement of lights on rivers and bays was marked and the placing of acetylene buoys to mark the Ambrose Channel of the New York harbor in 1920 was a distinct advance. On the Mississippi and Hudson Rivers also there has been a marked improvement in the lights. With the extensive development of aeronautics, lighthouse authorities were giving consideration to the utilization of coast lighthouses in aerial navigation, but little had been done in determining modifications needed for existing equipment. For the American Transcontinental Mail route an elaborate system of illumination and light marks had been devised. See AERONAUTICS.

Automatic Lighting. In the period following the War automatic lighting was a leading consideration for the lighthouse services of the various countries of the World. It was extensively introduced, even at the more important stations, although in the latter instances one keeper usually was retained, and the installation was quite costly. Such lights for the most part employed dissolved acetylene, and for the higher illuminating power there was a lens revolved by the gas pressure, while the flame was produced by the combustion of a mixture of acetylene and air under an incandescent mantle, with automatic mantle exchanger. European automatic lights and light sectors were in many cases more complicated than those employed in the United States. Automatic lighting by incandescent electric lamps had been extensively developed in some countries for unwatched or semiwatched stations, even those of primary importance. Here were often employed large light bulbs approximating 1 foot in diameter, with spirally wound filaments in gas-filled bulbs. The large current required was supplied from commercial sources or by automatic power units at the station. In some of the apparatus, particularly that for the coast of Holland, where this system was extensively introduced, the electric light had a reserve gas light which was automatically swung into focus or set in operation in another lens on the failure of the electric light.

The United States Lighthouse Service in 1923 had in commission more automatic apparatus than similar services in any other country in the world. Of 4047 coast and lake

lights, 1665, or 41 per cent, were automatic, doing the work of 765 lighthouse keepers and assistants. In addition, 668 lighted buoys, which could not be maintained by human attendance and which were invaluable aids to mariners, were automatically operated and aided night navigation on many important rivers and channels. This tendency to provide automatic installations is indicated by the fact that during the fiscal year 1923, 30 stations were put on an automatic basis, with an annual saving of 76 per cent of the cost of the changes. Thus, in addition to many automatic gas buoys, new automatic lighthouses were installed at important points, as at Molasses Reef and Pacific Reef, two important unlighted stretches of the Florida Reefs.

Fog Signals. A most important development in the way of improving coastwise navigation was fog signals which by the use of radio were to send out from transmitting stations signals appropriate to the locality. These could be detected on vessels equipped with ordinary receiving apparatus. The first radio fog signals in the United States were placed May 1, 1921, on the Ambrose Channel Light vessels at the entrance to the New York harbor, on the Fire Island light vessel, and on the Sea Girt (N. J.) lighthouse, all in the vicinity of New York harbor. Eight radio fog signals were in operation in 1923, one at Cape Henry, Va., one on the Diamond Shoals lightship in North Carolina, and one on the Blunts Reef lightship off Cape Mendocino, Cal. Five additional radio fog signals were later installed in lightships at Boston, Mass.; Five Fathom Bank, Del.; Swiftsure Bank, Wash.; in the Columbia River; and off the Straits of Fuca. These instruments furnished, with proper precautions, bearings approaching the accuracy of visual bearings, and were available at greater distances. See RADIO TELEGRAPH.

In 1924 a power tube radio fog signal transmitter was placed in commission on Ambrose Channel lightship. This was the first tube transmitter used in the United States for fog signal purposes. This transmitter was installed by the United States Lighthouse Service after extensive tests indicating freedom from directional distortion, lessened interference, and increased efficiency. While the radio fog signal stations in the United States had used spark transmitters, it was found that tube transmitters would provide a signal which could be tuned more sharply to the wave length prescribed for radio fog signals. Comparative tests of the tube and spark transmitter indicated that the former would give signals equally effective with at least one-third less power than the spark transmitter. Installations of radio fog signals had been provided in France, Spain, Norway, Scotland, England, and Holland, though less extensively than in the United States. It was universally recognized that instruments for determining the radio bearing should be located on shipboard, and some 100 European craft were equipped in 1923 with radio direction finders. Aside from the use of radio, the principal advance noted in fog signals was the further introduction of automatic apparatus for minor signals, such as bells, along the lines described or of similar nature. Explosive signals were used to some extent, but the advantage of small installation cost was offset by the continuous manual attention required.

United States Lighthouse Service. On June 30, 1923, there were maintained by the United States Lighthouse Service, which is by far the largest lighthouse organization in the world, 16,888 aids to navigation, including 5942 lights of all classes and 596 fog signals (not including 153 buoys with whistles and 397 buoys with bells), of which 7 were radio signals, 6 were bells operated automatically by gas, and 46 were submarine signals. The accompanying table gives a summary of the aids to navigation under each class in commission at the end of the fiscal years 1914 and 1923.

Class	June 30, 1914	Total, June 30, 1923
Lighted aids:		
Lights (other than minor).....	1,588	1,915
Light vessel stations.....	52	47
Gas buoys.....	453	430
Gas buoys, with whistles and bells *.		233
Minor lights.....	2,793	3,147
Float lights.....	118	170
Total lighted aids.....	5,004	5,942
Fog signals:		
Radio.....		7
Sound fog signals (air).....	519	543
Submarine fog signals.....	48	46
Gas buoys, with whistles and bells *.		233
Whistling buoys, unlighted.....	86	76
Bell buoys, unlighted.....	233	241
Total fog signals.....	886	1,146
Unlighted aids:		
Buoys.....	6,380	7,276
Day beacons.....	1,978	2,757
Total.....	8,308	10,033
Grand total.....	14,198	16,888

* Gas buoys with whistles and bells are counted only once in the grand total.

In the period between 1910 and 1920 there was a net increase of 4611 in the total number of aids to navigation in the United States. The number of gas buoys increased two and one-half times and the number of lighthouses, equipped with brilliant oil vapor lights, increased four times. The number of automatic gas lights ashore increased nearly seven times, effecting an important economy in the cost of attendance. In 1924 radio equipment had been placed on more than half of the tenders and telephone communications between shore stations. Acetylene buoys were in standard use and were placed at important channels.

In Alaska during the period from 1914 to 1924, many new aids to navigation were established, so that on June 30, 1923, there had been provided a total of 650 aids to navigation in this Territory. This was a steady growth from 1910, when there were but 160 such aids. In 1923 there were 227 lights, 14 gas buoys, 11 fog signals, 271 buoys and 127 day marks. The United States Lighthouse Service had been active in the other Territories and outlying districts, where increased commerce rendered additional aids to navigation essential. Thus in 1921 there was built a new light station and buildings at Point Borinquen, at the northwestern extremity of Porto Rico, at a location where the necessity of a landfall light was emphasized by the opening of the Panama Canal and its increasing use. This new light was placed on a reinforced concrete structure of cylindrical form located 233 feet above sea level. It was simple in design and heavy and strong enough to resist earthquake shocks. It was built on a concrete foundation 25 feet square by six feet deep, and the main tower was 15 feet in diameter with walls 15 inches thick

and rising to a height of 46 feet; above it was a service room and a standard helical bar lantern. The illuminating apparatus consisted of a third-order 12-panel flashing lens on a mercury float with a 55 mm. type A incandescent oil vapor lamp. This light shows a group of four white flashes of 32,000 candle power every 30 seconds and is visible 24 miles. At Guam a valuable new light was installed at Hole-in-the-Wall in 1923 by the United States Lighthouse Service. Lights were also maintained at Guantanamo and Samoa. At these last three points the aids to navigation are maintained under the direction of the Naval Commandant by means of allotments from the appropriations for the Lighthouse Service.

LIGHTNING ARRESTER. See **ELECTRIC POWER TRANSMISSION AND DISTRIBUTION.**

LIGHTSHIPS. See **LIGHTHOUSES.**

LIGNIN. See **CHEMISTRY, ORGANIC.**

LILIENFEIN, HEINRICH (1879-). A German dramatist and novelist. He was born at Stuttgart and studied history and philosophy at the universities of Tübingen and Heidelberg. He became general secretary of the *Deutsche Schillerstiftung* at Weimar. Among his later works are: *Der Herrgottswarter* (1906); *Der grosse Tag* (1907); *Der Schwarze Kavalier Olympias* (1908); *Der Stier von Oliveira* (1910); *Die Herzogin von Palliano* (1914); *Hildebrand* (1917); *Die Ueberlebenden* (1920). His principal works of fiction are: *Die Grosse Stille* (1912); *Der Versunkene Stern* (1914); *Im Stillen Garten* (1915); *Ein Spiel im Wind* (1916); *Die Feurige Wolke* (1919). He also wrote *Heinrich Vierodt, das Profil eines Deutschen Dichters* (1915).

LILLIE, RALPH STAYNER (1875-). An American physiologist, born at Toronto, Ont., Canada. He was educated at Toronto University, at the University of Michigan and at the University of Chicago (Ph.D., 1901). He was instructor in physiology and histology (1902-03) and adjunct professor (1903-05) at the University of Nebraska; instructor in physiology at Harvard (1905-06); instructor in physiology and zoology (1907-11), and assistant professor (1911-13) at the University of Pennsylvania; professor of biology at Clark University (1913-20); biologist at the Nela Research Laboratory, Cleveland, Ohio (1920-24); and instructor in physiology at Woods Hole, Mass. (1901). He published extensively in scientific journals on osmotic pressure of colloids, physiology of growth processes, and articles on protoplasmic transmission.

LIMBURG. Upon the region of South Limburg, in southeastern Holland, centred the chief Belgian demand for territorial compensations. This Dutch province, with an area of 847 square miles and a population (1922) of 450,620, had been given to Holland by the Treaty of 1839, against the protests of the Belgians. At the Versailles Conference, Belgium once more pressed her claims, not on grounds of ethnography, for the people are plainly Dutch, but for historical, strategic, and economic reasons. Limburg had taken part in the Belgian revolution of 1830. It was vitally necessary for the protection of the Belgian frontiers, for it dipped south to touch Belgium on the east and thus controlled the defense of the Meuse. The position of the Meuse in the disputed district was perhaps the most serious of the Belgian grievances, for the Dutch possession of this

waterway, with its important bridgehead at Maestricht, imposed an effective check on the progress of Belgian commerce. Similarly, Limburg seemed vitally necessary to Belgium if the Rhine-Scheldt Canal, which was guaranteed by the Peace of Versailles, was ever to become a reality. Limburg, formerly neglected by the Dutch, became a source of real interest during the War; the lignite mines opened up there were producing 1,425,617 tons in 1918 and some 400,000 tons more in 1919. The Peace Conference, however, refused to countenance the transfer of the territory; the only step it would take was the establishment of an international commission to investigate the matter of the Treaty of 1839. Territorial compensation was thus out of the question. Only after lengthy negotiations was it possible for the two disputants to come to terms on the matter of waterways. In 1920 an agreement was reached on the administration of the Scheldt, the Antwerp-Meuse-Rhine Canal, and two other water-systems; with this, Belgium had to remain content.

LIME. In 1922, there were 530 plants in the United States engaged in the production of lime, and these were scattered widely, being distributed throughout nearly every State in the union. The more important districts were in Southern Pennsylvania, the Toledo district of Ohio, and the Shenandoah Valley district of Virginia and West Virginia. The production in 1922 was 3,639,617 short tons, valued at \$33,255,039. About one-half of the lime produced is used in the building trades. In 1922, agriculture used 7.5 per cent of the output, this being a decrease from previous years' consumption in this field, while the remainder was employed in various chemical industries, such as paper mills, glass works, tanneries, metallurgical plants, sugar factories and the manufacture of chemicals and for other purposes, with about 140 different industries in which lime is regarded as essential. Lime is sold either in lump or in ground form and by means of the air separation process a very pure product is obtained and the ease of shipping and handling has been increased so that it is more widely used than ever.

LIMING. See **FERTILIZERS.**

LIND, SAMUEL COLVILLE (1879-). An American physicist, born at McMinnville, Tenn. He was graduated at Washington and Lee University in 1899 and at the Massachusetts Institute of Technology and received his Ph.D. at Leipzig, Germany. He was assistant in chemistry at the Massachusetts Institute of Technology and assistant professor of general and physical chemistry at Michigan (1905-15). Meanwhile he became interested in radioactivity and studied in Paris (1910) and at the Radium Institute in Vienna (1911). In 1913, he was appointed chemist for the United States Bureau of Mines in charge of radioactivity and in 1918, he became director of its rare and precious metals station in Reno, Nev. Dr. Lind published papers on radium extraction and measurement, on the influence of radiation on chemical action, and relation of gaseous ionization to chemical action; he is also the inventor of the Lind interchangeable electroscope for radium measurements.

LINDSAY, (NICHOLAS) VACHEL (1879-). An American poet and artist (see Vol. XIV). In 1910, when he published the *Village Magazine*, he was almost unknown but since then he has been recognized as one of the main hopes

of American poetry. Technically and aesthetically he is full of inaccuracies, but his poetry is strong and vital and many of his poems have the true ballad ring. He is one of the strongest forces in the development of the epic of the West in the United States. He has recited before many school audiences in this country and in England. His chief works are: *Handy Guide for Beggars* (1916); *The Art of the Moving Picture* (1915); and the volumes of poems entitled *General Booth Enters Heaven* (1913); *Congo and Other Poems* (1914); *The Chinese Nightingale and Other Poems* (1917); *The Golden Whales of California and Other Poems* (1920).

LINDSEY, BEN (JAMIN) B (ARR) (1869-). An American jurist and reformer (see VOL. XIV). He was active in the organization of the Progressive party and was a member of its National Committee in 1912. He lectured much throughout the country on children's problems. He was the author of *The Rule of Plutocracy in Colorado*; *The Doughboys' Religion* (1919), and *Pan-Germanism in America* (1919).

LIPPMANN, WALTER (1889-). An American writer (see VOL. XIV). He resigned as a member of the staff of the *New Republic*, in 1915, to become assistant to the Secretary of War. He served also as secretary for the organization directed by E. M. House to prepare data for the Peace Conference. During the War he served as captain of the Department of Military Intelligence. He was attached to the 2d Section of the General Staff at General Headquarters in France. He served also in Paris during the Peace Conference. His later books include *The Political Scene* (1919); *Liberty and the News* (1920); *Public Opinion* (1922). Later he joined the editorial staff of the *New York World* and in 1924 became its chief editorial writer.

LIQUIDS. See PHYSICAL CHEMISTRY.

LISSAUER, ERNST (1882-). A German poet. He was born in Berlin and studied at Leipzig and Munich. He first attracted attention by his lyric volume *Der Acker* (1907), which was followed by *Der Strom* (1912), a tribute to the centenary of the Wars of Liberation, entitled 1813, and *Zyklus* (1913). At the outbreak of the War he published a series of pamphlets, *Worte an die Zeit* (1914), and attained notoriety by his *Hymn of Hate*. He later wrote: *Der Brennende Tag* (1916); *Idyllen und Mythen* (1916); *Das Ewige Pfingsten* (1919); *Der Inwendige Weg* (1920); two dramas, *Eckermann and Yorck* (1921); a series of one-act plays, *Gesichte* (1922); and an appreciation of the genius of Anton Bruckner, *Gloria Anton Bruckners* (1921).

LITCHFIELD, ELECTUS DARWIN (1872-). An American architect, born in New York City. He was graduated from the Brooklyn Polytechnic Institute in 1889 and from the Stevens Institute of Technology in 1892. He began his professional work with Carrère and Hastings in New York and was afterwards associated with several other architectural firms in that city. In 1919, he was a member of the firm of Electus D. Litchfield and Rogers. He designed the United States Post Office and Court House in Denver; the St. Paul Public Library; the James J. Hill Reference Library in St. Paul; and many important buildings in Washington, Brooklyn and other cities. He was architect and town planner for Yorkshp

Village, a permanent industrial town of 1700 houses built during the War for the Emergency Fleet Corporation and the New York Shipbuilding Company. He was a member of several architectural and other societies.

LITERATURE. See FRENCH LITERATURE; ITALIAN LITERATURE; GERMAN LITERATURE; HUNGARIAN LITERATURE; RUSSIAN LITERATURE; RUMANIAN LITERATURE; SPANISH LITERATURE; SCANDINAVIAN LITERATURE; SLAVONIC LITERATURE; and LITERATURE, ENGLISH AND AMERICAN.

LITERATURE, ENGLISH AND AMERICAN. Any survey of the literature of the last decade must necessarily largely be made in terms of the War. For so profoundly has the fact of conflict conditioned the course of events that even in those fields where its influence has been least direct it has radically altered the background of thought as well as of life. A part of the literature of both England and America deliberately eschewed the War; yet it was inevitably of it. Nevertheless the striking thing that becomes apparent in looking back over the years 1914-24 is that the stream of letters, stirred to the depths as it has been by the period of strife, has followed since the inception and the conclusion of the struggle the direction in which it was setting when it broke. The contest stimulated the revolt which was under way against established conventions of thought and action; it crystallized discontent, fructified emotion, and unfettered expression; but it marks no watershed in literary annals. Its immediate effect, indeed, was rather repressive than submersive, and its results to the present have been rather to nurture seriousness than to transform letters.

The first result of the War, both in England and America, was enormously to increase the output of books which constitute what may be termed the fringes of literature. An amazing avidity of interest in the background of the conflict, and in the psychology of the belligerents, made itself manifest almost as soon as the German hosts began to roll into Belgium, and coincidentally with the issuance of the official explanations of the fighting nations began to appear the vanguard of that army of publications which as the contest developed ranged from inquiry into its causes to description of the manner and incidents of its waging. Speculation as to the means of preventing a similar calamity in the future kept pace with the chronicles of battle and drew into the ranks of the exponents and propagandists many of the leading writers of England and America. Among others Kipling, H. G. Wells, Arnold Bennett, Mrs. Humphry Ward, May Sinclair, Gilbert Murray, Viscount Bryce in England; Edith Wharton, Dorothy Canfield, Richard Harding Davis, Winston Churchill, Owen Wister, Gilbert Parker in America turned their pens to the services of the Allies. Valuable as may have been their work in the developing and sustaining of morale and in familiarizing the public with current international doctrine, from the standpoint of literature it was negligible. Indeed, accurate and animated as was much of the writing of the various phases of the War it was in great part of ephemeral importance. Such books as G. Lowes Dickinson's *The European Anarchy*, Arthur Bullard's *The Diplomacy of the Great War*, Max Eastman's *Understanding Germany*, Bertrand Russell's *Justice in War Time*, Josiah

Royce's *The Hope of the Great Community*, Roland G. Usher's *Pan-Germanism*, and William Stearns Davis's *The Roots of the War*, had wide attention upon publication but they have already passed into the oblivion of topical literature. So too have the multiplicity of volumes recording the impressions of travelers in war-beleaguered Europe, works such as Carl Schreiner's *The Iron Ration*, Madeleine Z. Doty's *Short Rations*, Winston Churchill's *A Traveler in War Time*, Ernesta D. Bullitt's *An Uncensored Diary*, Daniel T. Curtin's *The Land of Deepening Shadow*, Frances W. Huard's *My Home in the Field of Honor*, and Stephen Graham's *Russia in 1916*.

Simultaneously with these more detached discussions came a flood of personal narratives, correspondence from the trenches, chronicles of battle on land, on sea and in the air. Notable in this grist was that mass of soldiers' letters that derived so moving a quality from the idealism that tempered their grim chronicle. At their best, as in the letters of Victor Chapman, Alan Seeger, Rupert Brooke, or Donald Hankey, these volumes that embodied the reactions of youth at grips with the realities of war had an impressive eloquence. Face to face with death, Anglo-Saxon manhood apparently sloughed off the inhibitions and reticences of normal life, and discovered an unsuspected ability to express emotion and experience with clarity and force. Short-lived as was their appeal, any survey of the literature of the war period must take account of these epistles from the trenches.

From the battlefields, too, came the practiced narratives of the war correspondents and official observers, vivid chronicles, which, whatever their limitations of scope, had the virtue of first-hand testimony. In one case at least, that of Masefield's *Gallipoli*, an imagination capable of conveying the epic nature of the drama unfolding before it transmuted a recital of events into stirring literature. And in H. W. Nevins's *The Dardanelles Campaign*, Philip Gibbs's *The Battles of the Somme*, and the reports of Richard Harding Davis and Frederic Palmer, there was sufficient of literary effectiveness to attach to them a degree of permanence.

It is, however, to other sources to which we must look for the war literature that will be history. So long as the conflict was in progress the necessities of the situation imposed an obligation to silence. But the conclusion of peace released the pens of the diplomats, and lifted the embargo on the utterances of military leaders. From the United States in 1918 came Brand Whitlock's *Belgium*, one of the notable books produced by the conflict, a work of importance historically and possessing no little literary quality. Vivid and revealing as it was, the outstanding diplomatic memoir of the war period was not, however, the Belgian ambassador's but *The Life and Letters of Walter Hines Page*, by Burton Hendrick, a collection of letters impressive for their recital of Anglo-American relations during the war epoch and for the mellow personality and grace of style that invested their record with abiding interest. Together with these reminiscences may be placed as of lesser but nevertheless high interest Ambassador Gerard's *My Four Years in Germany* and *Face to Face with Kaiserism*, Ambassador Morgenthau's *Story*, Lewis D. Einstein's *Inside Constantinople*, and Hugh Gibson's *A Journal from Our Legation in Belgium*.

Close upon the end of the conflict the military leaders entered the literary lists, some of them to combat criticism, others merely to tell the story of their experiences. Viscount French, Sir Frederick Maurice, Julian Corbett, Admiral Jellicoe, Field-Marshal Haig, Commander Belaire, Admiral Fisher, Admiral Sims, Sir Ian Hamilton and others of their associates on land and sea published narratives that must hold permanent place as history. Supplementing these more personal chronicles, and of hardly less value as source books of the future, appeared a stream of books of which some of the most notable were Winston Churchill's *The World Crisis*; *The Economic and Social History of the War*, edited by James T. Shotwell; Charles Seymour's *A Diplomatic Background of the War*, and Woodrow Wilson and the *World War*; Charles G. Dawes's *A Journal of the Great War*; H. W. V. Temperley's *A History of the Peace Conference at Paris*; Ray Stannard Baker's *Woodrow Wilson and the World Settlement*; and Robert Lansing's *The Peace Negotiations, a Personal Narrative*. Definitive histories of the War it is too soon to expect, but several preliminary treatises presenting panoramic surveys of the contest have made their appearance. Such are Nelson's *History of the War*, by John Buchan; Buchan's *History of the Great War*; Conan Doyle's *History of the Great War*, and Frank Simonds's *The Great War*.

The War while giving rise to a vivid curiosity as to the period immediately antecedent to its outbreak at the same time directed attention to the more distant past. Specialized fields of interest came suddenly to the fore as when the doctrine of self-determination brought the smaller nationalities into prominence, or discussion of a League of Nations threw emphasis on earlier experiments in restraint of war. On the other hand, the entire pageant of history assumed a new significance, and subjected to painstaking research, was made to yield fresh import as its data were interpreted not as by the older historians, through the medium of personal or national prejudice, but with the detachment of scientific investigation. Ancient times as well as modern were tapped at their sources, with the result that the last 10 years have seen a steadily growing body of authoritative history. The important series of Cambridge histories—the *Cambridge Mediæval History*, the *Cambridge History of Modern Times*, the *Cambridge History of India*, the series entitled *The Legacy of Greece and Rome and Our Debt to Greece and Rome*, the *Chronicles of America*, edited by Allan Johnson; *The Second Empire*, by Philip Guedalla; *The Evolution of Parliament*, by A. F. Pollard; *The Age of the Reformation*, by Preserved Smith; *Modern Democracies*, by Viscount Bryce; *The History of the United States since the Civil War*, by Ellis Paxson Oberholtzer; *The McKinley and Roosevelt Administrations*, by James Ford Rhodes; *The Declaration of Independence*, by Carl Becker; *The History of Modern Europe*, by G. P. Gooch; *The Beginnings of New England and Revolutionary New England*, by James Truslow Adams; *The Supreme Court in United States History*, by Charles Warren; *The Conquest of New Granada*, by R. B. Cunninghame Graham—these are a few works representative of the range and character of historical research during the decade.

That in an age of specialization, and at a

period when history more uniformly than ever before had become categorical and documentary, the "outline" should spring to such wide popularity as it attained in the past decade in H. G. Wells's *The Outline of History*, Hendrik Van Loon's *The History of Mankind*, and the books in related fields that followed their fashion, may at first glance seem an anomaly. Yet it is in truth but the logical result of the scientific development of historical study. For history has grown too complex in the light of contemporary research, and in its conjunction with economic, social and environmental factors to be followed by any but the scholar in detail. The outline, with its swift portrayal of the march of mankind from primitive beginnings to the highly organized society of to-day, provides the means to that bird's-eye view of human history which is a minimum essential to the understanding of the present; and when invested with the dramatic quality which the daring of a Wells bestowed upon it, the success of the epitome of history is easily comprehensible.

If history has flourished during the past decade biography has had a no less robust development. More than any field of literature except fiction it has responded to the interest in the new psychology which has been the dominant preoccupation of the last few years. Biographical writing has advanced far indeed from its old conception of a life as a mere succession of incidents to the analysis of such a book as Van Wyck Brooks's *The Ordeal of Mark Twain*. Under the handling of writers who like Mr. Brooks, Lytton Strachey, and Gamaliel Bradford apply though in differing fashion and degree the psychological method to career and personality it has become rather than chronicle an essay in interpretation. As a result it has gained in brilliance and suggestiveness and grown in favor but it has laid itself open to the charge of eccentricity when written by the less scientific and to the danger of being considered an argument to a thesis even when practiced by the ablest of its exponents. Mr. Strachey, whose *Eminent Victorians* and *Queen Victoria* have not only brought biography but almost the Victorian age into favor, applies impressionism to an epoch as well as to personalities, while Mr. Bradford in *American Portraits and Damaged Souls* uses a psychological as Mr. Brooks does a psychoanalytical method in his characterization. As a result, biography as it is being written to-day by its most brilliant popular exponents represents not detached description and appraisal but an evaluation in which the personality of the author inevitably fastens its stamp upon that of the hero.

Curiously enough in a period which began in violent reaction against its philosophy and practice, much of the biographical writing of the past 10 years has dealt with the Victorian era. Victorian gods might be dethroned but their shadow was still mighty in the land. From the painstaking research of Monypenny and Buckle's monumental *Life of Disraeli* and the informed chronicle of Lady Gwendolen Cecil's *Life of Robert Marquis of Salisbury* to the audacious egotistries of *Margot Asquith: An Autobiography*, Victorian reminiscence has run the gamut of politics and the arts. Government and diplomacy have found spirited reflection in such works as *The Private Diaries of the Rt. Hon. Sir Algernon West*, edited by Horace G. Hutchinson; the *Diaries of Wilfrid Scawen*

Blunt; The Letters of Lord and Lady Wolseley, edited by Sir George Arthur; Lady Paget's *Embassies of Other Days*; A. G. Gardiner's *The Life of Sir William Harcourt*; Lord Frederic Hamilton's *The Day before Yesterday*; Sir Harry Johnston's *The Story of My Life*; and Kathleen Fitzpatrick's *Lady Henry Somerset*. Literature and art were represented in biographical or autobiographical form in *Unpublished Letters of Matthew Arnold*, by Arnold Whitridge (a book written and originally published in America); *Carlyle till Marriage*, by David Alec Wilson; *Letters of Thomas Carlyle to John Stuart Mill, John Sterling and Robert Browning*, edited by Alec Carlyle; *Thackeray and His Daughter*, edited by Hester Thackeray Ritchie; *The Life of Mrs. Humphry Ward*, by Janet Penrose Trevelyan; W. S. Gilbert's *His Life and Letters*, by Sidney Dark and Rowland Grey; *Changes and Chances*, by H. W. Nevinson; *The Adventure of Living*, by J. St. Loe Strachey; *My Life and Some Letters*, by Mrs. Patrick Campbell; *Letters and Papers of John Addington Symonds*, edited by Horatio F. Brown; *John Ruskin's Letters to William Ward*; and W. H. Mallock's *Reminiscences*. Mr. Mallock's volume, a disappointing revelation of stagnation in mental outlook, presents an interest out of all proportion to its actual merits through its reflection of the persistence into the very maelstrom of the war years of a philosophy of politics and society untempered by the progress of events. By contrast the *Recollections of Viscount Morley*, one of the outstanding biographies of the past 10 years both from the standpoint of literature and that of contemporary history, is all the more notable for ripeness of spirit and spacious mental outlook.

American personal history during the past decade has in some of its most important expression been autobiographical. Close to the opening of the period, Thayer's *Life and Letters of John Hay* wove into a rich pattern public achievement and literary accomplishment, furnishing interesting commentary on contemporary political annals. Few biographies of recent years have equaled in interest from the point of view of psychology *The Education of Henry Adams*, a remarkable human document, in which the author depicts the play of quintessentially New England influences upon a sensitive nature. Like the life of Hay and *The Education of Henry Adams*, the volumes of letters by William and Henry James constitute permanent contributions to literature, the one portraying a mind of widest philosophic scope, sturdy in its Americanism, and the other a personality finding fulfillment possible only outside of its native land, but for all its overlay of cosmopolitanism essentially of it. Racy of the American background, though in widely variant fashion, are Hamlin Garland's *A Son of the Middle Border*, and *A Daughter of the Middle Border*, with their vivid depiction of pioneer life; Theodore Dreiser's *A Book about Myself*; Theodore Roosevelt's *Letters to His Children*; Robert Underwood Johnson's *Remembered Yesterdays*; M. T. Werner's *Barnum*, the record of a career unthinkable outside of America; Royal Cortissoz's *Life of Whitelaw Reid*; Henry Watterson's recollections; Kate Douglas Wiggin's *My Garden of Memories*; the life of E. H. Harriman; *The Americanization of Edward Bok* and Michael I. Pupin's *From Immigrant to Inventor*. Political biography added

to its credit during the past decade Joseph Bucklin Bishop's *Life of Roosevelt*; the authorized biography of Grover Cleveland, by Robert McElroy; *Samuel Adams, Promoter of the American Revolution*, by Ralph Volney Harlow; *The Life of Roger Brooke Taney, Chief Justice of the United States Supreme Court*, by Bernard C. Steiner, and Beveridge's exhaustive life of Chief Justice Marshall, indispensable to the student of his period.

Perhaps of all forms of literature the essay most demands for its fertilization the quiet and contemplative mind. War, and the aftermath of war in radical thought and propaganda, were little conducive to armchair philosophy, and the dearth of outstanding work in the field of the essay during the greater part of the decade is easily explicable in view of the prevailing turmoil. Both in England and America, however, the essay and the essay in criticism have increasingly been coming into their own in the past few years. In the United States, indeed, criticism has had a development which is one of the most striking features of contemporary American literature. Never before in this country has there been so widespread a public for critical writing, or so many organs devoted partially or predominantly to its uses. Stuart P. Sherman, Paul Elmer More, H. L. Mencken, Henry S. Canby, Carl Van Doren, Van Wyck Brooks, and a goodly fellowship of able if less noted critics have produced works of genuine distinction. If a greater urbanity still marks the work of the English critics a compensatory eagerness may be placed to the credit of the American.

The decade of 1914-24 was, except for the development of its fiction, most striking for its renaissance of interest in poetry; and in poetry, as in fiction, it has been the American contribution which has been of peculiar interest. When the War broke out in 1914, it found America riding on the crest of a wave of poetical experimentation, which derived primarily from France, but which struck its roots deep into American soil, and drew from it sinews and strength. Free verse, as the new poetry was termed, and as it was expounded by Amy Lowell, and practiced by Edgar Lee Masters, Carl Sandburg, Vachel Lindsay and other of its serious exponents, is "a verse form based on cadence." It eliminates the recurrent rhythm of the line, and regards the group of lines as the unit of verse. It claims thereby to attain a flexibility and compass impossible to poetry in traditional meters; "free verse," says Miss Lowell, "within its own law of cadence has no absolute rules; it would not be 'free' if it had." Nor has it regard for the restrictions imposed in the past on the content of poetry. It holds to a belief in "exteriority" or "objectivity," rejecting the traditional abstractions of poetry for the concrete and the scientifically accurate. And it strives to convey its meaning through a clear-cut imagery which in the hands of an essential classicist like H. D. or an artist with the craftsmanship of Miss Lowell produces poetry of genuine beauty and in those of a Carl Sandburg or an Edgar Lee Masters verse of rugged power. But free verse has not been consistently at ease in the house of its friends; it has been torn and tortured by the wilder experimenters like Kreymer and Pound, and it has been the excuse for the entrance into the lists of poetry of numbers of persons whose only qualification

for its writing is the ability to shuffle off conventional forms. Nevertheless it has been a vigorously fructifying force in American literature, and though it is safe to say that a reaction has set in at present against it, there is no doubt that it has to its credit not only new and valuable metrical achievements but the sudden outcropping of magazines of verse and poetical criticism that have both reflected and stimulated the growth of interest in poetry.

That the Imagist precision of diction and sharpness of impression are capable of attainment without sacrifice of traditional metrical forms, the work of Edwin Arlington Robinson, by many critics adjudged the greatest contemporary American poet, and of Robert Frost abundantly prove. Robinson's ironical and analytical intelligence, playing upon rustic characters and scenes has produced poetry of highly realistic power in his portrayal of New England life. His method, however, which is indirect, and the frequently difficult texture of his thought, have prevented his works from capturing the popular fancy as did the grim realism of Edgar Lee Masters's epitaphs in the *Spoon River Anthology*. Robert Frost, on the other hand, who wraps the commonplaces of New England life in a kindly irony, has won popular favor as well as critical approval with *North of Boston* and *Mountain Interval*. And Miss Lowell herself, *vers librist*, imagist, and originator of what she has termed polyphonic prose, has shown herself competent to produce as admirable effects in conventional meters as in the new. Most of the American poets of standing, Conrad Aiken, Witter Bynner, William Rose Benét, Stephen Benét, Louis Untermeyer, to mention but a few, have written at times in free verse, though perhaps their best expression is found in the old forms. An interesting experimenter of different sort has been Vachel Lindsay, who first in the *Congo and Other Poems* and later in other interesting narrative poems, attempted to approximate his lyrics to a chant, employing various typographical devices to develop his effects.

In 1924 some of the most, if not the most distinguished poetical work was being done by two women who only within the past few years had come to the fore, Elinor Wylie, whose *Nets to Catch the Wind* and *Black Armor* have been followed by a novel, *Jennifer Lorn*, as striking in execution as her verse, and Edna St. Vincent Millay whose *Second April*, *Renascence*, *Harp-Weaver* and *Figs from Thistles* all have no less fine an art than her Elizabethan play. Miss Millay's strength lies in the abundant lyric beauty of her lines, in a sort of naïveté combined with passion, and in a technical proficiency that cloaks the cleverness of its performance in the ease of its accomplishment. Mrs. Wylie's work has remarkable precision and chastity of outline, perfection of form and brilliance of execution, an emotion that, as one of her critics has said, "burns with cold fire," and more depth of thought than Miss Millay displays. Theirs is on the whole the most promising talent of the day.

The English poets have in the main been less influenced by the new verse forms than their American fellows, and have correspondingly less sought their subjects in the commonplaces of life. Imagism under the influence of the transplanted Americans, H. D., Ezra Pound, and

T. S. Eliot, has been productive of interesting results, and in the case of H. D. of its most perfect expression. But in England as in America a reaction against it is under way.

English poetry has more than American sought its interest in narrative themes, having achieved in the work of John Masefield probably the most significant poetic output of the Anglo-Saxon world during the decade. The sea and the English countryside have engaged Masefield's efforts, and an intense concern for man at his coarsest and most humble has lent an imaginative and moving quality to verse of often noble diction. Had he survived, Rupert Brooke, whose war sonnets gave evidence of growing beauty and power, might have written his name large in the annals of English poetry. The War, indeed, developed a notable output of verse, the most able of its exponents being James Elroy Flecker, "the last of the Parnassians," Robert Graves, Robert Nichols, Wilfrid Owen, Siegfried Sassoon, Edmund Blunden, Isaac Rosenberg, and Richard Aldington. In striking contrast to the bitter mood of the war period is the pastoral character of the work that men like Graves and Blunden are doing to-day. The lyric tradition of British poetry has further been carried on by Wilfrid Wilson Gibson, John Drinkwater, Ralph Hodgson, and Walter de la Mare. Hardy, Bridges and Kipling have continued to write and A. E. Housman in *Last Poems*, published 28 years after his previous volume of verse, *A Shropshire Lad*, has added a permanent contribution to the poetical literature of England. At the other extreme from these poets stand the Sitwells, the representatives of the most revolutionary poetical doctrine.

Interesting as has been the course of poetry during the past decade the developments in fiction have held the centre of the stage. And in fiction as in poetry it is in America that the most striking evolution has taken place. The War found the English realists in command of the field and the post-war period has seen the continuance of their sway. Sex, and more latterly psychology, have supplanted the interest in social problems and injustices which were so dominantly the preoccupation of the closing period of the Victorian era and the opening years of the twentieth century; yet such writers as H. G. Wells and John Galsworthy still continue the sociological tradition. Wells, with his exuberant fancy, his perennial zeal for reform, his distinguished didacticism, and his daring in applying scientific doctrine to romance, has produced a series of novels which like the plays of the no less ardent moralist, Bernard Shaw, are the vehicle for the promulgation of the author's social and spiritual gospel. *Mr. Britling Sees It Through*, the most successful war novel of the Anglo-Saxon world, no less than *Joan and Peter* or *The Secret Places of the Heart* revealed Mr. Wells himself. Mr. Galsworthy's preoccupation has remained predominantly social, even where as in his war novel, *Saint's Progress*, he has become immersed in an emotional situation. In his *Forsyte Saga*, an analysis of the possessive instinct as exemplified in an English family, both his art and his social outlook have found expression in a series of novels that take rank with Arnold Bennett's studies of the English countryside as among the most notable contributions to Anglo-Saxon fiction of the century. From *Old Wives' Tales* to

Riceman's Steps, despite several insignificant novels, Bennett's realism has translated the commonplace from dullness to dignity by lifting it to the plane of the universal and thereby investing it with poignance lacking to such work, for instance, as the quiet annals of Archibald Marshall.

If social relationships have continued primarily to interest certain of the English novelists it is the pastures of the soul that have captured the interest of more of them. J. D. Beresford, May Sinclair, Compton Mackenzie, Rebecca West, Frank Swinnerton, Dorothy Richardson, Sheila Kaye-Smith, H. G. Wells, Aldous Huxley have all set themselves to its exploration with the result that the psychological novel, now frequently the psychoanalytical novel, has become the most conspicuous type in English fiction to-day. In such novels as May Sinclair's *Mr. Waddington of Wyck*, Rebecca West's *The Return of the Soldier*, Sheila Kaye-Smith's *Joanna Godden*, or H. G. Wells's *Secret Places of the Heart* it differentiates itself sharply from the specifically sex novel as written by George Moore and in its extreme form exemplified by D. H. Lawrence, while in the work of an author like Aldous Huxley it becomes naturalism. A remarkable example of the psychological novel is to be found in James Joyce's *Ulysses*, the hundreds of pages of which chronicle the stream of consciousness as it passes through one man's mind over a period of 24 hours. Various considered a work of genius and a dull abnormality it is at least important in its influence on the development of expressionism.

The largest figure of contemporary English fiction was undoubtedly Joseph Conrad whose novels of the sea and adventure draw their deepest interest not from their incident but from their splendid projection of the conflict of human emotions under the play of forces extraneous to themselves as well as inherent. It is a noble psychology which Conrad has outlined, moving, pregnant and touched by a profound compassion, presented in rich and virile manner, and transfused by a high imagination. Work of the last few years that stands out by reason of its singular subtlety is that of *The Garden Party* and *The Dove's Nest*, by Katherine Mansfield, whose delicate art was ripening into fuller achievement at the moment of her untimely death. In their ability to suggest the shifting play of mood and feeling, and their clear-sighted understanding of human reactions, her short stories gave promise of a genuinely high talent.

Despite the predominance of the interest in psychology, the purely romantic and the fantastic still hold their own in English fiction. In the case of Walter de la Mare, a gifted and richly endowed poetic fancy in combination with broad human sympathy have produced in *The Memoirs of a Midget* a work which, easily capable of grotesquerie, is in actuality a tender and convincing characterization. So too in David Garnett's *Lady into Fox* and *A Man in the Zoo*, the improbable and the fantastic are welded into harmony with a conceivable reality through a singularly unified conception and execution. Like the fantastic tale the novel of manners has continued to hold place in England, having found particular popularity in the work of Rose Macaulay whose *Potterisms* and *Dangerous Ages* have skillfully held up to view a type of contemporary Briton whose muddled

thought and sentimentality the War brought into prominence.

Noteworthy as a large part of British fiction during the past decade has been, and distinguished as its craftsmanship, on the whole the English novel has been flat in comparison with the American. For in America, forces that were stirring before the War, and that were brought to full growth in the heat of battle, have resulted in a literature of revolt remarkable alike for its vigor and its vehemence. Within the last decade American fiction has left off its swaddling clothes and arrived at maturity. A generation after the influence of Zolaism has passed in France and England it has arrived at naturalism. It no longer acquiescently accepts the world, and especially its particular corner of it, at its own valuation, but it has taken to investigating it for itself scientifically; and great has been its disillusionment. What formerly it deemed fair it now has discovered to be at bottom ugly and binding. The ease of American life it reads as stultification, its uniformity as desperate monotony, and its complaisance as promise of disaster. It has set itself to the high task of saving America from itself by joining battle with the dullness, the restrictions, the narrowness of its life. Especially against the village has it turned the power of its attack. And in its efforts to come to grips with realities it has introduced into American literature an acerbity completely foreign to its past. Sinclair Lewis's *Main Street* and *Babbalanja*; Sherwood Anderson's *Winesburg, Ohio*, and *Poor White*; Zona Gale's *Miss Lulu Bett*; Floyd Dell's *Moon-Calf* burn with a passion of indignation. They are tracts as much as novels—tracts against monotony, against convention, against rigid social codes. Their propagandism is their limitation as well as their strength. Embittered by the same sudden awareness of the uglinesses of life are the works of the writers of the more extreme expressionist school, Evelyn Brown, Carl Van Vechten, Waldo Frank, Ben Hecht and a group of lesser novelists whose concentration on the abnormalities of life converts their fiction into pathology. No less a challenge to existing conditions is the attitude of the "younger generation" to whom Scott Fitzgerald's *This Side of Paradise* set a model for depicting the breakdown of decorum and convention, and Dos Passos's *Three Soldiers* established a norm for frank speaking.

Side by side with the naturalistic movement has continued a milder realistic stream. Booth Tarkington; Edith Wharton, whose *Age of Innocence* with its acid delineation of a New York that had not yet acquired self-consciousness confirmed her position in the forefront of American novelists, Joseph Hergesheimer, Willa Cather, whose delineation of American life displayed its nature without the social criticism implicit in the work of Sinclair Lewis; Dorothy Canfield; Fannie Hurst; Robert Herrick, Charles G. Norris have proved virility and closeness to life of fiction in America. Playing on another plane is the unique talent of James Branch Cabell, whose theory that art should be based on a dream of life as it should be and not as it is, and that it must therefore tend "to become more or less of an allegory," has resulted in a richly tapestried series of romances of the Middle Ages and of present-day Virginia. A very genuine gift for fiction showed itself in Elinor Wylie's *Jennifer Lorn*, a "sedate ex-

travaganza" that sustains the manner and style of the eighteenth century with amazing success throughout its fantastic course.

Despite the seriousness which has become the most marked characteristic of American fiction, and despite its absorption in the commonplace, the story of mystery, of adventure, the society novel, and the love story pure and simple continue to flourish. Both in England and America there has been an amazing output of mystery and detective tales, and in both countries trash of the first order attains to best-sellerdom.

Briefly to summarize, Anglo-Saxon fiction while it has produced no masterpiece has shown a sturdy development and a constantly closer approximation to the problems and interests of everyday life. In America the trend to naturalism and on both sides of the ocean the application of the findings of science and especially of the new psychology to the interpretation of life have been the outstanding developments of the period. While the British novelists have displayed a surer and more accomplished craftsmanship the Americans have shown more ruggedness and intensity and a more bitter attack upon the strongholds of custom.

In drama the notable fact has been the passing of the closet play, and the concern with the interests and problems of the day. Bernard Shaw has remained the outstanding satirist and moralist of his time, while Galsworthy has continued to use the stage as a means for protest against social abuses and injustices. Barrie, Lord Dunsany and Lady Gregory have produced work of delightful whimsy and fancy, while Drinkwater with his *Abraham Lincoln*, Clemence Dane with her *Will Shakespeare*, and Bernard Shaw with *Saint Joan* have brought the historical play into favor. Shaw's amazing *tour de force*, *Back to Methuselah*, should have special mention. In the opinion of many critics the most considerable dramatic work of the decade in America has been that of Eugene O'Neill. For discussion of the drama in detail see the article THEATRE.

It is interesting to note that economic and social science has much advanced in public interest under the handling of such writers as Graham Wallas, R. H. Tawney, John Maynard Keynes and other writers whose scientific accuracy is in no way impaired by their ability to write for the lay intelligence. Their work, however, falls without the scope of an article on literature.

In concluding a survey of the decade begun by the War, attention must be drawn to the increase of interest in foreign literature which followed in the wake of the conflict. International-mindedness indeed is one of the most strongly marked trends of the period. The fiction of Spain, Scandinavia, Holland, and Russia as well as that of France and lately of Germany has been translated and widely read. The criticism and art discussion of foreign lands has had broad currency, and the war memoirs and older biographies of the European nations have taken place beside similar chronicles in the English tongue. America, at least, has broadened its horizons in a decade as never before in a century and in that fact, as well as in its sudden waking to self-realization, lies rich augury of future achievement.

LITHOPONE. See CHEMISTRY; ZINC.

LITHUANIA. One of the new Succession States, created out of the former Russian Em-

pire after the War. The claims of the Lithuanian government included: the whole of the former Russian province of Kovno; the province of Vilna, minus the districts of Disna and Vileika; a part of the province of Grodno north of the Niemen River; the province of Suvalki; part of the province of Courland; the Memel District. According to 1914 figures, this territory had an area of 151,491 square kilometres (59,633 square miles) and 4,800,000 inhabitants. The eastern frontier was defined in the Russo-Lithuanian Treaty of July 12, 1920; the fixing of the northern frontier was provided for in a convention with Latvia on Sept. 28, 1920, by which the line was to be laid down by an English arbiter. To the south, however, no agreement was reached by 1924 (see below). Both Poland and Lithuania laid claim to part of the province of Suvalki, the province of Vilna, and Grodno province. The actual area under the control of the Lithuanian government was only 33,000 square miles, and the population (1923 estimate) 2,011,200 of which 86.7 per cent was rural. Ethnographical Lithuania, i.e. the territory included in the claims of the government, was comprised of 73.5 per cent Lithuanians, 12 per cent Jews, 4.3 per cent Poles, 2.5 per cent White Russians, 1.5 per cent each Germans and Russians. Vilna, the capital, claimed by Lithuania, had in 1914, a population of 214,600; other large towns were: Kovno, the seat of government (92,000), Grodno (61,600), Memel (32,000), Suvalki (21,240), Shavli (21,240). These towns were in both political and ethnographical Lithuania.

Religion and Education. In the most important provinces, Vilna, Kovno, and Suvalki, Roman Catholics formed 75 per cent of the population, Jews 12 per cent, Greek Orthodox 9 per cent, Protestants 4 per cent. In 1922, there were 1708 primary schools with 160,230 pupils and 93 secondary schools with 17,149 pupils. In 1922, the University of Kovno was opened with 25 professors and 800 students.

Industry and Trade. The population was preponderantly rural in character. Of the total area it was computed that 45.8 per cent was arable land, 24.3 per cent meadow land, 20.3 per cent forest, and the rest unproductive and waste. In 1923, 540,800 hectares were under winter rye and 76,000 hectares under winter wheat. Principal crops in 1922 yielded, in metric tons: rye, 535,000; oats, 264,000; barley, 146,000; wheat, 78,000; potatoes, 1,386,000; flax, etc., 42,000. In 1923 there were 505,500 horses, 1,285,000 cattle, 1,413,000 sheep, and 1,897,000 pigs. Poultry farming and bee keeping were also important. Forests cover 2,065,000 acres of which 889,600 were owned by the state. By the treaty with Russia, Lithuania received 247,000 hectares of forests as compensation for damages. The leading internal question was the distribution of the large landed estates and by 1922 it was evident that expropriation was to be the plan adopted, without compensation. The agrarian law of February, 1922, provided for the expropriation of all holdings in excess of 80 hectares. The want of capital and the unsettled condition of Central Europe made the reversion to an exclusive agricultural economy the only means for the maintenance of an ordered national life. The government applied itself to this purpose, adopting the following measures: the teaching of the principles of scientific agriculture, the replenish-

ment of the herds, the increasing of the arable area, in order to make possible greater export of agricultural products. These plans were meeting with success, for by 1920-21, 10 per cent of the barley, rye, and wheat, half of the flax, and a good deal of the poultry, were exported.

Immediately after the War there was no revival of industry, the destruction caused by belligerent armies and the lack of raw materials together with the dismantling of the larger plants being insuperable obstacles in the way of a resumption of activities. What commercial intercourse there was partook of the nature of an exchange of agricultural products for finished manufactured articles. The trade for 1922 and 1923 was:

	1922	1923
Exports	\$7,690,000	\$14,680,000
Imports	7,490,000	15,660,000

Chief exports were: corn, cattle, hams, dairy products, flax, linseed, timber, hides, and wool. Chief imports were: manufactured articles, agricultural machinery, fertilizers. In 1923, almost all the imports (82 per cent) came from Germany; England supplied 5 per cent; United States 2 per cent. Principal countries of destination of exports were Germany, 43 per cent; England, 27 per cent; Latvia, 16 per cent.

Communications. There were only about 930 miles of road in the whole country. There were 1995 miles of railway, including Memel, in 1923. The most important lines were: The Wirballen-Kovno-Koszedari line; the Janov-Shavli; the Koszedari-Jewie. Also 117 miles of waterway were navigable for steamboats, and 453 miles for smaller craft. The most important, the Niemen River, was internationalized by the Treaty of Versailles. See MEMEL.

Finance. In 1921 the revenues were 672,-582,658 Lithuanian marks and the expenditures 885,725,375 marks. For 1922, the budget estimates balanced at 4,312,280,089 marks (roughly, \$7,000,000). For 1923 revenues exceeded expenditures, which totaled \$19,860,000. Up to 1923, the depressions of the German mark seriously affected the Lithuanian currency because much of the discounting business was done in Germany. On Oct. 1, 1922, a new currency law provided for the creation of a national currency based on the gold standard, with the *lit* (equal to one-tenth of the American gold dollar) as unit. Paper currency in circulation on Dec. 31, 1923, totaled 60,074,300 lits (\$6,007,430); backed by gold reserve of 16,446,200 lits; silver in circulation was 254,800 lits, and foreign currencies 46,521,800 lits. The Lithuanian foreign debt, in 1923, was put at \$7,000,000.

Government. After working for two years, a constituent assembly finally promulgated a constitution on Aug. 1, 1922. This provided for a nationally elected diet (*Seim*), chosen every three years on the basis of universal suffrage and the proportional system, to make the laws, ratify treaties, approve the budget, and choose the state president. The ministry was to be selected by the president but was to be held responsible to the diet. Cultural autonomy was provided for national minorities, viz., Jews, White Russians, and Poles, and religion and education were to be unhampered. The economic clauses provided for state regulation of lands and estates; state insurance for

the aged, infirm, and unemployed; freedom of organization, and the right to strike. Up to the first national election (Oct. 10, 1922), the government was in the hands of a Christian Democrat-National Socialist bloc, representing the peasants, and the opposition was made up of the Social Democrat and Polish parties. The first election returned 78 members grouped as follows: 38 Christian Democrats, 19 National Socialists, 11 Social Democrats, 3 Jews, 2 Poles, 5 Communists. The first president was A. Stulginskis, president of the constituent assembly, who was appointed Dec. 21, 1922. The government was formed by a clerical-agrarian combination, which continued in power after the May election of 1923.

History. The policy of Russianization that characterized imperial rule in Lithuania during the nineteenth century was maintained in the twentieth century, even though, in 1905, a Lithuanian National Assembly was called in session during the Revolution. It was not until 1915 that the Russian grip was broken, to be replaced (unfortunately) by the German. From 1915 to 1919 a German army held the land and the exploitation of its resources and scrapping of its factories did much to impoverish the country for years to come. The policy of the Germans aimed at eventual annexation; the erection of a Lithuanian State Council in 1917 was tolerated and Lithuanian independence was nominally recognized by Germany in March, 1918, but a German monarch, Prince von Urach of Württemberg, was nominated as the future king, the German administration was maintained, and the German army stayed on in the country until late in 1919, living off the land and pillaging at will, having the weak provisional government at its mercy. The outcome of the War, however, put an end to these intrigues. Bolshevik forces now succeeded the German and fighting was sporadic throughout the whole of 1919. In January, 1919, a conference of Lithuanian patriots reestablished the Tariba, or National Council, which had been formed in 1917, organized a cabinet, and proclaimed a provisional government. This government, however, was driven from Vilna, its capital, to Kovno, which in turn was soon threatened by Bolshevik invaders. At the same time the Bermondts branch of Von der Goltz's mercenaries had to be beaten off, while Polish troops were continually being engaged in 1919-20. By the spring of 1920 the situation had improved to such an extent that a constituent assembly could be convened, to reiterate the declaration of independence, begin work on a constitution, and open negotiations with Russia. The first ray of hope for the young nation appeared in July, 1920, when Russia came to terms with its succession state on a remarkably liberal basis. Lithuania was freed of its share of the Russian state debt; was compensated with 3,000,000 gold rubles; received 100,000 hectares of forest land; and had its ethnographic frontiers recognized, including the right to Vilna and Grodno.

The Polish difficulty could not be terminated so easily. Vilna was occupied by a free-lance Polish army in October, 1920, with the result that recourse had to be taken to the League of Nations (q.v.). Though the Polish government disavowed the raid, the insurgent army could not be dislodged and it was necessary late in 1920 to dispatch an international force into

Lithuania to end the conflict. Nothing was accomplished and it was not until November, 1921, that the rebel leader, Zeligowski, voluntarily withdrew. Throughout 1921, 1922, 1923, all attempts to adjudicate the Vilna controversy were fruitless. The plebiscite plan first broached by the League of Nations had to be abandoned in 1921 in favor of direct negotiations between Lithuania and Poland, and these proving unsuccessful, was adopted again. Finally on Jan. 8, 1922, an election was held in the Vilna district and the diet thus chosen decided on February 20, by a vote of 96 to 6, for union with Poland. Lithuania refused to accept the result on the ground of irregularities and in this was upheld by the League of Nations Council. But on July 18, Vilna was incorporated into the Polish nation, and the League of Nations, accepting the *fait accompli*, appointed a commission to fix the boundary line. On Mar. 16, 1923, the Council of Ambassadors, in laying out the eastern and northern Polish boundaries, included the Vilna district, despite the still strenuous objections of the Lithuanian government. In 1924, hostile forces still confronted each other on the disputed frontier. In its attempt to acquire the Memel district (910 square miles), formerly belonging to Germany, as its only outlet to the Baltic Sea, Lithuania was likewise thwarted for a time. By the Treaty of Versailles, the district north of the Memel River, including the port of Memel, was turned over to an Allied commission presumably in trust for Lithuania. In 1922, a movement for a free state, encouraged by Poland, was under way with the result that the French in charge refused to cede the district to Lithuania. It was not until Feb. 16, 1923, after a show of arms, that Lithuania received Memel on condition that Poland be permitted to use the port (see MEMEL).

On Sept. 21, 1921, Lithuania was admitted to the League of Nations. On Mar. 23, 1918, it had received *de jure* recognition by Germany; on July 12, 1920 by Russia; and on Dec. 20, 1922, by the Great Powers. A commercial treaty was signed with Great Britain in May, 1922, and with Germany in June, 1923. The latter also contained political provisions which pointed toward a closer understanding.

LITTLE, ARTHUR W. (1873-). An American printer and publisher, born in New York City. He was educated in private schools and in 1891 joined the company of his father, J. J. Little & Company, printers. He served in the State Guard in New York from 1891 to 1912. In the War he served in France with the 369th United States Infantry, colored, as regimental adjutant and major, and took part in all actions with Gouraud's 4th Army. He was wounded in action Sept. 12, 1918. He was made a Chevalier of the Legion of Honor and received four Croix de Guerre.

LITTLE ENTENTE. The series of agreements and treaties entered into by Czechoslovakia, Jugo-Slavia, Rumania, and on occasions Poland, for the protection of their mutual interests, was commonly called the Little Entente. It was ostensibly an alliance for defensive purposes in case of an unprovoked attack from Hungary, but in reality it embodied an all-embracing policy aiming at the maintenance of the status quo on the European continent resulting from the Peace Treaties of Versailles, St. Germain, and the Trianon. Since

the precarious national existence of the Central European Succession States was part of the settlement attempted in these treaties and was an outgrowth of the French desire for security, the Little Entente may with justice be regarded as having begun with the Peace Conference and as being part and parcel of the French continental policy. In her desire for security, France became at the Peace Conference the sponsor of the most extreme claims of the Czechs, the Poles, the Serbs, and the Rumanians, in order to make the new states formed by these peoples as strong as possible and to create out of them a bloc as France's ally against Germany. Hence the new states were given contiguous frontiers and direct railroad communications and practically no regard was shown for the wishes and the economic necessities of the inhabitants of the border districts. The Succession States, on the other hand, when they found themselves so generously endowed, were quite ready to fall in line. The more territory they acquired, the greater became their desire for more, and they treated their alien minorities as harshly, if not more harshly, than they themselves had been treated before by their German, Magyar, or Russian masters. More flagrant even than the violation of ethnical principles was the disregard shown for economic considerations. The economic unity which was the most plausible justification for Austria-Hungary's existence was destroyed by the treaties primarily because the Allies wished to block Germany's penetration into the East. The disruption of economic intercourse with the German network of ports, rivers, canals, railroads, etc., of which they were the natural hinterland, left the Succession States economically hanging in the air. The result of the settlement was thus a patchwork of new states saddled with alien minorities counting many millions and faced with political unrest and economic chaos. This being the situation, security for France and the Succession States lay only in the closest coöperation toward a continuation and consolidation of the existing status by military effort. The only means of accomplishing this was the formation of a "cordon sanitaire" of the new states around Germany, to prevent the rise of the Germans and the Magyars and their union with Russia. In pursuit of this aim France set out to strengthen these states as far as possible by granting them generous loans toward the building up of powerful armies, disproportionate to their size and true interests, and by missing no opportunity of supporting their excessive territorial demands at the expense of Germany and her potential friends. Most important to France in this respect was Poland, because its interposition between Germany and Russia destined it to be the bulwark in the "cordon sanitaire."

The most essential prerequisite for the success of this policy was the conclusion of a definite alliance between the Succession States based on community of interests and the coöperation of this compact group with the French policy. On Aug. 13, 1920, a convention was signed between Czecho-Slovakia and Jugo-Slavia which provided for mutual help in case of unprovoked attack. When the efficacy of this alliance for the maintenance of the status quo had been sufficiently demonstrated on the occasion of the prevention of the restoration of Emperor Charles to the throne of Hungary, Rumania joined on Apr. 23,

1921. The immediate concern of this tripartite defensive alliance or Little Entente was the consolidation of its position, which was successfully carried out during the following years. Its intervention frustrated, in September, 1921, a second Habsburg Putsch in Hungary, and it coöperated with France in blocking the union of Austria with Germany. By means of a coercive policy, Austria and Hungary were subsequently compelled to submit in every respect to the wishes of the Little Entente and to seek a closer accord with it. Thus a frontier incident between Hungary and Rumania in January, 1923, brought about a partial mobilization of the Little Entente, in the face of which Hungary was powerless. Similarly, in seeking a loan abroad Hungary had to comply with the conditions laid down by the Little Entente at the Sinaia Conference in July, 1923. While Austria was also coerced into dependence on the Little Entente, open union with the latter as a way out of the difficulties besetting the little republic was vetoed by Italy, which objected to a strengthening of the influence of France and the Little Entente on her northern frontier. The Italians were not without justification in sensing in the formation of the Little Entente a veiled threat against their interests in Central Europe and the Adriatic. Although some of the difficulties between the Little Entente and Italy were subsequently ironed out by the Treaty of Rapallo between Italy and Jugo-Slavia and by the Fiume settlement of Jan. 27, 1924, it remained an open question, in 1924, how far these and other pacts had actually removed the deep-rooted friction between the Little Entente and Italy. Absolute accord seemed impossible as long as the Little Entente remained the guardian of French interests. Poland never joined the Little Entente officially. She did, however, on all important matters coöperate with the latter to an extent which made her an unofficial fourth member of the alliance. In accordance with an agreement reached at the Belgrade Conference in March, 1922, Poland, Czecho-Slovakia, Jugo-Slavia, and Rumania operated as a quadruple alliance at the Genoa Conference. This bond was further cemented at the Prague Conference on Aug. 27-28, 1922, by a further agreement as to community of action. Within the years 1922-24 this union of interest and action between Poland and the other three Succession States grew, if anything, more firm. The position of the Little Entente became more consolidated with each successive year through conferences and treaties between the individual members and an ever-progressing understanding with France. France's system of binding these states to her policy by rendering them military, financial, and diplomatic assistance reaped its greatest success in the conclusion of the Franco-Czech Alliance on Dec. 27, 1923 (signed Jan. 25, 1924). By this treaty the two countries pledged themselves to render each other military assistance in case of an unprovoked attack by a third party and to guarantee the full execution of the Peace Treaties. In substance this amounted to a military alliance in favor of the maintenance of the territorial status quo and of the domination of Central Europe by France and the Little Entente, and as such it aroused grave apprehension and adverse criticism in Italy and Germany. At the Belgrade Conference of the Little Entente the extension of this treaty to include the other

members of the Little Entente was under discussion, and while no definite action was taken then, such a step, in the summer of 1924, appeared to be more than a possibility. See CZECHO-SLOVAKIA; FRANCE; ITALY; JUGOSLAVIA; POLAND; RUMANIA.

LITTLETON, MARTIN WILIE (1872-). An American lawyer, born in Tennessee. He was self educated and after studying law was admitted to the bar in 1891. For several years he practiced in Dallas, Texas, and then removed to New York, where he at once took a prominent place in legal circles. Becoming active in politics, he was assistant district attorney of Kings County from 1900 to 1904, and president of Brooklyn Borough in 1904-05. He served as delegate from New York to the Democratic National Convention in 1904 and presented the name of Alton B. Parker for President. From 1911 to 1913, he was a member of Congress for New York.

LIVE STOCK. The live stock situation during the decade following 1914 was somewhat unstable. Prior to the War there was an increasing tendency toward a reduction in the per capita consumption and production of meat in the United States and in the world in general. The War, however, acted as a great stimulus to meat production in the United States. At first the effects of rising feed prices tended to start a temporary liquidation of animals in 1915 and 1916, but as the world's shortage of meat became evident, prices of meat animals increased. As early as 1913 the dwindling per capita production of meat also stimulated production in the more remote and thinly populated areas of the world where previous evidence had indicated that beef production might thrive. Consequently the United States packers began to establish plants in South America. The calculated per capita consumption in the United States of meats including lard was 154 pounds in 1914, dropping as low as 143 pounds in 1917 and rising in 1922 to 164 and in 1923 to 183 pounds. The greatest portion of this increase was due to an increase of 33 pounds in the per capita consumption of pork. The increased demands for meats and the high prices offered caused many light cattle to be slaughtered during 1917 and 1918, thus tending to reduce the total amounts of meat produced. In order to assure a good price for meat animals during the encouragement of meat production in the United States during the War, several conferences were held under the direction of the United States Food Administrator and the Secretary of Agriculture relating to the profits to be expected by packers and to the relative prices of corn and pork. Although no prices were guaranteed as the result of these conferences, plans were adopted for licensing the packers and seeing that their profits should not exceed 2.5 per cent of the sales. It was also suggested that beginning in 1917 an effort would be made to maintain the price of hogs per 100 pounds at 13 times the price of corn per bushel. Under these plans, the United States Department of Agriculture in cooperation with the State agricultural colleges endeavored to increase pig production about 15 per cent during 1918. These efforts met with much success.

The peak of meat prices was reached in 1919 with practically all classes of animals, and live stock producers were enjoying a more prosperous position probably than ever before, although

a severe drought in the Southwest ending in 1918 and followed by one in the Northwest tended to handicap feeders and breeders alike in those sections. Following the prosperous conditions of 1919 there was an irregular decline in both pork and beef prices during 1920, choice and prime beef dropping from \$19.25 per 100 pounds at the first part of the year to \$13 at the end of the year. Hogs advanced to \$18.25 on September 25, followed by a sharp decline to an average of \$8.97 on Dec. 15, 1919. The situation was, therefore, very critical for beef and hog producers, but the outlook for the sheep breeder was even more demoralizing. Wool dropped from \$0.72 on the range to a condition where no market at all existed. The prices of live stock continued to fall through 1921, reaching low levels at the end of the year. Although the European countries were still suffering from the loss of many of their animals during the War, they were unable, due to poor exchange rates and a lack of credit facilities, to purchase any great amounts of meat. At the end of 1921, however, conditions began to show more promise, and some meat products, especially pork, were exported to western Europe. Conditions in 1922 were somewhat better, especially for the sheep raiser, and the passage of the McCumber-Fordney Tariff bill placed a heavy duty on all mutton, lamb, and wool imported. During 1923 a peculiar situation existed which apparently was unexpected, resulting in an unprecedented slaughtering of hogs and a reduction of hog prices to low levels of less than \$7 per 100 pounds in December. The following table indicates the annual fluctuations in the numbers of animals slaughtered under Federal inspection in the United States, and the estimated total slaughtering based on the 1909 and 1919 Census reports.

The supervision of the packers and stockyards agencies during the War finally resulted in the passage of the Packers and Stockyards Act by Congress, which became a law in August, 1921. This act provided for the supervision of public stockyards, live stock market agencies, and dealers in live stock and live stock products, to prevent misleading or illegitimate practices and to encourage fair competition. Some of the operations of the packers and stockyards administration under the direction of the Secretary of Agriculture were severely criticized by several of the large packers from the commencement of the operation of the law, making it necessary to establish legally the constitutionality of the act, and next to secure the right to inspect the books of certain of the packers who refused permission for it.

International Conditions. Many changes occurred in the live stock situation in the different countries of the world between 1914 and 1924. The beef industry had developed rapidly in Argentina, New Zealand, Australia, and South Africa. New Zealand and Australia also became the world's largest exporters of lamb and mutton. The development in these countries was rendered possible by the rapid improvements in methods of refrigeration and cold storage of meat products and by the opening of large slaughtering plants. Much of the Australian and New Zealand products was shipped to England and Europe, though considerable New Zealand lamb coming to the United States prior to and after the War met with much favor. The extreme depression in the beef cattle mar-

ANNUAL SLAUGHTER OF ANIMALS IN THE UNITED STATES

LIVE STOCK

799

LIVE STOCK

Calendar year	Number of cattle			Number of calves			Number of sheep and lambs			Number of goats			Number of swine		
	U. S. inspected	Estimated total	U. S. inspected	U. S. inspected	Estimated total	U. S. inspected	U. S. inspected	Estimated total	U. S. inspected	Estimated total	U. S. inspected	Estimated total	U. S. inspected	Estimated total	U. S. inspected
1913	6,978,361	11,477,600	1,902,414	5,284,500	18,689,400	14,405,759	75,655	214,600	34,198,585	57,973,500					
1914	6,756,737	11,004,500	1,696,962	4,661,400	18,460,500	14,229,342	175,906	499,000	32,531,841	55,148,100					
1915	7,153,395	10,822,100	1,818,702	4,639,500	15,843,000	12,211,765	153,946	435,000	38,381,228	62,693,900					
1916	8,310,458	12,026,700	2,367,403	5,773,900	11,941,366	9,344,994	198,909	564,300	43,083,703	70,054,800					
1917	10,350,152	13,723,900	3,142,721	7,030,700	12,123,800	10,319,877	165,660	470,000	33,909,704	57,488,800					
1918	11,828,549	15,750,400	3,456,393	7,513,900	13,230,600	10,691,084	137,725	390,100	41,217,250	65,732,400					
1919	10,091,084	15,635,100	3,969,027	8,445,000	12,691,116	12,691,116	87,381	247,500	41,811,630	66,680,300					
1920	8,608,691	12,847,700	4,058,370	8,445,400	10,982,180	10,982,180	42,477	120,500	38,018,684	60,635,900					
1921	7,608,280	12,271,300	3,807,568	7,770,600	16,673,000	13,004,904	12,133	34,400	38,982,355	62,172,900					
1922	8,677,807	13,148,200	4,181,569	8,363,100	10,928,941	10,928,941	20,633	58,400	43,113,629	67,050,700					
1923	9,162,516	13,882,600	4,500,323	8,824,200	11,528,550	11,528,550	26,607	75,400	53,833,708	81,582,600					

ket which began in 1921 and continued through 1923 was keenly felt in several of the beef exporting countries. In Argentina where cattle raising for export is the main industry, the situation became so acute in 1923 that the cattlemen organized and were instrumental in having a law passed on October 15 to set a minimum price for beef in the export trade. The fallacy of such a procedure was evident when the law began to operate and the British and American packing companies in Argentina refused to buy cattle. This resulted in a situation more serious than before the law was passed, and in a little more than three weeks the government suspended the operation of the law for six months, and the purchase of meat for export was resumed but at a lower price than one month before. For the relief of similar situations in Australia and South Africa, the respective governments offered bounties on export beef of $\frac{1}{4}$ d. (\$.005) and $\frac{1}{2}$ d. (\$.01) per pound. Bounties were also offered for live cattle exported.

Canadian stock raisers were somewhat affected by the United States tariff bills and by the raising of the embargo on Canadian cattle by Great Britain in 1923. Most significant in the meat export trade of the United States was the reaction to the European demand for meat during the War. In 1916 and 1919 the exports of both beef and pork reached the largest amounts in history, although the United States has long been the leading exporter of pork. In 1914 less than 400,000,000 pounds of pork products, exclusive of lard, were exported, but this amount was more than doubled in 1915, with gradual increases in 1916 and 1917, and a large increase in 1918 to nearly 1,750,000,000 pounds. The exports in 1919 were over that figure, but in 1920 they were only about one-half of this amount and gradually declined to a little over 700,000,000 in 1922, with an increase to 900,000,000 in 1923.

The major part of the pork exported consisted of bacon, which was over 1,000,000,000 pounds in both 1918 and 1919. Over 50 per cent of the bacon and about 75 per cent of the ham and shoulder exports were to the United Kingdom. The lard exports were close to 500,000,000 pounds up to 1919, when they reached 750,000,000. This amount was maintained through 1922, but 1923 saw a further increase to over 1,000,000,000 pounds. The exportation of lard to Germany, which was entirely stopped from 1915 to 1918, was resumed in 1919, with gradual increases in the amount exported each year to nearly 377,000,000 pounds in 1923. In 1913 the amounts of lard exported to the United Kingdom and Germany were nearly equal, but this condition did not again exist until 1920, though in the years following, large amounts were shipped to each country. The amount sent to Germany was very heavy, showing an increase about 50 per cent, in 1923.

There was also a remarkable increase in the fresh beef exports of the United States during the decade, from less than 7,000,000 pounds in 1913 to 514,000,000 in 1918, with a gradual decline to 3,000,000 pounds in both 1922 and 1923. Canned beef exports were similarly increased. A major part of the exports of fresh beef and about one-third of the canned beef were to the United Kingdom.

Research. Experimental inquiry indicated a more complete realization of the importance

of fundamental research. Notable advances were made in the physiology of nutrition and knowledge of qualities which influence the value of feeding stuffs. A better understanding of the importance of vitamins, minerals, and the different kinds of proteins in the rations of live stock tended to explain why certain feeds and feed combinations produced unsatisfactory growth or gains. During and succeeding the War the high prices of feeding stuffs made the utilization of fibrous and other low grade feeds desirable, and much work was done, especially in Germany, toward increasing the digestibility of such feeds by hydrolysis. The attainment of results in breeding experiments with the live stock of more economic importance is necessarily a slow process, and the expense of such investigations is often prohibitive. Much progress in breeding has been made through the use of the smaller experimental animals such as the rat and the guinea pig, with sufficient comparisons with larger animals to make it evident that the same fundamental principles of inheritance are operative.

Fundamental investigations of much practical value on the effect of inbreeding in rats and inbreeding and crossbreeding in guinea pigs were carried on at the Wistar Institute and the United States Department of Agriculture, respectively. Both studies indicated that inbreeding tends to increase the percentage of homozygosity of the stock. The latter study dealing with the effect on fertility and vigor showed that such conditions seem to depend mainly on dominant factors and that crossbreeding brings together a greater variety of dominant factors and thus results in increased vigor. The fundamental work in animal breeding has been closely correlated with the results of breeding investigations with the fruit fly, *Drosophila melanogaster*, which species has been better analyzed genetically than any other organism.

Interesting studies of sex determination in animals have indicated that sex is not only due to differences in the sex determining power of chromosomes, but that the sex may also be modified by other factors which tend toward the production of intersexuality in certain cases. R. Goldschmidt in Germany, working with gipsy moths, has carried this analogy further than other investigators, although recent results with goats, chickens, and pigs in Scotland and the United States have partially, at least, corroborated his results. Theoretical studies of growth, senescence, and production in dairy cattle and hens have indicated that the curves of milk production, egg production, and growth and senescence in dairy cattle and senescence in fowls tend to follow the course of a monomolecular chemical reaction. It is thus concluded that these physiological operations are limited by chemical reactions. See VETERINARY MEDICINE.

LIVONIA. See BALTIC PROVINCES.

LLOYD GEORGE, DAVID. A British statesman and reformer (see VOL. XIV). At the outbreak of the War, as Chancellor of the Exchequer, he took measures which enabled British credit to withstand, with success, the immediate needs brought about by the beginning of the struggle. Early in 1914, he was appointed Minister of Munitions, in which office he displayed remarkable ability for organization and ceaseless energy. Following the death of Earl Kitchener, in 1916, he was appointed

Secretary of State for War. He proposed the limiting of the cabinet to a smaller membership, from which the prime minister was to be excluded. After failure of his attempts to bring this about, he resigned, and as he was supported by the Unionist leaders, Mr. Asquith, Prime Minister, retired, and Lloyd George became Minister and First Lord of the Admiralty. From 1917, to the conclusion of peace, he was practical dictator of government policies. Following the Armistice, he called for a general election, and was returned to power by an immense majority. He was one of the leading figures at the Peace Conference and showed remarkable diplomatic skill. In 1920, he introduced the Home Rule Bill, and largely through his efforts the Irish Free State was established. In 1921, he took an active part in many conferences on the political and social conditions in Europe. His aggressive support of Greece in 1922, and the success of the Turkish armies in that year, brought about his defeat, together with that of the Coalition Cabinet. He was, however, returned to Parliament and remained leader of the Liberal policy in the House of Commons. He visited the United States in 1923. See GREAT BRITAIN, *History*.

LOANS, INTERNAL AND EXTERNAL. See FINANCE AND BANKING.

LOCKWOOD, CHARLES CLAPP (1877-). An American lawyer, born in Brooklyn, N. Y. He was graduated from the New York Law School in 1900, and in 1903 was admitted to the bar. He served in the New York Assembly in 1914 and in the State Senate from 1915 to 1922. He was prominent in reform movements in the city and State and was chairman of the Senate Committee to investigate rents, housing and combination in restraint of trade. He was also chairman of the commission to investigate the finances of the City of New York.

LODGE, HENRY CABOT (1850-). An American legislator and historical writer (see VOL. XIV). He was reelected to the Senate in 1916. In the same year he served as chairman of the Committee on Resolutions at the Republican National Convention in Chicago. He was the leader in the Senate in opposition to the Versailles Treaty and the covenant of the League of Nations in the form in which they were presented for ratification. He proposed reservations and amendments which President Wilson refused to accept (see UNITED STATES). He served as temporary and permanent chairman of the Republican National Convention of 1920, and in the same year was chairman of the United States Pilgrim Tercentenary Commission. In the 67th and 68th Congresses, he was chairman of the Committee on Foreign Relations and was the Republican leader of the Senate. He was appointed, by President Harding, delegate and special ambassador to the Conference on the Limitation of Armaments, 1921-22. In 1922, he was again reelected to the Senate, though by a greatly reduced majority. His opposition to several of the important policies advocated by President Coolidge in 1924 caused him to be severely criticized. His later books include *Democracy of the Constitution and Other Essays* (1915); *War Addresses* (1917).

LODGE, SIR OLIVER JOSEPH (1851-). A British philosopher and man of science (see VOL. XIV). In 1919, he was made Albert Medallist of the Royal Society of Arts as a

pioneer in wireless telegraphy. His publications after the War were devoted exclusively to psychical research, a cause which found greater favor in the eyes of the British public than ever before. *Raymond*, published in 1916, purports to reveal communications between Sir Oliver and his son who was killed in the War. *Christopher* (1919) is a study in human personality on the spiritistic hypothesis. In addition to these publications, Sir Oliver was active as an experimenter in psychical phenomena and contributed a number of articles to journals devoted to that cause.

LOEB, JACQUES (1859-1924). An American physiologist and experimental biologist (see Vol. XIV). Dr. Loeb's death occurred unexpectedly at Bermuda, where, as was his custom, he had gone to conduct experiments with marine life. During the past decade he had published the following major works: *The Organism as a Whole, from the Physicochemical Viewpoint* (1916); *Forced Movements, Tropisms and Animal Conduct* (1918), and *Proteins and the Theory of Colloidal Behavior* (1922).

LOEB CLASSICAL LIBRARY. See PHI-
LOLOGY, CLASSICAL.

LOENING, GROVER C. (?-). An American aeronautical engineer born in Bremen, Germany. He was educated in New York. He is best known for his many inventions: the first flying boat; monoplane flying boat, and first American short hull flying boat. At San Diego (1914) he invented the first monoplane rigid bracing pursuit machine. In 1915, he built the Signal Corps tractor used by Lt. B. Q. Jones in establishing the world's three passenger endurance records and by Lt. T. Dodd in the cross country record. He introduced steel construction in the Sturtevant biplane (1916) and the next year began the designing and development of the Loening monoplane and seaplane. In 1922, the Collier Trophy was awarded him for the Loening Air-Yacht. Among his books are: *Monoplanes and Biplanes* (1917); *Military Aeroplanes* (9th ed., 1916-18); *Revival of the Monoplane* and many papers and articles.

LOGUE, MICHAEL (1840-). A Roman Catholic cardinal, born in Donegal, Ireland. He was consecrated Bishop of Rapoe in 1879 and coadjutor, and in 1887 was made Roman Catholic Primate of all Ireland. He was created Archbishop of Armagh in 1888 and Cardinal in 1893. He took an active part in bringing about settlement between the opposing parties in Ireland prior to the formation of the Irish Free State, and his influence was constantly exerted against violence and bloodshed.

LONDON CONFERENCES. See REPARATIONS.

LONDON, TREATY OF (1915-). See FIUME-ADRIATIC CONTROVERSY; ITALY; REPARATIONS; TIROL, GERMAN SOUTH; WORLD WAR, DIPLOMACY OF.

LONE SCOUTS OF AMERICA. An organization for boys, incorporated in Washington in 1915. It offers boys the advantages of the Boy Scout Movement without the necessity of joining a group of boys in the same neighborhood. Up to Aug. 1, 1924, 527,353 boys were enrolled. The Lone Scouts, with no adult leadership except that of two officials at the Long House, or national headquarters, who edited and published the official organ, developed complete national organization. Sixteen districts were created, each with a Council Chief and a Council of Ten.

The Council Chiefs constituted a national executive committee. Forty authorized Lone Scout amateur publications were edited and published by Lone Scouts who, in most cases, did the printing themselves. Local, State and National rallies were conducted. On Mar. 1, 1924, the Lone Scouts of America merged with the Boy Scouts of America (q.v.) without losing its separate identity, the national officials of the Boy Scouts of America becoming the national officials of the Lone Scout organization. The *Lone Scout*, the official magazine, was discontinued at the same time, and *Boy's Life*, the Boy Scout magazine, became the official magazine for the Lone Scouts. The Long House is at 500 North Dearborn Street, Chicago.

LONGFELLOW, ALEXANDER WADSWORTH (1854-). An American architect, born at Portland, Me. He was graduated from Harvard in 1886 and studied architecture at the Massachusetts Institute of Technology and at the Ecole des Beaux Arts. He began the practice of his profession in Pittsburgh and Boston in 1887, forming the firm of Longfellow, Alden and Harlow. This firm designed the Carnegie Library at Pittsburgh and the City Hall at Cambridge. In 1895, he formed a partnership with his brother, R. K. Longfellow. He designed Phillips Brooks House and other buildings for Harvard University and several buildings for Radcliffe College. He was the designer of the original Boston elevated railway stations. His memberships included that in the Art Commission of Boston and the Boston Marine Museum. He was a trustee of the Boston Museum of Fine Arts, a Fellow of the American Institute of Architects, and a member of other architectural and patriotic societies.

LONGLEY, HARRY SHERMAN (1868-). An American Protestant Episcopal bishop, born at Cohoes, N. Y. He was graduated from St. Stephen's College in 1891 and from the General Theological Seminary in 1894. He was ordained priest in 1895 and served as rector in churches in Massachusetts, New York and Illinois. In 1912, he was consecrated suffragan Bishop of Iowa. He was elected coadjutor bishop in 1917, and in 1920, became presiding bishop of the Province of the Northwest.

LONGMAN, (MARY) EVELYN BEATRICE (1874-). An American sculptor (see Vol. XIV). Among her awards during the period were the French gold medal from the Art Institute of Chicago, 1920; the Widener gold medal from the Pennsylvania Academy of Fine Arts, 1921; and the Watrous gold medal from the National Academy of Design, 1923. She became a member of the National Academy in 1919.

LONG RANGE GUNS. See ARTILLERY.

LONGWORTH, NICHOLAS (1890-). An American public official, born at Cincinnati, Ohio, and educated at Harvard. He was admitted to the bar in 1894, and served in the State Legislature of Ohio from 1899 to 1903. In 1903, he was elected to the United States Congress and was reelected for 10 consecutive terms. He was floor leader of the House of Representatives. In 1906, he married Alice, daughter of Theodore Roosevelt.

LORD, ROBERT HOWARD (1885-). An American educator, born at Plano, Ill. He was graduated from Harvard University in 1906 and took postgraduate courses in Austria, Germany and Russia. He was successively instructor in

history and assistant professor of history at Harvard, occupying the last post from 1916. In 1918-19, he was Harvard Technical Expert on Polish affairs with the American Commission to Negotiate Peace in Paris, and a member of the American Inter-Allied Commission to Poland (1919). He wrote *The Second Partition of Poland* (1915), and, with Professor C. H. Haskins, *Some Problems of the Peace Conference* (1920).

LORENZ, ADOLF (1854-). An Austrian orthopedic surgeon (see VOL. XIV) who has received unusual publicity in the United States and elsewhere, because identified with a successful method of bloodless treatment for a special deformity—congenital dislocation of the hip. At the close of the War, Lorenz removed to the United States, although dividing his practice between the latter and his home city of Vienna. His free orthopedic clinics held in some of the large cities of the United States caused a difference of opinion among the profession of the latter, but the claim of his partisans has been that the public needs education as to what may be accomplished among cripples by orthopedists.

LORENZEN, ERNEST GUSTAV (1876-). An American lawyer and educator, born at Russee-Kiel, Germany. He came to the United States in 1892 and studied law at Cornell University, taking postgraduate studies in France and Germany. After practicing law in New York City from 1901 to 1903, he was appointed professor of law at the University of Maine. In 1904, he became professor of law and in 1910, dean of the Law School at George Washington University. From 1911 to 1914 he was professor of law at the University of Wisconsin, and from 1914 to 1917 at the University of Minnesota. In the latter year, he was appointed to the same chair at Yale. He was the author of several books on legal subjects, and contributed articles to American and European reviews.

LORING, WILLIAM JOSEPH (1869-). An American mining engineer, born in San Mateo County, Cal. He began his career as a boy in a mine in California in 1881 and after successively passing through the stages of milling practice, he became (1894) mill superintendent of the Utica Milling Company. In 1906, he was made general manager of Benick, Moreing and Company's Australasian interests, consisting of 41 mining companies with headquarters in London. Eight years later he returned to California and became president and general manager of six or more gold-mining corporations. He presided over the American Mining Congress in 1921-22.

LOS ANGELES. The largest city of California. The population rose from 319,198 in 1910 to 576,673 in 1920, an increase of more than 80 per cent in 10 years, and to 666,853 by estimate of the Bureau of the Census for 1923. During 1922 and 1923, \$6,000,000 was spent by the city on harbor improvement, and Los Angeles became a regular port of call for 61 different freight and passenger liners and five tank liners. Imports increased from \$1,942,647 in 1910 to \$9,897,336 in 1920 and to \$33,555,593 in 1923, while exports climbed even more remarkably from \$135,911 in 1910 to \$18,606,121 in 1920 and to \$29,495,005 in 1923. In 1924, bonds were voted by the city for the following purposes: \$34,000,000 for school sites, buildings and equipment, \$8,000,000 for water

works, \$1,600,000 for police stations and signal system, \$1,000,000 for bridges, \$600,000 for incinerators, and \$400,000 for fire boats; \$35,000,000 additional for flood control was voted by the county. Municipal power houses were built in 1916 and 1919, and an extension in 1923, which all together produced 107,000 horse power of electrical energy. The value of oil refineries rose from \$1,145,812 in 1914 to \$5,613,897 in 1919; the value of petroleum products in 1923 was \$135,271,425. Bank clearings increased from \$1,145,167,110 in 1914 to \$7,024,888,783 in 1923 and to \$3,713,429,255 the first six months of 1924; and building permits from \$21,684,100 in 1910 to \$200,133,181 in 1923, and to \$78,828,738 the first six months of 1924.

A new city charter was adopted in May, 1924. The outstanding characteristics were the enlisting of citizen service on a great number of administrative boards, with boards of expert administrators attached; and the large administrative powers given to responsible executives subject to these citizen boards. The mayor, the city attorney, controller, members of the council and of the board of education were elected by popular vote. Sixteen departments each administered by five paid commissioners were created. Provision was also made for the creation of boroughs within the city, whereby any annexed section not a part of the original central city of 4000 acres, or of 40,000 population, might become a borough by action of the city council and a vote of the residents of the proposed borough territory.

LOTI, PIERRE (JULIEN VIAUD) (1850-1923). A French novelist (see VOL. XIV). In 1914, he reentered the service of his country, being appointed to the General Staff of the Armies of the East as inspector of the defense against airplanes. Resulting from his war experiences were numerous articles, published in the following collections: *La Hyène Enragée* (1916); *Quelques Aspects du Vertige Mondial* (1917); *L'Horreur Allemande* (1918); *La Mort de Notre Chère France en Orient* (1920). The last-named book pleads the cause of Turkey. During these latter years he also published several autobiographical works, continuations of his earlier ones: *Prime jeunesse* (1919), *Un Jeune officier pauvre* (1923), and *Suprêmes visions d'Orient* (1922). The two last works were revised and published by his son Samuel. He died at Hendaye and was buried at Saint-Pierre-d'Oléron, the "cradle of his family."

LOUCHEUR, LOUIS (1872-). A French industrialist and politician, born at Roubaix, and educated at the lycée of Lille and at the Ecole Polytechnique in Paris. Graduating as engineer, he was interested in industrial enterprises, but did not come to the fore until the War when he became Minister of Munitions. After the Armistice, he was made minister for the devastated regions. He tried to bring French and German industrialists together on programme of mutual interest, but the plan was for the time being unsuccessful. See REPARATIONS.

LOUDERBACK, GEORGE DAVIS (1874-). An American geologist, born at San Francisco, Cal. He studied at the university of California and received his Ph.D. there in 1900. He became professor of geology at the University of Nevada in 1903. In 1906, he returned to California, where during 1917-1920 he was professor of geology and in 1920, dean of the college of

letters and science. During 1914-15 he was consulting engineer of the Standard Oil Geological Expedition to China and in 1918-19 he held consulting relations with the United States Bureau of Mines and the United States Geological Survey. During the War he was a member of the Pacific Coast committee on geology of the National Research Council. Dr. Loudereback made a specialty of the basin range structure and West Coast stratigraphy and was the discoverer of several new minerals, including benitoite. He was president of the Seismological Society of America in 1914.

LOUIS III, LEOPOLD JOSEF MARIA ALOYS ALFRED, last KING OF BAVARIA (1845-). (See Vol. XIV.) He was forced to abdicate in November, 1918, when the people of Bavaria inaugurated the Bavarian Free State.

LOUISIANA. Louisiana is the thirtieth State in size (48,506 square miles), and the 22d in population; capital, Baton Rouge. The population increased from 1,656,388 in 1910 to 1,798,509 in 1920, a gain of 8.6 per cent. The white population increased from 941,086 to 1,096,611, the native white increasing from 889,304 to 1,051,740, while the foreign-born white decreased from 51,782 to 44,871. The number of negroes fell from 713,874 in 1910 to 700,257 in 1920. Both urban and rural populations increased: the former from 496,516 to 628,163; the latter from 1,159,872 to 1,170,346. The growth of the principal cities was as follows: New Orleans (q.v.), 339,075 (1910), 387,219 (1920); Shreveport, 28,015 to 43,874; Baton Rouge, 14,897 to 21,782.

Agriculture. Agricultural conditions in Louisiana in the decade 1910-20 were affected, as in the case of the other southern States, by the ravages of the boll weevil, which became serious about 1905. The effect is apparent in the following comparison of the acreage and production of cotton for various years during the period. In 1904, the acreage was 1,745,865 and the production 1,089,526 bales; in 1908, 1,550,000 and 470,136 bales; in 1913, 1,244,000 and 440,000 bales; in 1917, 1,454,000 and 639,000 bales; in 1919, 1,527,000 and 298,000 bales; in 1921, 1,168,000 and 279,000 bales; and in 1922, 1,185,000, and 357,000 bales. The estimated production in 1923 was 340,000 bales. In addition to the devastations of the boll weevil, army worms in many sections of the State stripped the leaves of the cotton plant. Damage in 1923 from the boll weevil and leafworm was heavier than in 1922. See **BOLL WEEVIL** and **COTTON**.

While the population of the State increased 8.6 per cent in the decade 1910-20, the number of farms increased 12.4 per cent (from 120,546 to 135,463). In 1910, the acreage of land in farms was 10,439,481; in 1920, it had decreased to 10,019,822, or 4 per cent. The improved land in farms, however, increased from 5,276,016 to 5,626,226 acres, or 6.6 per cent. The total value of farm property showed an apparent increase, from \$304,220,988 in 1910 to \$589,826,679 in 1920; the average value per farm, from \$2499 to \$4354. In interpreting these values, however, and, indeed, all comparative values in the decade 1914-24, the inflation of currency in the latter part of that period is to be taken into consideration; the index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of

land used for agricultural purposes decreased from 35.9 in 1910 to 34.5 in 1920; the percentage of improved land rose from 50.5 to 56.2. In 1920, of the total of 135,463 farms, 57,254 were operated by owners, 828 by managers, 77,381 by tenants. The comparative figures for 1910 were 52,989, 950, and 66,607. White farmers in 1920 numbered 73,404, compared with 65,667 in 1910; the native white farmers, 71,081, compared with 63,236; Negro farmers, 62,036 compared with 54,819. The 1.9 per cent decrease in Negro population, 1910-20, in contrast with the increase of 9.7 per cent in the preceding decade, quite seriously affected the farm labor situation. The farms free from mortgage in 1920 numbered 36,010, compared with 42,011 in 1910. Those mortgaged numbered 11,783 compared with 9834. The number of dairy cows in 1920 was 217,690, compared with 279,097 in 1910, a decrease of 22 per cent; "beef cows," 316,518, compared with 183,550. The number of swine declined from 1,368,000 in 1910 to 911,600 in 1920. Mules, in 1920, numbered 180,115, compared with 130,928 in 1910; sheep, 129,816 compared with 139,308. The estimated production of the chief farm crops in 1923 was as follows: corn, 26,545,000 bushels; oats, 1,194,000 bushels; potatoes, 1,638,000 bushels; sweet potatoes, 6,802,000 bushels; tobacco, 459,000 pounds; rice, 15,896,000 bushels; peanuts, 9,132,000 bushels. Comparative figures for 1913 are: corn, 41,800,000 bushels; oats, 990,000; rice, 11,760,000; potatoes, 1,750,000; hay, 240,000 tons; tobacco, 270,000 pounds; and cotton, 444,000 bales. Louisiana is the most important cane-sugar producing State. The area planted to sugar cane in 1922 was 217,000 acres, and the crop of cane was 3,342,000 short tons, producing 241,376 short tons of sugar and 20,420,000 gallons of molasses. While the area and production show some fluctuation during the decade, they were practically the same in 1922 as in 1914.

Mining. Louisiana is an important producer of minerals, especially of petroleum, sulphur and natural gas. There is no metal mining in the State. The petroleum industry is most important. Its progress during the decade 1914-24 is indicated by the following comparative figures: in 1914, there were produced 14,309,435 barrels, valued at \$12,886,897; 1915, 18,191,539, \$10,804,653; 1916, 15,248,138, \$14,669,774; 1917, 11,392,201, \$17,224,602; 1918, 16,042,600, \$27,535,000; 1920, 35,714,000, \$112,606,000; 1921, 27,103,000, \$42,469,000; and 1922, 35,376,000. The increased production in the last three years indicates the discovery and development of new oil fields. In production of sulphur, Louisiana heads the list of States. Production figures for the period under review are as follows: 1914, 374,470 tons; 1917, 595,130; 1918, 918,700; 1919, 526,250; 1920, 37,635; 1921, 795,980; and 1922, 1,146,860. The production of natural gas is also of great importance, as indicated by the following figures: 1915, 25,540,392 M. cubic feet; 1918, 36,094,132; 1920, 58,274,000; 1921, 58,004,000. The output of natural gas gasoline has increased steadily, rising from 2,113,159 gallons in 1916, to 7,020,538 gallons in 1918; 10,609,629 gallons in 1920; and 15,340,374 gallons in 1921. In addition to the minerals mentioned above, the State produces clay products, salt, and sand and gravel. The total value of the mineral products in 1921 was \$61,061,974, compared with \$138,745,725 in

1920; \$38,851,509 in 1919, \$54,769,225 in 1918, and \$21,890,025 in 1914.

Manufactures. While Louisiana is not one of the chief manufacturing States, its industrial progress, since 1909, has been great. The six cities in the State with a population of more than 10,000, in 1919 contained 27.6 per cent of the total population and produced 32 per cent of the total value of the manufactured products. In 1909, there were in the State 2516 manufacturing establishments; 2211 in 1914, and 2617 in 1919. Persons engaged in manufacture numbered 86,563, 88,014, and 112,523; and capital invested amounted to \$221,816,398, \$261,635,022, and \$462,209,056 in these years. The value of the products in 1909 amounted to \$233,948,638; in 1914, \$255,312,648; and in 1919, \$676,189,770. The increase in value of the products was due largely to changes in industrial conditions brought about by the War, and therefore cannot be properly used to measure the growth of manufactures during the census period of 1914-19; but the increase shown in number of establishments and number of wage earners clearly indicates a growth in the State's manufacturing activities. The first industry in importance in point of value of products is the refining of sugar. This, in 1909, amounted to \$63,775,000; in 1914, to \$57,948,000, and in 1919, to \$141,843,000. The manufacture of lumber and timber products ranks second; in 1909, such products were valued at \$62,838,000; in 1914, at \$66,656,000, and in 1919, at \$130,521,000. Since 1914, when there were 21 refineries, the refining of petroleum has become one of the great industries of the State. The value of the product in 1919 was \$75,023,726. The manufacture of cotton-seed oil and cake takes fourth place in point of value: in 1909, \$13,085,000; in 1914, \$18,016,000, and in 1919, \$57,162,000. The chief manufacturing cities are New Orleans (q.v.), Shreveport, and Lake Charles. In 1909, there were in New Orleans 848 manufacturing establishments, with a product valued at \$78,794,000; 733 in 1914, with a product of \$69,814,000, and 873 in 1919, with a product of \$182,799,000.

Education. Educational progress in the decade 1914-24 was steady in Louisiana. The Legislature of 1914 passed, among other important measures, a compulsory education law affecting all cities of over 25,000 inhabitants. In 1916, measures were passed authorizing the acceptance of the terms and provisions of the Smith-Hughes bill providing for vocational education. The State colony and training school for feeble-minded was created in 1918. In 1920, parish school boards were authorized to create school districts at any time. The Legislature of 1922 passed an act providing for a State Board of Education and parish school boards, defining their powers and providing for the administration and supervision of the public schools of the State; the board to include 11 members, three appointed by the governor, and eight elected for terms of eight years. In the same year an inclusive compulsory attendance measure was passed, providing for the attendance in school of every child in the State between the ages of 7 and 14; and the Legislature also provided for the promotion of vocational rehabilitation. In 1914 the total enrollment in the schools was 288,972, including both white and colored pupils; in 1921-22, the number enrolled had increased to 390,324; of whom 267,-

727 were white and 132,597 were colored; the total enrollment in the elementary white schools was 225,167; and in the secondary white, 32,560. The attendance in the State-approved high schools for white children was 23,433. The total expenditure for current expenses in 1921-22 was \$12,586,110, and the total outlay for all educational purposes was \$25,204,675. The percentage of illiteracy in the State decreased from 31.1 in 1910 to 24.9 in 1920; among the native white, from 16.8 per cent to 13.5; among the foreign-born white, from 23.2 to 22.6; among the colored, from 52.2 to 43.8 per cent.

Finance. See STATE FINANCES.

Political and Other Events. There was much friction in the political history of the State in the decade 1914-24, especially in the latter part, due to the activities of the Ku Klux Klan and attempts to control and regulate members of this body by the Governor and other State authorities. In 1914 elections were held for representatives in Congress only. The Democrats were successful in all districts, except one, where a Progressive candidate was elected. In 1915 over \$4,500,000 was expended in New Orleans in an effort to rid the city of rats in order to prevent the reappearance of the bubonic plague. Elections were held in 1916 for governor and other State officers. R. G. Pleasant, Democratic candidate, was elected. In the presidential voting in this year, President Wilson received 79,875 votes; Charles E. Hughes, 6466. In 1920 elections were held for United States senator, and E. S. Broussard, Democratic candidate, was elected. In the presidential voting of this year, J. M. Cox received 87,354 votes; W. G. Harding, 38,538. On Dec. 21, 1922, the bodies of two men were found in a lake in Morehouse parish. It was alleged that these men had been flogged by members of the Ku Klux Klan and their bodies thrown into the lake. Many persons were arrested, but on March 15, owing to lack of evidence, the grand jury failed to bring indictments against them. On Apr. 18, 1923, the district attorney of Morehouse parish lodged 30 informations against prominent citizens for the alleged participation in the murder of the two men, and on November 5, four members of the Ku Klux Klan were found guilty of "carrying firearms on the premises of another," in connection with the activities of the Klan in Morehouse parish. Elections for representative in Congress were held in April, 1924. Genevieve Clark Thompson, daughter of the late Champ Clark, was a candidate for nomination, but was defeated by J. Zach Spearing, of New Orleans, who was elected. In May, 1924, J. M. Fuqua was inaugurated governor of the State.

Legislation. Among the important acts of the Legislature in the decade 1914-24 are those noted below. In 1916 a State Board of Education was created. In 1918 the Legislature ratified a prohibition amendment and the Federal woman suffrage amendment. Cities were authorized to adopt the commission form of government when their population exceeded 5000. Laws were passed regulating the sale of narcotics, and the child labor laws were also amended. A law requiring instruction in the common schools to be conducted only in the English language was enacted. The Legislature of 1924 enacted a measure prohibiting the wearing of masks by members of secret societies.

LOUISVILLE. The largest city of Kentucky

and the second most populous south of the Ohio and the Potomac Rivers. The population rose from 223,928 in 1910 to 258,500 in 1924, by estimate of the Bureau of the Census. The incorporated area of the city was increased to 25,101 acres by the annexation of Highland Park and Oakdale in 1922. The cities of New Albany, Ind., and Jeffersonville, Ind., with an additional population of 42,000, are immediately across the Ohio River. The assessed valuation of the city increased from \$207,000,000 in 1914 to \$500,000,000 in 1924. In point of value of manufactured products, the city is shown by the Census Bureau to be the most important industrial centre in the South. The value of its manufactured products increased from \$105,223,000 in 1914 to \$204,566,000 in 1919, according to the Census Bureau, and the Louisville Industrial Foundation estimated the value of the city's industrial output at \$311,427,908 in 1923. Bank clearings increased from \$715,731,000 in 1913 to \$1,551,638,237 in 1923. The city is supplied with transportation service by nine trunk-line steam railways, eight inter-urban electric railways, and the Ohio River.

LOUVAIN LIBRARY. A famous institution connected with the University of Louvain in Belgium. In the German invasion of 1914, the university together with its library, which contained 120,000 volumes and 250 incunabula, was ruthlessly destroyed. When Cardinal Mercier, its head, visited the United States in 1919, he was asked of what particular aid Americans could be in the work of Belgian reconstruction; he suggested that the schools, colleges, and universities of the younger and larger country should join in the restoration or rather rebuilding of this monument of the smaller and older land. Under the terms of the Versailles Treaty, a large number of volumes were sent into Belgium from Germany to replace those destroyed. Whitney Warren was the architect of the new building, planned for completion in August, 1925, at a cost of \$1,000,000. For its opening and for the celebration of the five hundredth year since the founding of the university and the eleventh from its destruction, ceremonies were projected which were to be attended by representatives of important institutions of learning of the world. Each of these was to leave its shield or other insignia in the library as a permanent memorial. The war records of the donors of funds were also to be engraved on the columns, keystones, and other parts of the structure.

LOVEJOY, ARTHUR ONCKEN (1873-). An American philosopher (see VOL. XIV). In 1920, he collaborated with a group of other American philosophers in the publication of *Essays on Critical Realism*. The common ground of the authors is the distinction between essence and existence, which is not usually stressed by the so-called naïve realists. During the War, Professor Lovejoy was an active propagandist for liberal ideals. He collaborated with Prof. Albert Bushnell Hart in the publication of a *Handbook for the War for Public Speakers* (1917).

LOVETT, ROBERT MORSE (1870-). An American editor and educator, born in Boston, Mass. He was graduated from Harvard in 1892 and in the same year was assistant in English at that university. He served as assistant professor of English from 1894 to 1904; associate professor from 1904 to 1909,

and from 1909 as full professor at the University of Chicago. From 1903 to 1920, he was dean in the junior college. He was a member of the National Institute of Arts and Letters and was the author of *The History of English Literature*, with W. V. Moody (1902); *Richard Gresham*, a novel (1904); *The First View of English Literature*, with W. V. Moody (1905); *A Winged Victory*, a novel, (1907); *Cowards*, a play (1914). He served as editor of the *Dial* in 1917 and joined the editorial board of the *New Republic* in 1921.

LOVETT, ROBERT SCOTT (1860-). An American railway president (see VOL. XIV). During the War he filled important positions in the management of railroads, and was chosen president (1919) and chairman of the Board of Directors (1920) of the Union Pacific System.

LOWDEN, FRANK ORREN (1861-). An American public official, born in Sunrise City, Minn. He was graduated from the Iowa State University in 1885 and studied law at the Union College of Law in Chicago. He began practice in that city in 1887, continuing until 1906. He took an active part in politics and was a member of the Republican National Committee, from 1904 to 1912. In 1906, he was elected member of Congress and was twice re-elected. In 1917, he was elected Governor of Illinois, serving until 1924. He was one of the prominent candidates of the Republican National Convention in 1920, and in 1924 refused the nomination for Vice President.

LOWELL. A manufacturing city of Massachusetts. The population rose from 106,294 in 1910 to 112,759 in 1920 and to 115,089 by estimate of the Bureau of the Census for 1923. A memorial auditorium costing \$1,000,000 was erected in 1921 in memory of the Lowell men and women who took part in the wars in which the United States has been engaged. In the same year, after 10 years of the commission form of government, the city changed back to the mayor and council form. A \$2,000,000 high school was completed in 1922. The assessed valuation of the city increased from \$87,277,643 in 1913 to \$136,492,851 in 1923. In 1924, there were over 300 manufacturing establishments in the city employing 35,000 persons and paying \$35,000,000 annually in wages.

LOWELL, AMY (1874-). An American poet and critic, born at Brookline, Mass., and educated in private schools. In 1917-18 she gave lecture courses at the Brooklyn Institute of Arts and Sciences; in 1921 she was the Francis Bergen Foundation Lecturer at Yale and Marshall Woods lecturer at Brown University. As a champion of free verse as well as one of its foremost writers, her influence in this movement in the United States was of great importance. (See LITERATURE, ENGLISH AND AMERICAN.) Her published works during the decade 1914-24 were *Sword Blades and Poppy Seed* (1914); *Six French Poets* (1915); *Men, Women, and Ghosts* (1916); *Tendencies in Modern American Poetry* (1917); *Can Grande's Castle* (1918); *Pictures of the Floating World* (1919); *Legends* (1921); *Fir-flower Tablets—Poems Translated from the Chinese*, with Florence Ayscough (1921); and *A Critical Fable* (1922).

LOWELL, GUY (1870-). An American architect (see VOL. XIV). His design for a new municipal court house in New York was accepted in 1919. From 1917 to 1919, he was

director of the Department of Military Affairs for the American Red Cross in Italy and received several decorations for efficiency and valor from the Italian government. He was the author of various books on architecture.

LOWES, JOHN LIVINGSTON (1867-). An American educator, born at Decatur, Ind. He was graduated from Washington and Jefferson College in 1888 and took postgraduate courses in Germany and at Harvard University. After serving on the faculties of several colleges, he was appointed, in 1909, professor of English at Washington University, St. Louis, serving until 1918. In 1913-14, he was dean of the college, and in 1918 became professor of English at Harvard University. He was Lowell Institute lecturer in 1919 and was the author of *Convention and Revolt in Poetry* (1919). He edited, both alone and with others, several texts on Shakespeare and others.

LOWIE, ROBERT HENRY (1883-). An American anthropologist (see VOL. XIV). His principal works include: *Societies of the Arikara Indians* (1914); *Dances and Societies of the Plains Shoshones* (1915); *Notes on the Social Organization and Customs of the Mandan, Hidatsa and Crow Indians* (1917); *Culture and Ethnology* (1917); *Plains Indian Age Societies* (1917); *Myths and Traditions of the Crow Indians* (1918); *The Matrilineal Complex* (1919); *Primitive Society* (1919); *The Religion of the Crow Indian* (1922); *The Material Culture of the Crow Indians* (1922); *Crow Indian Art* (1922); *Psychology and Anthropology of Races* (1923).

LUBIN, DAVID (1840-1919). American agricultural specialist and merchant. He was for many years in business at Sacramento, Cal., but interested himself in improving the system of marketing agricultural products, promotion of complete and systematic statistical information, and development of rural credits, national marketing, etc. He succeeded in bringing before Congress a proposal for an international convention for the establishment of an International Commerce Commission on merchant marine (the measure passed Sept. 1, 1914); and he also secured the introduction of a measure for improving the Parcel Post service, facilitating direct dealing between producers and consumers (1916). His proposals for the International Institute of Agriculture were embodied in that institution, which has since supplied world crop, import and export reports, etc., and to which he was the American delegate. Mr. Lubin died at Rome, Italy, Jan. 1, 1919. See AGRICULTURE, INTERNATIONAL INSTITUTE OF.

LUCIFERINE, LUCIFEROSE. See PHYSICS.

LUDENDORFF, ERICH (1865-). A Prussian general, born at Kruszevnia, near Posen. He worked out the last great German Army Bill passed by the Reichstag in 1913. All his proposals were adopted with the exception of that concerning three new army corps. On the outbreak of the War he was first sent to the western front, where he took the citadel at Liège. On Aug. 22, 1914, he was sent to the eastern front as chief of the General Staff and shared with Hindenburg the credit of the great victories at Tannenberg and the Masurian Lakes. During the progress of the War his advance was rapid and constant. He organized

the great German offensive of the spring and summer of 1918 whose final collapse led to the German defeat.

LUDWIG, EMIL (1881-). A German writer. He was born at Breslau and studied at the university of that city. He wrote verse and prose, fiction, drama, essays and biography. His plays include: *Napoleon* (1906); *Der Spiegel von Shalott* (1907); *Trilogie der Renaissance* (1904-20); *Atalante, Ariadne* (1914); *Friedrich von Preussen* (1914). His novels are: *Manfred und Helene* (1911); *Diana* (1918); *Meeresstille und Glückliche Fahrt* (1920). He is also the author of the essays, *Der Künstler*; of the lyric volume, *Römische Sonette* (1921); of a life of Wagner (1913), and is most highly esteemed for his *Goethe, Geschichte eines Menschen* (1920).

LUMBER. See FORESTRY.

LUMEN. See ELECTRIC LIGHTING.

LUMINESCENCE IN ANIMALS. See ZOÖLOGY, *Physiology*.

LUSITANIA, SINKING OF. See BLOCKADE, ALLIED; and WAR, DIPLOMACY OF THE.

LUTHERANS. The third largest Protestant church in the United States, established officially in America in 1648, historic records showing Lutherans in America as early as 1562. The congregations, the central units and seat of final authority, were organized in synods or general bodies. The Lutherans of the United States and Canada accept the Canonical Scriptures of the Old and New Testaments as the inspired Word of God and as the only infallible rule and standard of faith and practice. They accept and confess the three ecumenical creeds, namely, the Apostles, the Nicene, and the Athanasian. They accept and hold the Unaltered Augsburg Confession as the correct exhibition of the faith and doctrine of the Evangelical Lutheran Church, founded upon the Word of God. All accept and use Luther's Small Catechism. None reject any of the other Symbolical Books of the Evangelical Lutheran Church, namely, the Apology of the Augsburg Confession, the Smalcald Articles, the Large and Small Catechisms of Luther, and the Formula of Concord. Many accept all of these.

The following statistical table shows the totals of the parochial reports made in the years 1914 and 1924:

	1914	1924
Congregations	14,871	15,426
Ministers	9,407	10,365
Baptized Members	3,684,315	3,801,235
Confirmed Members	2,370,656	2,539,939
Congregational Expenses ...	\$10,275,269	\$30,258,002
Benevolent Contributions ..	8,214,644	9,402,105
Total Expenditures	13,489,913	39,660,107
Total Valuation of Property	90,019,621	203,234,636
Sunday Schools—Number...	5,923	10,581
Officers and Teachers....	76,112	101,110
Scholars	927,787	1,058,075

During the period, 12 foreign mission societies carried on work in more than 15 countries. After the War, many mission fields formerly supported by the Lutherans of Germany were aided through the National Lutheran Council.

The outstanding events of the decade among the Lutherans of the United States and Canada were: the celebration in 1917 of the 400th anniversary of Luther's posting of the Ninety-Five Theses; the formation of the Norwegian Lutheran Church of America by the merging of

three Lutheran organizations in 1917; the formation by the merging of several other bodies in 1918 of the United Lutheran Church in America, which included in its membership more than one-third of all the Lutherans in the United States and Canada; and the formation of the Evangelical Lutheran Joint Synod of Wisconsin and Other States; the appearance in 1917 of the *Lutheran Common Service Book*; the organization in the same year of the National Lutheran Commission for Soldiers' and Sailors' Welfare, which was supported by the various general bodies and churches; and the organization in 1918 of the National Lutheran Council, an agency for two-thirds of the Lutherans of the United States and Canada for carrying on the regular work of representation, statistics, reference, and publicity, and also emergency relief work. This latter agency gave at least \$6,500,000, including more than \$2,800,000 in the form of clothing, and over \$3,700,000 in the form of cash, for the relief of Lutherans in Europe.

Among the celebrations of the 10 years were: the 400th anniversaries of Luther's appearance before the Diet of Worms, of the appearance of Luther's translation of the New Testament, and of the introduction of congregational singing and the development of hymnology under the influence of the Reformation; and the anniversaries, 175th, 100th, 75th, and 50th respectively, of the Pennsylvania Ministerium, the Maryland Synod, the Missouri Synod, and the Synodical Conference. The Muhlenberg Building was dedicated in 1924 by the United Lutheran Publication House. Led by the veteran Dr. George U. Wenner, the Lutherans reemphasized religious education, especially promoting the idea of week-day religious instruction after school hours. Tens of millions of dollars were subscribed for endowments of Lutheran educational institutions, and millions of dollars to the Ministerial Relief and Pension Funds.

The Lutherans of America took part in the first Lutheran World Convention held at Eisenach, Germany, Aug. 19 to 26, 1923. There were 160 delegates and representatives from 22 or more nations of Europe, Asia, North America, and Australia. With the exception of the Synodical Conference of North America, with about 1,000,000 members, they represented the Lutherans of the world, or about 80,000,000 members. Carefully prepared papers including doctrinal and practical themes of fundamental importance were presented, followed by free discussions. The Rt. Rev. Ludwig Ihmels, D.D., Bishop of Saxony, was made chairman of the Convention. The following doctrinal statement was unanimously adopted: "The Lutheran World Convention acknowledges the Holy Scriptures of the Old and New Testaments as the only source and the infallible norm of all Church teaching and practice; and sees in the Lutheran Confessions, especially the Unaltered Augsburg Confession and Luther's Small Catechism, a pure exposition of the Word of God."

LUXEMBURG. This Grand Duchy, bounded by Germany, Belgium and France, has an area of 999 square miles and population of 263,824 (1916). The population in 1910 was 259,899. The capital, Luxemburg, had 45,986 inhabitants in 1921, as compared with 20,848 in 1910. The activities of the population were equally divided between agriculture and industry. The principal crops were oats and potatoes,

while the vine was cultivated in the Moselle Valley region. The economic wealth of the country was, however, centred in its iron fields which continued to average an annual yield of 7,000,000 tons. The iron ore was employed in the manufacture of pig iron and steel by local works. In 1912, the production of pig iron was 2,252,229 tons; in 1918 it was only 1,226,671 tons; but after the War it recovered, reaching 3,704,390 tons in 1920. The production of steel continued steadily to lose ground; 1,296,407 tons were produced in 1916; by 1920, only 692,935 tons.

Although in accordance with the Treaty of London (1867) Luxemburg, like Belgium, was permanently neutralized, and its integrity and independence guaranteed, nevertheless, like Belgium again, the grand duchy was invaded by German troops, Aug. 2, 1914, and occupied throughout the War. No attempt was made to interfere with civil affairs after 1915, but the German hand was felt in the check on the dissemination of opinion through a censorship on posts, wires, etc. A cabinet crisis was precipitated in 1915 and affairs were at a deadlock until the formation of a Catholic-Socialist-Liberal coalition government in February, 1916. The conclusion of the War saw the appearance of a new independent spirit in the population. Agitation in particular was aimed at the severance of the economic union with Germany, in existence since 1842, as well as for the erection of a more liberal frame of government. The result was the abdication of the Grand Duchess Marie Adelaide on Jan. 12, 1919, the ascension to the throne of the Princess Charlotte, and the holding of a plebiscite in September for the determination of the political and economic status of the country. The vote on the former indicated that the Luxemburgers preferred the continuance of the ruling dynasty to a republic; on the question of a new economic union, 60,133 votes were cast in favor of alliance with France against 22,242 in favor of a Belgian alliance. In 1921, however, France yielded up her rights to Belgium with the result that a treaty, completed on July 25, 1921, effected an agreement between Belgium and Luxemburg by which the two agreed to level their customs barriers for 50 years. Belgian currency was introduced into Luxemburg and the Belgians consented to float a loan of 175,000,000 francs for the retirement of German marks then in circulation. The agreement went into effect May 1, 1922.

LUXEMBURG, ROSA (1870-1919). A German-Jewish Socialist and revolutionary agitator, born in Poland. She became a socialist in her student days. She entered Germany in 1895. In order to obtain German nationality she went through a form of marriage with a German workman named Luxemburg. After employment on various socialist newspapers, she went to Poland to aid the Russian revolutionary movement there in 1905 but soon returned to Germany and engaged in extreme communistic propaganda. With Karl Liebknecht she founded the Spartacus League. In 1914 at outbreak of the War she was sentenced to a year's imprisonment for inciting insubordination. Throughout the War she remained in preventive custody. When set at liberty again she instigated street fighting in Berlin. Liebknecht was shot while being conveyed to prison. Rosa Luxemburg was brutally beaten by a mob and shot to death.

LUXURY TAXES. See TAXATION IN THE UNITED STATES.

LVOV, GEORGE EUGENIEVITCH, PRINCE (1861-). A Russian statesman. He studied law and took his degree in 1885. He was the owner of great estates and devoted much of his time to the organization and development of the Zemstvos, or agricultural cooperative societies. In 1905, he was elected a member of the first Duma. He joined the right wing of the Constitutional Democratic party. During the Russo-Japanese War, he was active in organizing relief among the Zemstvos, and also carried on this work with great efficiency during the great War. In 1917, at the outbreak of the Russian Revolution, he was chosen premier and minister of the interior in the provisional government. Later he became leader of the cabinet in the coalition government, but he showed a lack of administrative ability and retired. Following the accession to power of the Bolsheviks, he was arrested but escaped and finally settled in Paris, where he was one of the leaders of the anti-Bolshevist movement.

LYAUTEY, LOUIS HUBERT GONZAGE (1854-). A French soldier, administrator and writer (see VOL. XIV). In 1912, he was appointed resident minister in Morocco, holding also the office of minister of foreign affairs. He administered this office with great efficiency and was successful in promoting the agriculture and trade of the colony. In 1916-17, he served for a short time as war minister in the cabinet of Briand, but in 1917 was reappointed to Morocco. He was made a marshal of France in 1920. He was a well-known writer and a member of the French Academy.

LYDSTON, GEORGE FRANK (1858-1923). An American surgeon and publicist born at Tuolumne, Cal., and educated in medicine in the New York University (M.D. 1879). After several years in New York, he settled in Chicago and was appointed professor of genito-urinary surgery and venereal diseases under the medical department of Illinois University. He was the first to write at length on the subject of sex gland-grafting in the male, an operation which is said to have been tested on his own person. His major writings comprise *Lectures on Syphilis* (1885); *Addresses and Essays* (1892); *Stricture of the Urethra* (1893); *Gonorrhea and Urethritis* (1892); *Surgical Diseases of the Genito-urinary Tract* (1899-1904); *The Diseases of Society* (1904); *Sex Hygiene for the Male* (1912); *Implantation of the Sex Glands* (1914); *Impotence and Sterility* (1917). Lydston engaged in a long controversy with the American Medical Association in respect to some of its policies.

LYMAN, EUGENE WILLIAM (1872-). An American theologian, born at Cummington, Mass. He was graduated from Amherst College in 1894 and took postgraduate courses at Yale and in Germany. After teaching in several schools, he was appointed professor of philosophy at Carleton College, Minn., in 1901, and was professor of theology at the Congregational College of Canada, Montreal, in 1904-05. From 1904 to 1913, he was a member of the faculty of Bangor Theological Seminary, and from 1913 to 1918, professor of the philosophy of religion and Christian ethics at Oberlin College. In 1918, he became professor of the philosophy of religion at the Union Theological Seminary in New York. He wrote *Theology and Human Problems* (1910); *God of the New Age* (1918); *Experience of God in Modern Life* (1918).

LYMAN, THEODORE (1874-). An American physicist, born at Boston, Mass. He was graduated from Harvard in 1897, where he also received his Ph.D. in 1900. He became an assistant in physics at Harvard, where he remained, becoming full professor in 1917, and where he was also director of the Jefferson Physical Laboratory (1908-17). Dr. Lyman made important studies on phenomena connected with diffraction gratings, on the wave lengths of extreme ultraviolet light discovered by Schumann and also on the properties of light of extremely short wave length, on all of which he contributed valuable papers to the literature of physics in the proceedings of scientific societies. During the War he served in France with the American Expeditionary Forces, holding the rank of major of engineers.

LYNCHINGS. According to the Department of Records and Research of the Tuskegee Institute, there was a total of 573 lynchings in the United States in the decade 1914-24. Of the victims, 56 were whites and 517 were Negroes. The number of lynchings by years and the alleged causes for which the 573 persons were summarily put to death are shown in the accompanying tables.

NUMBER OF LYNCHINGS

Year	Whites	Negroes	Total
1914.....	3	49	52
1915.....	13	54	67
1916.....	4	50	54
1917.....	2	36	38
1918.....	4	60	64
1919.....	7	76	83
1920.....	8	53	61
1921.....	5	59	64
1922.....	6	51	57
1923.....	4	29	33
Total.....	56	517	573

ALLEGED CAUSES FOR LYNCHING

Year	Homicide	Felonious Assault	Rape	Attempted Rape	Robbery and Theft	Insults to Women	All Other Causes
1914.....	30	8	0	1	1	—	6
1915.....	26	10	11	—	9	8	8
1916.....	20	7	3	9	8	2	5
1917.....	6	2	7	5	3	2	14
1918.....	28	2	10	6	2	—	16
1919.....	28	3	9	10	1	6	26
1920.....	22	9	15	3	—	3	9
1921.....	19	7	16	3	—	3	16
1922.....	15	5	14	5	4	1	13
1923.....	5	4	6	1	1	1	15
Total.....	199	57	97	43	28	21	128

The decade 1914-24 was notable for (1) a growing sentiment against lynchings and (2) a large decrease in the number of lynchings. The growing sentiment against lynchings manifested itself in (a) the attitude of the press of the country, particularly the editorial policy of the leading newspapers, in speaking strongly against it; (b) expressions of religious denominations, particularly through the Federal Council of Churches; (c) expressions of organizations of white women of the South; (d) agitation for the enactment of laws against lynchings; and (e) the passing of laws by a number of States for the suppression of lynching. The agitation for suppressive legislation had its strongest expression in the effort to have a Federal antilynching law enacted. This effort extended over the entire decade. In 1920, an antilynching measure, later known as the Dyer Antilynching Bill, was jointly introduced in the House and Senate of the United States Congress. The press of the South strongly opposed the bill on the ground that it was an invasion of States' rights; and a Democratic filibuster in the House of Representatives in 1921 prevented its coming to a vote. On Jan. 26, 1922, however, the House passed the bill by a vote of 230 to 119. When the measure reached the Senate the question of its constitutionality was brought forward. On July 28, 1922, the Senate Judiciary Committee ruled that it was constitutional. A well-organized filibuster by the Democratic members of the Senate prevented it, however, from coming to a vote and on Dec. 2, 1922, the Republican caucus agreed to drop the measure and not to call it up again during that session of Congress. With the defeat of the Dyer Antilynching bill, newspapers and women's organizations of the South urged that it was now up to the States to take preventive measures. Such action was taken, during the decade, by nine States, either by the enactment of new laws or the strengthening of existing legislation against lynching. These States were Alabama, Kansas, Kentucky, Minnesota, New Jersey, North Carolina, Pennsylvania, Tennessee, and West Virginia.

The decrease in lynching during the decade is

shown by the following table, which compares the number of lynchings, 1914-24, with the number in each of the three previous decades.

COMPARISON OF LYNCHINGS BY DECADES
1884-1923

Decade	Number of Lynchings		
	White	Negroes	Total
1884-1893.....	751	990	1,741
1894-1903.....	322	1,020	1,342
1904-1913.....	63	673	736
1914-1923.....	56	517	573

LYNN. A manufacturing city of Massachusetts. The population increased from 89,336 in 1910 to 99,148 in 1920 and to 102,683 by estimate of the Bureau of the Census for 1923. The form of government was changed from the commission to the mayor and council type. In 1924, the city was spending \$1,500,000 for sewer development, and about \$3,000,000 on new schools. The value of the shoes produced in Lynn increased from \$46,660,000 in 1909 to nearly \$100,000,000 in 1924, and the total value of all manufactures rose from \$71,503,000 to more than \$160,000,000 during the same period.

LYON, BETHUEL B. VINCENT (1880-). An American physician, gastro-enterologist, who has introduced into clinical medicine a new method of diagnosis and treatment of gall bladder disease, termed by him "nonsurgical drainage of the gall bladder"; which is secured through the introduction of the duodenal sound through the stomach. Dr. Lyon received the degree of M.D. from Johns Hopkins in 1907 and was appointed professor of clinical medicine in Jefferson Medical College, in the department of gastro-intestinal diseases. He had done much original work in connection with the diagnostic and therapeutic use of the duodenal sound, collaborating for a time with the late Dr. Meltzer, and in 1923 first appeared his pioneer work *Nonsurgical Drainage of the Gall Ducts*, which has given rise to much controversy.

LYS RIVER, BATTLES OF. See WAR IN EUROPE, *Western Front*.

M

McADOO, WILLIAM GIBBS (1863-). An American cabinet officer (see Vol. XV). In 1913 he was appointed Secretary of the Treasury by President Wilson. His tenure of this office marked by the enormous complications and transactions of the entrance of the United States into the War, and in this work he showed great versatility and efficiency. In addition to his duties as Secretary of the Treasury, he was also Director General of Railways in 1917-19 and ex-officio chairman of the Federal Reserve Board. He resigned as Secretary of the Treasury on Dec. 10, 1918, and as Director General of Railways on Jan. 10, 1919. On May 7, 1914, he married Eleanor Wilson, daughter of Woodrow Wilson. He was the most prominent candidate for the Democratic nomination for the presidency until, in the early part of 1924, it was disclosed before the oil investigating committee of the Senate that he had been employed at a large annual salary by Edward F. Doheny, the oil magnate, some of whose leases in California were alleged to be fraudulent. Although Mr. McAdoo's employment had no connection with these leases and was considered, from a legal standpoint, quite legitimate, it materially affected his chances for the nomination. He was engaged in the practice of law in New York City. In the Democratic national convention held in New York City in 1924, McAdoo and Governor Smith of New York controlled enough votes to checkmate each other. The result was that neither was nominated, and John W. Davis was selected as a compromise candidate after more than 100 ballots had been cast. See RAILWAYS.

MACALESTER COLLEGE. A coeducational college under Presbyterian control, founded in 1884, at St. Paul, Minn. The number of students increased from 399 in 1913 to 634 in 1924, the faculty from 21 to 37 members, and the library from 13,600 to 16,500 volumes. In an endowment campaign in 1920 \$915,220 was raised. The gymnasium was under construction in 1924. Elmer Allen Bess, D.D., succeeded Thomas Morey Hodgman, LL.D., as president in 1918 and was succeeded in turn by John C. Acheson, Ph.D., in 1924.

McALEXANDER, ULYSSES GRANT (1864-). An American army officer, born in Dundas, Mich. He graduated from the United States Military Academy in 1887 and was commissioned 2d lieutenant in the same year. During the Spanish-American War he served in the field and was recommended for promotion for gallantry under fire. He saw service also in the Philippines and in 1906 was a member of the General Staff Corps. After serving as instructor of troops in 1916-17, he was given command of the 18th Infantry in France. As commander of the 38th Infantry, he took part in the second battle of the Marne and in other campaigns, including the last great German of-

fensive. He broke the great German offensive on the Marne on July 15, 1918, and won the sobriquet of "The Rock of the Marne." He received decorations from the American, French, and Italian government. He wrote *History of the Thirteenth Regiment* (1905).

McALLISTER, ADDAMS STRATTON (1875-). An American electrical engineer (see Vol. XIV). During 1918 he became connected with the Ordnance Department, Washington, D. C., and in 1921 with the Bureau of Standards. He contributed many articles on engineering subjects to technical publications during the period 1914-24 and published *The Descendants of John Thomson* (1917).

McARTHUR, DOUGLAS (1880-). An American soldier, born in Arkansas. He graduated from the United States Military Academy in 1903 and was commissioned 2d lieutenant of engineers in the same year. In 1917 he was appointed colonel of infantry in the National Army and in the same year became Chief of Staff of the 42d Division. He commanded the 84th Infantry Brigade in 1918 and the 42d Division later in the same year. He took part in all the great operations in France and served with the Army of Occupation in Germany. In 1919 he was appointed superintendent of the United States Military Academy and in 1923 became commander of the department of the Philippines. He received several divisional citations and decorations from the French, Italian, and Belgian governments.

McBAIN, HOWARD LEE (1880-). An American lawyer and educator, born in Canada. He graduated from Richmond (Va.) College in 1900 and afterward studied at Columbia and the University of Chicago. After teaching in schools in Richmond he lectured on constitutional history at the University of Virginia. He was appointed instructor of political science at Columbia in 1907, and in 1909 he became dean of the College of Political Science at George Washington University. From 1910 to 1913 he was associate professor of political science at the University of Wisconsin and in 1917 became associate professor of municipal science and administration and Eaton professor at Columbia University. He was a member of many legal and learned societies and was the author of *How We Are Governed in Virginia and the Nation* (1908); *The Law and Practice of Municipal Home Rule* (1916); and *American City Progress and the Law* (1917).

McCARRISON, ROBERT (1878-). A distinguished Irish physician. His professional activities have been largely associated with Hindustan and with the disease of goitre. Born in Lisburn, County Antrim, he was educated at Queen's College, Belfast, and entered the Indian Medical Service in 1901. He developed a special interest in goitre and cretinism and during 1913-14 investigated these affections for the government. Later he visited many medical centres in English-speaking countries to lecture

on goitre and made a tour of the United States for this purpose in 1921. His major writings are *Collected Papers on Goitre and Cretinism* (1916); *The Thyroid Gland in Health and Disease* (1917), and *Studies in Deficiency Disease* (1921). He was placed in charge of the Pasteur Institute at Coonoor on its establishment.

McCHORD, CHARLES CALDWELL (1859-). An American lawyer and public official (see VOL. XIV). From 1910 he served as a member of the Inter-State Commerce Commission and from 1915 as chairman and was reappointed a member of the Commission in the same year. In 1918-19 he was a member of the Railway Wage Commission and arbitrator of the War Labor Board.

McCOLLUM, ELMER VERNER (1879-). An American biochemist, born near Ft. Scott, Kan., and educated at Kansas and Yale Universities. From 1907 to 1917 he held the chair of agricultural chemistry in the University of Wisconsin, resigning to accept the professorship of biochemistry in the Johns Hopkins University School of Hygiene and Public Health. He has published many papers on nutrition, diet, vitamins, etc., and several textbooks, which include *Textbook of Organic Chemistry* (1916); *The Newer Knowledge of Nutrition* (1918), and *The American House Diet* (1920). Professor McCollum has published an account of the fourth vitamine, known as Vitamine D, lack of which from the nutriment is believed to play an important rôle in the genesis of rickets.

McCOMBS, WILLIAM FRANK (1875-1921). An American lawyer (see VOL. XIV). From 1912 until 1916 he was chairman of the Democratic National Committee. He was offered but declined the ambassadorship to France. Both before and after his death there was much discussion in respect to the controversy between him and the supporters of the Wilson administration as to whether he had been fairly treated by Mr. Wilson in view of the great services which he had rendered in bringing about the latter's nomination and election. A volume giving Mr. McCombs' side of the controversy was published in 1921.

McCOOK, PHILIP JAMES (1873-). An American jurist, born at Niantic, Conn., and educated at Trinity College and the Harvard Law School. In 1899 he began practice of law in New York. He was special master in the United States District Court in 1919 and in the same year became Justice of the Supreme Court of New York State. He served in the Spanish-American War in Cuba and the Philippines and in the War in Europe as major in the Adjutant-General's department. He was a trustee of Hunter College and the Law Committee of the Charity Organizations Society and Legal Aid Society.

McCORMICK, CYRUS HALL (1859-). An American manufacturer, born at Washington, D. C., and educated in the public schools. He went into his father's business. He was the inventor of the reaping machine. From 1894 to 1902 he was president of the McCormick Harvesting Machine Company and of the International Harvester Company from 1902 to 1919. In 1917 he was a member of the special diplomatic mission of the United States to Russia. He was a trustee of Princeton University and a director of the McCormick Theological Seminary.

McCORMICK, YANCE CRISWELL (1872-).

An American newspaper publisher and public official, born in Harrisburg, Pa., and educated at Yale University. For several years he was engaged in the newspaper business in Harrisburg. He served as mayor of that city from 1902 to 1905. In 1914 he was Democratic candidate for governor and in 1916 served as chairman of the Democratic national campaign committee. He was chairman of the War Trade Board from 1917 to 1919 and in the former year was also a member of the War Commission of Great Britain and France. At the peace conference in Paris, he acted as adviser to the American commission. He was a director of many important financial institutions and a member of the Yale Corporation.

McCOY, FRANK ROSS (1874-). An American soldier, born in Lewistown, Pa. He graduated from the United States Military Academy in 1897 and was appointed 2d lieutenant of the 8th Cavalry in the same year. He served on the western frontier in Cuba, in the Philippines, and in the Santiago campaign. In Cuba and the Philippines he acted as aide to General Wood and was for several years aide to President Roosevelt. He was appointed a member of the General Staff in 1911 and after service as military attaché in Mexico became a member of the General Staff of the American Expeditionary Forces in 1917. He commanded the 63d Infantry Brigade in 1918 and was director of the army transport service and deputy director general and later director general of transportation for the A. E. F. in 1918-19. In the latter year he also served as chief of staff to the American military mission to Armenia and as special commissioner to the Philippines. He wrote *Principles of Military Training* (1918).

McCOY, HERBERT NEWBY (1870-). An American chemist, born at Richmond, Ind., and educated at Purdue and Chicago Universities. He entered professional practice in Chicago and held the chair of chemistry and physics at Fargo University, after which he returned to the University of Chicago as assistant in chemistry. In 1899 he became assistant professor at the University of Utah. In 1901 he returned again to Chicago and was professor there from 1911 to 1917, when he resigned to accept the vice presidency of the Lindsay Light Company. From 1919 he was president of the Carnotite Reduction Company. His researches covered quinazolin derivatives in organic chemistry; equilibrium in carbonate solutions and secondary ionization constants in physical chemistry; rare earths in mineral chemistry, and radioactivity. He has published papers in these subjects. He wrote, with Ethel M. Terry, an *Introduction to General Chemistry* (1919) and *A Laboratory Outline of General Chemistry* (1919).

McCULLOUGH, ERNEST (1867-). An American civil engineer, born on Staten Island, N. Y., and educated at the Van der Naillen School of Engineering in San Francisco. He at once entered on the practice of his profession as a civil engineer, at first in San Francisco, and later in Chicago. During 1893-96 he was editor of *Engineer and Contractor* in San Francisco; he became associate editor of *Engineering-Contracting* (Chicago) in 1909 and of the *Railway Age* in 1910. He was later an associate editor of *The American Architect*. During the War he was a lieutenant-colonel in the Chemical Warfare Service in France, and in 1919-20, director of the officers' school for that service at

Lakehurst, N. J. He is the author of *Country Roads* (1891); *Farm Drainage* (1892); *Municipal Public Works* (1894); *Engineering Work in Towns and Cities* (1906); *Reinforced Concrete* (1908); *Engineering as a Vocation* (1911); *Practical Surveying* (1915); and *Practical Structural Design* (1917).

MCCULLY, NEWTON ALEXANDER (1867-). An American naval officer, born in Anderson, S. C. He graduated from the United States Naval Academy in 1887 and in 1889 was made ensign. He was promoted to be commander in 1909, captain in 1913, and rear-admiral in 1919. His duties included the command of several important battleships and service in various capacities on shore. From 1914 to 1917 he was naval attaché at St Petersburg and represented the Navy Department in connection with the Russian commission to the United States. In 1917-18 he commanded the patrol squadron off the coast of France and in 1919 was commander of the American naval forces in American waters. In the following year he acted as special agent for the Department of State in southern Russia and in 1921-22 commanded the patrol force of the Atlantic fleet.

MCDERMOTT, GEORGE ROBERT (1860-). An American naval architect, born at Glasgow, Scotland. After an academic and technical education in Glasgow, he served as naval architect for several shipbuilders in Scotland and in the naval construction works in England. He removed to the United States and was successively assistant professor of naval architecture and professor of naval architecture in charge of the Department of Naval Architecture and Marine Engineering at Sibley College in Cornell University. During the War he served with the United States Shipping Board and the Emergency Fleet Corporation and as technical adviser of the American Bureau of Shipping in 1919. He was a member of many architectural societies.

MACDONALD, JAMES RAMSAY (1866-). A British public official, leader of the Labor party (see Vol. XIV). He was not in sympathy with Great Britain's entry into the War and was defeated for Parliament in 1918. But in 1922 he was elected, and the Labor party was numerically the second party in the House of Commons. Ramsay MacDonald became the official leader of the Opposition. Two years later, on Jan 22, 1924, he was made Prime Minister and headed the first Labor government in Great Britain. See GREAT BRITAIN.

MCDONALD, JOHN DANIEL (1863-). An American naval officer, born in Machias, Me. He graduated from the United States Naval Academy in 1884 and was promoted to be commander in 1908, captain in 1911, and rear-admiral in 1917. He served during the Spanish-American War and commanded several war vessels. From 1913 to 1915 he was a member of the staff of the Naval War College and in 1915-16 was chief of staff of the Atlantic fleet. He was appointed commandant of the New York Navy Yard in 1918, with the rank of vice admiral.

MCDUGALL, WILLIAM (1871-). One of the leading Anglo-American psychologists (see Vol. XIV). During the War he was attached to the medical service of the British Army. In 1920 he was called from his post at Oxford to head the psychology department at Harvard University. In his *Outline of Psy-*

chology (1923), the eminent psychologist modified his conception of instinct so as to allow for growth and transformation of the presumed hereditary dispositions.

Professor McDougall's other works deal largely with the problems of national psychology which transcend mere science and involve ethical theory. *The Group Mind* (1920) and *Is America Safe for Democracy?* (1922) are noteworthy for their defense of the superiority of the Nordic race. *Ethics and Some Modern World Problems* (1924) contains a warning against sentimental idealism as a guiding principle of national conduct. He was also interested in psychical research and took a leading part in the activities of both the British Societies for Psychical Research. See SOCIAL PSYCHOLOGY.

McELROY, ROBERT (McNUTT) (1872-). An American educator, born at Perryville, Ky., and educated at Princeton University, in Germany, and at Oxford. In 1898 he was instructor of history at Princeton and was successively assistant professor of American history and Edwards professor of American history (from 1909). He was also head of the department of history and politics at Princeton, 1912-16, and was the first American exchange professor to China in 1916-17. He lectured in China, Japan, and the Philippines on government. He was educational director of the National Security League from 1917 to 1919 and was organizer of the national campaign for the celebration of "Constitution Day" in 1919. He was a member of many learned societies and wrote *Kentucky in the Nation's History* (1909); *The Winning of the Far West* (1914), and *The Representative Idea in History* (1917).

McELWAIN, FRANK ARTHUR (1875-). An American bishop, born at Warsaw, N. Y., and educated at Trinity College and the Seabury Divinity School. In 1902 he was ordained deacon and became a priest in the following year. He held several pastorates in Missouri and from 1907 to 1912 was on the faculty of the Seabury Divinity School. In 1912 he was elected suffragan bishop of Minnesota and was consecrated bishop in 1917.

McFARLAND, JOSEPH (1868-). An American pathologist and bacteriologist, born at Philadelphia. Soon after receiving his M.D. from the University of Pennsylvania in 1889 he became professor of pathology and bacteriology in the Medicochirurgical College, from which he resigned in 1916 to accept the same chair in his Alma Mater. He has published several textbooks: *Pathogenic Bacteria* (1886); *Textbook of Pathology* (1904); and *Biology, General and Medical* (1910). A semipopular work, *Fighting Foes too Small to See*, was published in 1924, and in the same year his *Surgical Pathology*. He also collaborated with Deaver and McFarland in *The Breast* (1917).

McFEE, WILLIAM (1881-). An American author, born in London, and educated in the East Anglican School, Bury St. Edmunds, England. He entered the marine service as engineer and chief engineer of transports. He wrote *An Ocean Tramp* (1908), which was followed by *Aliens* (1914); *Casuals of the Sea* (1916); *Captain Macedoine's Daughter* (1920); *A Six-Hour Shift* (1920); *Harbors of Memory* (1921); *Command* (1922); and *Race—a Prelude* (1924). His books show great descriptive power and an unusually attractive style.

McGILL UNIVERSITY. A Canadian in-

stitution at Montreal, Quebec, founded in 1821, standing at the head of a group of affiliated colleges and schools, and itself affiliated with the universities of Oxford, Cambridge and Dublin. The student enrollment numbered 1600 in 1914, dropped during the War to 1045, but rose again to 2767 in 1923-24. The faculty increased during the period 1914-24 from 265 to 417 members and the library from 184,000 to 215,900 volumes. The productive endowment was increased correspondingly from \$8,207,000 to \$17,344,210, and the annual income from \$820,000 to \$1,722,765. The university received \$1,000,000 in 1918 from the Carnegie Corporation of New York, "in recognition of the noble and devoted service and sacrifice of McGill toward Canada's part in the great war." Sir William C. Macdonald bequeathed various sums to the university, including \$500,000 towards the endowment of the Medical School, \$300,000 toward the endowment of the Conservatory of Music, \$20,000 to provide traveling scholarships in the faculty of law, and \$1,000,000 for Macdonald College. The university also received \$100,000 from the estate of James Ross in 1914. In 1920 subscriptions made to the Centennial Fund totaled \$4,440,000, not including gifts of \$1,000,000 each from the Rockefeller Foundation and from the Quebec government. The biological building was erected in 1922 at a cost of \$716,000, and the pathological building was completed in 1923 at a cost of \$450,000. The course in the School of Commerce was lengthened from three to four years in 1923. Sir Arthur Currie, G.C.M.G., K.C.B., LL.D., succeeded Sir William Peterson, G.C.M.G., K.C.B., LL.D., D.Litt., as president in 1920.

McGLACHLIN, EDWARD FENTON (1868-). An American soldier, born in Fond du Lac, Wis. He graduated from the United States Military Academy in 1889 and was commissioned in the artillery. He served in various capacities with the field artillery and was promoted to be colonel in 1916. In the following year he was made brigadier-general of the National Army and in 1918 major-general. He served in the Philippine campaigns and from 1914 to 1916 was commandant of the School of Fire for Field Artillery. In 1917 he was appointed commander of the 165th Field Artillery Brigade and later commanded several other brigades. He was made chief of artillery of the 1st Army Corps in 1918 and commander of army artillery and chief of artillery of the 1st Army in the same year. From November, 1918, to September, 1919, he was commander of the 1st Division, and from 1919 to 1921 he commanded the 7th Division. From the latter year he was commandant of the Army War College and contributed many articles to army periodicals.

MacGOWAN, KENNETH (1888-). An American author, born at Winthrop, Mass., and educated at Harvard. He became editor of *The Theatre Arts*, a monthly magazine, in 1919. After 1923 was dramatic critic for *Vogue*. Previously he had been dramatic, literary, and photoplay critic for the *Philadelphia Evening Ledger* (1914-17); publicity director for the Goldwyn Picture Corporation, (1917-18); special writer on the New York *Tribune* (1918); advertising agent for the Goldwyn Picture Corporation (1919), and critic for the New York *Globe* (1919-23). His books on the theatre are *The Theatre of To-Morrow* (1921); *Continental*

Stagecraft (1922), and *Masks and Demons* (1923).

McGRAW, JOHN J. (1873-). Professional baseball player and manager, born at Truxton, N. Y. He was with the Olean Club in 1890, Cedar Rapids in 1891, and Baltimore, 1891 to 1899, becoming manager in the last-named year. In 1900 he played with the St. Louis National League team and managed the Baltimore American League Club in 1901 and 1902. Since 1902 he has been manager of the New York National League team, familiarly known as the "Giants," winning penants in 1904, 1905, 1911, 1912, 1913, 1917, 1921, 1922, and 1923 and world's championships in 1905, 1921, and 1922, a record of achievement attained by no other big league manager.

McGREGOR, JAMES HOWARD (1872-). An American zoologist, born at Bellaire, Ohio. He was educated at Ohio State and at Columbia Universities. He was assistant in zoology at Ohio State University (1894-95). In 1897 he went to Columbia University, where he was successively assistant, tutor (1899-1904), lecturer (1904-06), instructor (1906-07), adjunct professor (1907-14), associate professor (1914-24), and professor of zoology. He published articles on vertebrate morphology and palaeontology and modeled an important series of reproductions of heads of types of primitive man.

MACHEN, ARTHUR (1863-). An English writer. His early books include *The Chronicles of Clemency*, *The Great God Pan*, *The Three Impostors*, *The Hill of Dreams*. Of late years his books have acquired considerable vogue both in England and the United States. Among his recent publications are *The Great Return*, *The Secret Glory*, and *Far-Off Things*.

MACHINE GUN ORGANIZATION. See ARMIES AND ARMY ORGANIZATION.

MACHINE GUNS. See ORDNANCE; SMALL ARMS.

McINTYRE, FRANK (1865-). An American military officer, born at Montgomery, Ala., and educated at the United States Military Academy. He entered the United States Army as second lieutenant in the 19th Infantry, serving in various ranks until he attained that of brigadier-general in 1912. Meanwhile he saw duty at different posts, chiefly on the Mexican border, until the war with Spain, in which he participated in the Porto Rico expedition in 1898. He was in the Philippines during 1899-1902, after which for two years he was with the general staff. He was attached to the Bureau of Insular Affairs in 1905 and became its chief in 1912. During the War in Europe he was assistant chief of staff with the rank of major-general.

McKEE, RALPH HARPER (1874-). An American chemist, born at Clinton, Mo., and educated at Wooster and Chicago Universities. During 1901-09 he was professor of chemistry at Lake Forest, and during 1909-16 he held a similar chair at the University of Maine; in 1917 he became professor of chemical engineering at Columbia. In New York, Professor McKee had a valuable commercial practice and was consultant to various chemical corporations. During the War he was director of the United States Ordnance School of Explosives.

McKENNA, REGINALD (1863-). An English statesman and financier (see VOL. XIV). He was a Liberal member of Parliament from 1895 to 1918, and from 1911 to 1915 he served

as Home Secretary. In the latter year he was Chancellor of the Exchequer, and as such brought in the famous budget of September, 1915, recognized as an able attempt to deal with the financial conditions arising out of the War. In 1915 he also introduced a new war loan. He retired from politics to assume the chairmanship of the London Joint Stock and Midland Bank in 1919. He was a member of the British-American Debt Fund Commission, in 1923.

McKENNA REPORT. See REPARATIONS.

MACKENSEN, AUGUST VON (1849-). A Prussian field marshal, born at Hausleipnitz in Saxony. He was at Danzig commanding the 17th Army Corps when the Crown Prince was sent there to be kept from troublesome political activities. On the eastern front in 1914 he commanded the 9th Army and won engagements with the Russians at Kutno, Lodz, and Lowitz. In 1915 he headed the German troops in western Galicia and later in the same year was made a field marshal. He was the commanding general also of the troops sent to Serbia and to Rumania during 1915 and 1916. After the Armistice in 1918, the French interned him at Neusatz, where he was forced to remain until nearly the end of 1919, although the German government protested vigorously.

McLEAN, ANGUS WILTON (1870-). An American lawyer, born in Robeson County, N. C., and educated in the law department of the University of North Carolina in 1892. In the same year he began the practice of law. He took an active part in State Democratic politics. From 1918 to 1920 he was director of the War Finance Corporation in Washington and was its managing director in 1920-21. In the same year he served as Assistant Secretary of the Treasury. He was a member of several commissions during the War in Europe. He was president of the trustees of the Flora MacDonald College and of the Union Theological Seminary at Richmond, Va., and a member of many learned societies.

MACLEOD, JOHN JAMES RICKARD (1876-). A Scotch-American physiologist and Nobel prize winner, born at Dunkeld, Scotland, and educated at the University of Aberdeen. In 1898 he devoted himself to the study of physiology and in 1903 was called to the chair of physiology at Western Reserve University, to succeed G. N. Stewart. He resigned this professorship in 1917 to accept a like chair in the University of Toronto, where he became the senior member of the group of workers who discovered insulin. The Nobel prize in medicine for 1923 was divided between MacLeod and Banting (q.v.). He had already published a book on diabetes. Beginning as a collaborator in small textbooks on physiology and chemistry, he later wrote *Diabetes* (1913) and *Physiology and Biochemistry in Modern Medicine* (1918). A prolific contributor to periodical literature, he published many papers on insulin.

MacMONNIES, FREDERICK (WILLIAM) (1863-). An American sculptor (see VOL. XIV). He executed the colossal group, "Civic Virtue," at the City Hall Fountain in New York (1919). It was the subject of considerable controversy.

MacNEIL, HERMON ATKINS (1866-). An American sculptor (see VOL. XIV). He won the gold medal at the Panama-Pacific International Exposition in 1915. Two years later he was awarded the medal of honor of the Architectural League in New York. In 1923 he was

awarded the Saltus medal for excellence.

McRAE, JAMES HENRY (1863-). An American soldier, born in Lumber City, Ga. He graduated from the United States Military Academy in 1886 and was commissioned 2d lieutenant in the same year. He rose to the rank of adjutant-general in 1913 and in the following year was appointed colonel of infantry. He was commissioned major-general in the National Army in 1918 and brigadier-general in the Regular Army in 1920. He took part in the Spanish-American War and in the campaigns in the Philippines. In 1917 he commanded the 9th Brigade, 5th Division, and in 1918-19 was commander of the 78th Division. He participated in St. Mihiel and in the Meuse-Argonne operation. From 1921 he was assistant chief of staff. He received decorations from the American and foreign governments.

MADAGASCAR. A French island colony off the southeastern coast of Africa. Area, 226,916 square miles; population, census of 1921, 3,387,968, of whom 17,149 were French and 10,310 other non-Malagasy, largely Asiatics. The populations of the chief towns were, in 1921: Antananarivo, the capital, 63,115; Tamatave, 15,000; Diégo Suarez, 10,377; Mananjary, 8927; Fianarantsoa, 8231. The principal ports were Tamatave (east coast), Majunga (northwest), Diégo Suarez (north), Tuléar (southwest). Agricultural products showed increases generally during the period 1912-22. In 1921, 12,800 tons of rice were exported (value 12,818,000 francs), about 13,500 tons of manioc (value 14,520,000 francs), and 21,000 tons of vegetables (value 21,000,000 francs). Other crops of importance were sugar cane, coffee, cacao, and vanilla. Besides these, the export trade embraced raffia, graphite, tanning bark, caoutchouc, tapioca, and gold. The extensive cattle breeding accounted for the importance of the hide industry as well as the appearance of local meat packing plants. Large factories for preserving and chilling meats were established at Majunga, Diégo Suarez, and other centres. In 1921 the export of preserved meats totaled 7,764,000 francs, although in 1922 this was only 2,880,000 francs. Cattle numbered 7,518,657 in 1923, as compared with 5,320,200 in 1913. Exports for 1913, 1920, 1921 and 1922 were 56,054,377 francs, 235,942,698, 108,308,000 and 138,472,491. Imports for the same years were 46,747,000 francs, 279,694,657, 225,921,000, and 173,921,000. Leading imports were cotton goods, beverages, metals, machinery, and clothing. Proportions of exports taken and imports sent for 1921 by leading countries trading with Madagascar were: France, 65 and 78 per cent; French colonies, 9 and 6 per cent; United Kingdom, 12 and 3 per cent; British colonies, 8 and 9 per cent. The United States came next after these. In 1921, 5604 vessels of 1,566,786 tons entered and 5665 vessels of 1,555,217 tons cleared at Madagascar ports. In 1912, 1,756,764 tons entered. Besides that from Antananarivo to Tamatave (240 miles), the following railways were in the course of construction: Antananarivo-Antsirabe (240 miles), of which 27 miles were finished in 1923, Moramanga-Ambatandrakaza (89 miles), a branch of the Tamatave railway projected to reach the northern provinces. A good system of metalled roads, 1611 miles long, made communication between the various centres easy. The 1923 budget totaled 90,660,991 francs, as compared with the 1911 budget of 31,153,000 francs. By Jan. 1, 1922, the public debt had

mounted to 105,000,000 francs. The colony prospered during the War, and work on internal improvements went on steadily. In 1921 an ambitious programme for the electrification of railways and the construction of a hydroelectric power station on the Vohitra River was announced. This project was later augmented to include the construction of 288 miles of wide-gauge and 468 miles of narrow-gauge road.

MAETERLINCK, MAURICE (1862-). A Belgian poet (see VOL. XIV). During the War he performed effective service in relief work in France and Belgium and wrote much in opposition to the German rule in Belgium. His later books include *Wrack of the Storm* (1916); *The Betrothal* (1918); *The Burgomaster of Stilemonde* (1918); and *Les Sentiers dans la Montagne* (1919). He visited the United States in 1921, with the intention of lecturing in various cities, but his lack of acquaintance with the English language led to the abandonment of this enterprise.

MAGNESIUM. See CHEMISTRY.

MAH-JONGG, PUNG-CHOW, OR PE-LING. An ancient Chinese game which has attained considerable popularity throughout Europe and America in recent years. It is played with pieces, "tiles," somewhat after the nature of dominoes but lends itself more readily to the gambling instinct than the latter game. The so-called "sets" comprise as many as 144 pieces, the higher-priced ones being made from ivory and most hands mely carved.

No standard rules and regulations have as yet been adopted, the methods of playing the game varying greatly. The Chinese confine themselves chiefly to building up a strong defense whereas the Europeans and Americans concentrate on the wide opportunities the game offers for offensive tactics.

Fairly comprehensive works on the game are: *How to Play Mah-jongg*, by Jean Bray, Putnam's Sons, New York and London, 1923, and *How to Play Pung-Chow* by L. I. Harr, Harper and Brothers, New York and London, 1923.

MAINE. Maine is the thirty-eighth State in size (33,040 square miles), and the thirty-fifth in population; capital, Augusta. The population increased from 742,371 in 1910 to 768,014 in 1920, a gain of 3.5 per cent. The white population rose from 739,995 to 765,095, the native whites increasing from 629,862 to 658,346. The negro population decreased from 1363 to 1310; the foreign-born whites, from 110,133 to 107,349. The urban population mounted from 262,248 to 299,569, while the rural population fell from 480,123 to 468,445. The growth of the principal cities was as follows: Portland, (1910) 58,571 to (1920) 69,272; Lewiston, 26,247 to 31,791; Bangor, 24,803 to 25,978.

Agriculture. Maine was one of the New England States in which there was only slight decline in the percentage of rural population, from 64.7 in 1910 to 61 in 1920. While the population of the State increased 3.5 per cent in the decade 1910-20, the number of farms decreased 19.6 per cent (from 60,016 in 1910 to 48,227 in 1920); the acreage of land in farms, from 6,296,859 to 5,425,968, and the improved land in farms, from 2,360,657 to 1,977,329 acres. The total value of farm property showed an apparent increase, from \$199,271,998 in 1910 to \$270,526,733 in 1920, or 35.8 per cent; the average value per farm, from \$3320 to \$5609, or 68.9 per cent. In interpreting these values, however,

and, indeed, all comparative values in the decade 1914-24, the inflation of the currency in the latter part of the period is to be taken into consideration; the index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of land used for agricultural purposes decreased from 32.9 in 1910 to 28.4 in 1920; the percentage of improved land from 37.5 to 36.4. Of the 48,227 farms in 1920, 45,437 were operated by owners, 786 by managers, and 2004 by tenants. The comparative figures for 1910 were 56,454, 999, and 2563. White farmers in 1920 numbered 48,214, as compared with 59,987 in 1910; foreign-born farmers, chiefly Canadians, numbered 4384, compared with 4973. Farms free from mortgage in 1920 numbered 30,665; in 1910, 41,309. Those under mortgage numbered 13,023 in 1920; in 1910, 14,948. The number of dairy cows in 1920 was 217,021, compared with 156,819 in 1910; "beef cows," 9956 and 8019; sheep, 119,471 and 149,934. There was a noticeable increase in dairying. The growing of potatoes for seed had become a large industry. The estimated production of the chief farm crops in 1923 was as follows: corn, 1,256,000 bushels; spring wheat, 220,000; oats, 4,780,000; barley, 104,000; potatoes, 27,454,000; and hay, 1,513,000 tons. Comparative figures for 1913 are: corn, 608,000 bushels; wheat, 76,000; oats, 5,600,000; barley, 140,000; potatoes, 28,160,000; and hay, 1,194,000 tons.

Manufactures. While Maine is not one of the most important industrial States, it has manufacturing interests of great importance. See UNITED STATES, *Manufactures*.

Education. In the decade 1914-24 there was a steady improvement in educational conditions in the State. Special attention was given to the needs of rural communities. The Legislature during this period enacted many important measures affecting education. This was especially true in 1919, when provision was made for rotation agricultural schools under the supervision of the State Board for Vocational Education; the industrial education act was amended to provide for a programme of Americanization; a rural teaching provision was virtually established, which is said by experts in education to be one of the most direct approaches to the rural school problem yet presented; and a State-wide compulsory physical education law and an act reorganizing the law affecting the schools in unorganized territory were passed. More recent advances in the State are the establishment of the State school fund, to be distributed on the basis of teaching positions, aggregate daily attendance, and school census, approximately one-third each; and the establishment of a special school for the training of rural leaders, 100 each year. Consolidation of schools is gradually taking place, and rural school improvement is definitely and systematically pursued. By an act of the Legislature of 1923, all towns were required to have their buildings in a sanitary and satisfactory condition by 1927. In 1914 the total enrollment was 146,620; in 1920, it had increased to 149,255, of whom 129,537 were enrolled in elementary schools and 19,718 in secondary schools. In 1922 the total enrollment was 159,790 (131,413 in elementary and 28,377 in high schools). The total expenditure for schools was about \$6,000,000 in 1920. The percentage of illiteracy in the State decreased from 4.7 in 1910 to 3.9 in 1920; among the native

white, from 1.5 per cent to 1.3; among the foreign-born whites, from 14.5 to 12.0; and among the negroes, from 10.3 to 6.8 per cent. Finance. See STATE FINANCES.

Political and Other Events. With the exception of one year, the Republicans continued to control the government of the State in the decade 1914-24. In 1916 Carl E. Milliken was nominated for governor by the Republicans, while Governor Curtis was renominated by the Democrats. For United States Senator, Frederick Hale received the Republican nomination and Charles F. Johnston the Democratic. The death of Senator Edwin C. Burleigh on June 16, 1916, made an extra primary election necessary to nominate his successor. Bert M. Fernald, a former governor, was nominated by the Republicans and Kenneth C. M. Sills, president of Bowdoin College, by the Democrats. In the September elections, Mr. Milliken was elected governor and Hale and Fernald United States Senators. In the presidential election in November, 1916, Charles E. Hughes received 69,506 votes; President Wilson, 64,118. The first national park east of the Mississippi, comprising 5000 acres, was created at Mt. Desert Island, in July, 1916. On Sept. 10, 1917, a woman suffrage amendment was defeated. At the same election an amendment was carried giving the governor the right to remove delinquent sheriffs. A budget system was inaugurated in this year. At elections held in 1918, Carl E. Milliken was reelected governor, and Senator Fernald was reelected to the Senate. The Republicans also elected a large majority of the members of the Legislature. In the presidential voting of 1920, W. G. Harding received 136,355 votes; J. M. Cox, 58,961. In 1920, elections were held for governor and other State officers. Frederick H. Parkhurst, Republican, was elected governor. Governor Parkhurst died on Jan. 31, 1921, 24 days after he had taken the oath of office, and was succeeded as governor by Percival P. Baxter, President of the Senate. In 1922 Governor Baxter was reelected, and Senator Hale was reelected to the Senate. The State Republican convention held in May, 1924, instructed its delegates to vote for President Coolidge.

Legislation. The most important acts of the Legislature in the decade 1914-24 are indicated below. The Legislature of 1914 amended the workmen's compensation law. A woman suffrage measure failed by a narrow margin to pass the House of Representatives. The liquor laws were amended in 1917. The Legislature in 1919 ratified the Federal Prohibition Amendment; made provision for the voting of women for president; and passed a measure providing for the registration of persons employed as counsels or agents to promote or oppose legislation. The Legislature of 1921 passed measures regulating the use of aircraft, extended the jurisdiction of the Public Utilities Commission over certain motor vehicles, amended the laws relating to teachers' pensions, amended the State prohibition law to harmonize with the Federal law, provided for the payment of a bonus to soldiers and sailors who fought in the war with Spain, and amended the workmen's compensation law. In 1923 the Legislature passed a bill to facilitate cooperative marketing of agricultural products and made it criminal conspiracy for two or more persons to conspire to sell liquor in violation of the law. In this period was developed a policy of improved highways, and bonds to the amount

of \$9,000,000 had been authorized and issued, under public referendum. In 1923, the State refused, by public referendum, to institute a 48-hour law for women and minors. The majority opposed was over 20,000. The State water-power policy instituted by Fernald, prohibiting transmission of hydroelectric power beyond the borders of Maine, was constantly under fire but was not changed in this period.

MAINE, UNIVERSITY OF. A coeducational State institution at Orono, Me., founded in 1862. The university grew steadily during the years 1914-24, with 1058 students enrolled, 40,000 volumes in the library, and an income of \$396,000 at the beginning of that time, as compared with an enrollment of 1409 students, a library of 73,000 volumes, and an income of \$642,756 in 1923-24. The number of members of the faculty, including the staff of the experiment station, was increased from 126 in 1914 to 188 in 1924. A department of music was established in 1916. Clarence Cook Little succeeded Robert Judson Aley, LL.D., as president in 1922.

MALACCA. See STRAITS SETTLEMENTS.

MALARIA. During the ten years 1914-24, several features of interest in connection with malaria merit discussion. The War in Europe caused the disease to be carried to Great Britain and France after long years of immunity. It also drove home strongly the fact that malaria was still the world scourge which nullifies the efforts of man to civilize certain of the world's areas. The successful campaign against malaria in the temperate zones will not be repeated in the tropics until our knowledge of the disease has been increased. Quinine is powerless against certain types of tropical malaria; while the *anopheles* mosquito, which can be made the object of an intensive campaign of eradication in the United States, is not the sole means of distribution of the plasmodium in the tropics. Other insects are doubtless involved, of whose life cycle and habits little is known. Nor is tropical malaria the whole obstacle to its conquest. In some portions of the temperate zone the disease seems to attain increased virulence merely from the massing of troops, as in Saloniki during the War. Even in this latitude the disease behaved like tropical malaria, and not more than 20 per cent of the men responded to quinine; in this case, the infection probably proceeded from Egypt and could be classed as tropical. In regard to malaria in the United States, the work of the Rockefeller Foundation appears to show that the control of the disease is a matter simply of money and engineering. It is true that in rural sections the cost would be prohibitive and that systematic use of quinine must be added. This drug should be given in childhood and youth, for malaria is but infrequently contracted after this period.

MALAY STATES, FEDERATED. A federation of native states in the Malay Peninsula under British protection. The territory, made up of Perak, Selangor, Negri Sembilan, and Pahang, had an area of 27,506 square miles in 1921 and a population of 1,324,890. The 1911 population was 1,036,999. The 1921 population was composed of 510,821 Malays, 494,548 Chinese, 305,219 British Indians (172,465 in 1911), 5686 Europeans, and 3204 Eurasians. The chief town, Kuala Lumpur, had an estimated population of 80,000. Indian laborers continued to predominate on the estates. The leading activities centred in the rubber and tin industries. Coco-

nuts, rice, sugar, tapioca, pepper, and gambier were also cultivated. The country was little touched by the War and the succeeding depression, as the figures for trade indicate. Exports for 1910, 1920, 1921, 1922 were, in Straits dollars (1 S. dollar = \$0.56 normally), 102,851,990 dollars, 288,715,698, 129,463,762, and 135,116,634. Imports for the same years were 47,843,541 dollars, 170,522,123, 102,914,877, 78,666,032. Thus the balance of trade was consistently in favor of the Federation. Leading imports in 1922 were rice, machinery, cigarettes and tobacco, kerosene and motor oils, and cotton goods. The principal exports were rubber, tin ore, tin, and copra. In 1921, 3288 vessels of 1,713,382 tons entered, and 3289 vessels of 1,713,609 tons cleared ports of the Federated Malay States. Government accounts for 1911 and 1922 were: revenues, 35,056,244 and 52,494,110 dollars; expenditures, 24,680,723 and 49,811,007 dollars. The public debt on Jan. 1, 1922, was £4,759,907. In 1921 there were 1022 miles of railway in operation, compared with 614 miles in 1912, and 48 miles more under construction. The government scheme called for a network of railways over the whole peninsula.

MALAY STATES, NONFEDERATED. Five Malay states not included in the Federation. These were: (1) *Johore*, with an area of 7500 square miles in 1921; population, 282,244. The state greatly increased in population after 1911 and also progressed economically. Rubber, tin, and copra were the leading exports. Exports in 1921 and 1922 were Straits \$32,029,128 and \$37,861,597; imports were Straits \$24,730,135 and \$24,407,531. The government expenditure for 1922 was Straits \$8,785,873; revenue, \$8,625,223. (2) *Kedah* had an area of 3800 square miles and a population of 338,554. Chief articles of commerce were rice, rubber, coconut, tapioca. The tin mines were rapidly being exhausted. Exports in 1922 were \$6,844,127; imports, \$4,473,496. Government expenditure for 1922 was Straits \$5,290,239; revenue, \$4,966,904. (3) *Pertis* had an area of 316 square miles, and a population of 40,091. Leading products were rice, tin, and guano; the last two were declining. (4) *Kelantan* had an area of 5870 square miles and a population of 309,293. Agriculture was the leading activity; rice, rubber, and coconut raising ranked highest in importance. Rubber was the chief article of commerce. Exports in 1920, 1921, and 1922, were Straits \$6,206,642, \$2,848,171, and \$3,577,038; imports were \$5,679,510, \$4,108,595, and \$2,983,248. Valuable mining concessions, said to contain gold, galena, pyrites, and tin, were owned by British companies. State expenditures in 1921 and 1922 amounted to \$1,678,432 and \$1,539,318. (5) *Trengganu* had an area of 6000 square miles and a population of 153,092. Industries were similar to those of Kelantan. Exports in 1921 were Straits \$2,297,238; imports, \$2,574,946; in 1922, \$2,255,240 and \$2,287,158 respectively. State expenditures for 1921 and 1922 were \$759,054 and \$858,303. Tin and wolfram mines were worked. All the states had native sultans at whose courts resided British advisers representing Great Britain.

MALIPIERO, FRANCESCO (1882-). An Italian composer, born at Venice. Although he began to study the violin at the age of six, his instruction was very desultory. Not until 1899 did he begin to study with interest and systematically at the Liceo Musicale in Venice, under

Enrico Bossi, whom he followed to Bologna (1902) on his becoming director of the Liceo there. After completing his studies, Malipero devoted himself entirely to composition. At different times he lived in Venice, Rome, Paris, and Asolo. His earliest compositions were influenced by Wagner, but these he himself destroyed. He adopted the principles of futurism, of which he is one of the leading exponents. Of his operas, *Elan e Fuldano*, *Canossa*, *Il Sogno d'un Tramonto d'Autunno*, *Pantea*, and a trilogy, *L'Orfeide* (*La Morte delle Maschere*, *Sette Canzoni*, and *Orfeo*), only two were produced, *Canossa* (Rome, 1914) and *Sette Canzoni* (Paris, 1920). For orchestra he wrote *Dai Sepolcri*, *Dalle Alpi*, *Sinfonia delle Eroi*, *Sinfonia del Mare*, *Impressioni dal Vero* (two series), *Pause del Silenzio*, *Ditrambo Tragico*, *Illustrazioni di un Poema Cavalleresco*, *Armenia*, and *Sinfonia del Silenzio e della Morte*. His *Rispetti e Strambotti* for string quartet won the Berkshire prize (1920). He also wrote piano numbers.

MALMÉDY. See EUPEN, MALMÉDY, AND MOESNET.

MALTA. A British island colony in the Mediterranean Sea. The total area of Malta and its two islet dependencies is 118 square miles; civil population in 1921, 213,024, as compared with 211,864 in 1911. Agriculture was the chief activity. Leading products were wheat, barley, vegetables, grapes and other fruits, and cotton. Trade (excluding goods in transit) for 1913-14 and 1920 totaled £1,154,363 and £1,602,294 in exports, and £2,589,272 and £5,789,426 in imports. The state budget increased over the period 1913-21 from £423,108 in revenues and £402,521 for expenditures (1913-14), to £1,063,743 and £1,060,664 (1920-21). The British subvention for the latter year was £250,000. In 1921 a Maltese constitution was promulgated for the purpose of giving the natives a responsible government. A bicameral house was provided with its own local ministry. Certain "reserved" matters, however, including control of naval, military, and air forces, imperial interests, external trade, immigration, and treaties, were to be controlled by the governor and a nominated council. Valetta, the chief town, continued as an important port of call and the headquarters for the British Mediterranean fleet.

MALTA FEVER. See VETERINARY MEDICINE.

MAN, ANCIENT. See ANTHROPOLOGY.

MAN, ISLE OF. See GREAT BRITAIN.

MAN, PREHISTORIC RACES OF. For a long time zoölogists, botanists, and geologists have taken evolution as a matter of course, not especially emphasizing the application of the theory to man himself. Lately, unusual interest has been shown in the origin of man. The increasing importance of the human problem and the growing tendency to look upon human conduct as a biological phenomenon, has brought the question of man's origin to the fore and made a direct challenge to established beliefs. By gradual accumulation the scientific world has come into the possession of a respectable series of prehistoric skeletal remains, some of which cannot be satisfactorily explained save as forms intermediate to the primates in general. Anthropology has noted how the knowledge of man's past advanced step by step until we were in possession of evidence for a series of cultures ranging in unbroken succession from

the crudest Stone Age to modern times. Along with this, and somewhat parallel to it, can now be arranged successive biological or racial types of man.

As an introduction to the problem of prehistoric man the reader should have clearly in mind the time scale now recognized. According to the usual mode of reckoning we live in the Quaternary Age which was preceded by the Tertiary. These terms in simpler language signify the Age of Man and the Age of Mammals, respectively. The Quaternary has the subdivisions Recent and Pleistocene; the Tertiary splits into Pliocene, Miocene, Oligocene, and Eocene.

The Tertiary is estimated to have lasted three times the duration of the Quaternary to date. Primate forms, or monkeys, appear in the Eocene, but it is not until the Pleistocene that forms closely approximating the human are found. For an account of the discoveries down to 1914, see the article MAN, SCIENCE OF, in Vol. XIV. In the decade 1914-24, we find the one outstanding discovery in the Old World to be that at Broken Hill, Rhodesia, Africa, in 1921. In this case, a large part of the skeleton was found, and fragments from the skeleton of at least one other individual. The brain case seems to be low-vaulted and indicative of low cranial capacity. The most striking feature, however, is the very large gorilla-like face. The teeth are large and the jaws massive. Even the Heidelberg jaw, truly massive, is inferior to that of the Rhodesian skull.

The skeleton, on the other hand, suggests an erect posture and straight legs similar to modern man. So just where this type will fall in relation to earlier finds remains to be seen, nor is it yet possible to state with exactness its geological age. Yet one important point is clear; viz., that this is one of the extinct forms of man and that it was found outside of Europe, thus extending the range of these early forms over Africa. Again, the face of this skull is the most primitive yet discovered, at least the most like the larger anthropoids.

Although *Pithecanthropus erectus* was discovered in 1891 by Dubois, the specimens were not made accessible to students until 1923. In consequence, they have been very carefully studied by a number of specialists, working independently. It appears that the brain capacity at first was somewhat underestimated; it was later rated at 985 cubic centimeters, which brings it much nearer the human level. It also became known for the first time that Dubois procured part of a lower jaw with teeth, which because of its location must be considered part of another individual, but apparently belonging to the same genus. The net result of this new information is to give added certainty to the existence of this genus and to increase the possibility of a Tertiary precursor who was able to begin the development of tools.

The outstanding event in this connection was the study of the Piltdown finds (see MAN, SCIENCE OF, in Vol. XIV). The discovery was made by Dawson, but the study of the skull and the subsequent excavation of the site was carried on by Smith-Woodward, a well-known scientist. The skull was incomplete; part of the brain case, portions of the face, some teeth and half of a lower jaw. With these in hand a satisfactory reconstruction has been made, indicating a high or modern skull capacity, but a rather thick skull. The lower jaw, however, is decidedly

simian in appearance and so are the teeth, so much so that for a time some students regarded the jaw as not human and not belonging to the skull. The doubters were chiefly Americans, whereas English specialists who had better opportunities of examining the original specimen have consistently maintained that the jaw was not only human, but that it belonged to the same individual as did the skull. The chief difficulty throughout has been the inconsistency of a highly developed brain case, associated with an extremely primitive jaw, but this is no longer regarded as impossible or contrary to the evolutionary view.

A careful study of the specimen was made by G. Elliot Smith and Smith-Woodward, comparing it point by point with the other extinct types. For one thing, they assumed that since speech and handwork are the outstanding characteristics of modern man, these extinct types should show a marked development in the lateral portions of the brain case, under which are found the parts of the brain most intimately concerned. It is generally believed, for instance, that it was the expansion in this part of the brain case among the anthropoids that resulted in the modern type of human brain and head. When the subject is approached in this comparative way, all the cranial characters of the several extinct types of man fall readily and consistently into a series: first, *Pithecanthropus erectus*; next, Heidelberg man; then, in order of ascending development, the Rhodesian man, the Piltdown, the Neanderthal, and so on to modern man. The latest find of the period was made about two miles from the original Piltdown site. In this instance there came to light two fragments of the brain case and a molar tooth. One fragment, at least, overlaps one of the first find, so two individuals are represented. The tooth proves to be a molar from the lower jaw. The condition of these bones, the strata in which they were found, etc. are all in close agreement with the original Piltdown find; hence, there can be little doubt that in this totality the Piltdown finds represent two individuals of the same species. The significance of this last find is great, since it adds to the certainty that in the original the jaw and skull belong together. It has been almost impossible to come to a definite decision as to the geological position of the Piltdown find, because it lay near the surface in a slightly jumbled formation; yet the evidence favors the third interglacial period. This would, in fact, be consistent with the developmental sequence given above.

Turning now to new finds on the continent of Europe, we have only repetitions of Neanderthal and Cro-Magnon, nothing distinctively new. However, one of the recent finds promises to throw new light on the origin of modern man. It will be recalled that the first modern type of man to appear in Western Europe is that known as Cro-Magnon, first definitely associated with the palæolithic period by the discovery of a skeleton in the famous station of Solutré in 1868. Since that date similar skeletons have come to light, but in 1923 at the same station of Solutré, a new find was made by Depéret, Arcelin, and Mayet. In this case five skeletons were found. The burials had been made in an orderly manner and the graves marked with upright headstones. The artifacts accompanying these burials were considered of Aurignacian age. In stature these

individuals were tall, estimated at about 6 feet 5 inches. Perhaps the most important point of interest is that these skeletons represent a type of man rather more modern than the established Cro-Magnon type in that the faces are not so broad and the heads not pronouncedly dolichocephalic. This gives us at the first appearance of this type a less individualized example of the Cro-Magnon type, particularly in that the faces are not so wide, or like those of the American Indians, and so "disharmonic," since the head was not correspondingly narrow. All this raises the interesting question whether this latest find is a later form of this type and in consequence the ancestor of the white races of western Europe, or whether the disharmonic type was a later, more generalized and perhaps hybridized form which was eventually displaced.

There is, however, one possible exception to the statement that no earlier new forms were found upon the continent of Europe, since in 1914 the lower jaw of an adult was found at Ehringsdorf not far from Weimar and recently an incomplete skeleton of a child of approximately 10 years. In the opinion of some, these represent a type that belongs to a more remote period than the Neanderthal, seemingly most clearly resembling the Piltdown specimen. Finally, mention should be made of the skeleton of a Neanderthal child discovered by Dr. Henry Martin at the station of La Quina. In this specimen the distinctively Neanderthal characters are fully pronounced, giving additional proof that the differentiation between Neanderthal and modern man is fundamental.

So far we have considered only Europe and Africa because with the single exception of *Pithecanthropus erectus* there have been no distinctive finds elsewhere. It does not follow, of course, that there will be none such, because both in Asia and America there have not been wanting signs of fair antiquity, but merely that they have not come to light. It is true that finds of great antiquity are frequently reported in the American press, but these have all failed to stand the examination. At least, so far no primitive remains have been found in the New World that would in any way compare with the Neanderthal. The inference therefore is that while man may have been in the New World for a very long time, he came here from the modern level. Differences in age, then, for ancient man in America must be determined largely by geological and archaeological criteria. However, there have been a number of finds whose claims to antiquity have not been completely demolished. Among these the most significant is that in Los Angeles, Cal., where early in 1924 fragmentary human remains and a few artifacts were found in strata that appeared to date back to the very beginning of the modern epoch, if not, in fact, the vanishing stage of the Pleistocene. It has, however, proved impossible to determine the precise geological horizon for this deposit, and since no associated fauna were found, the age of these remains is still doubtful. The skeletal features, on the other hand, are similar to those of California Indians.

Perhaps the greatest interest in this subject centres in the immediately prehuman types, one of which promises to be the fossil apes of the genus *Dryopithecus*, for some time known by fragmentary examples. In Europe, at least, *Dryopithecus* seems to have lived in the upper Miocene which would place this form on the

line of differentiation between the tree-living and the ground-living primates. Specifically, *Dryopithecus rhenanus*, the form known in Europe, is of large size and in a number of morphological characters lays strong claims to the rôle of man's precursor. In size it compares favorably with the gorilla, and in dentition it shows clearly the basic human tooth patterns. Again in 1923, Barnum Brown, a well-known palæontologist, from the American Museum of Natural History in New York, discovered parts of three jaws in the Siwalik Hills, India, which prove to belong to one or more species of *Dryopithecus*. The significance of this discovery is that the range of this genus corresponds to that of the primitive forms just discussed, *Pithecanthropus* in Java, the Heidelberg man in Europe. One might then draw upon a map of the world a line from Australia to England and consider this the axis to the distribution area for primitive man and his precursors, at least insofar as our knowledge goes.

Even in the New World traces of a large anthropoid primate have come to light. President Henry Fairfield Osborn of the American Museum in New York announced in 1922 the discovery of a molar tooth from fossil beds near Agate, Neb. In fact, this specimen was found by Harold J. Cook, an experienced geologist and palæontologist, while exploring fossil beds in the locality noted above. An exhaustive study of this tooth has been made by W. K. Gregory and Milo Hellman, the outcome of which supports the original determination of Professor Osborn that the finding of this tooth indicates the presence in the world of a new form of higher primate, falling between *Dryopithecus* on the one hand and *Pithecanthropus* on the other. Accordingly, the name *Hesperopithecus* has been assigned to this new type. The geological and palæontological setting of the deposit from which the tooth came suggests Upper Miocene or Lower Pliocene, and this again, on mere chronological grounds, places *Hesperopithecus* between *Dryopithecus* and *Pithecanthropus*.

The general significance of these discoveries lay in not only their revealing an ancient worldwide range for the higher primates, but in their supplying the intermediate structural forms needed to complete the evolutionary outline.

MAN, SCIENCE OF. See ANTHROPOLOGY; ETHNOGRAPHY; ETHNOLOGY; MAN, PREHISTORIC RACES OF.

MANCHURIA. A Chinese outer territory, with an approximate area of 363,700 square miles. Population estimates varied from 5,750,000 to 29,400,000. The most recent estimate, that of the Southern Manchuria Railway, put the population at 20,112,100, of whom nearly 90 per cent were Chinese. The capital and chief town, Mukden, had 158,132 inhabitants; the chief post was Dairen. Other large towns were Harbin (365,000), Newchwang (82,100), Kirin (540,214), Ying-k'ou (60,000), and An-tung (57,699). The extraordinary fertility of the soil and the improved railway facilities caused Manchuria to grow more rapidly than any other section of China. In 1921, it was estimated that 22,744,505 acres of land were under cultivation, worked by 19,461,100 people. The soya-bean, millet, kaoliang (a sort of sorghum), wheat, and rice were the principal crops. From 1912 to 1920, the kaoliang output increased from 3,807,740 to 6,733,000 tons; millet from 2,309,800 to 5,128,900 tons; barley from 364,369 to

1,552,000 tons. In 1910, 350,000 tons of soyabeans were exported; in 1920, 550,000 tons. In 1910, 250,000 tons of bean cake were exported; in 1920, 1,120,000 tons. Some idea of the advances made in mineral production may be gathered from the fact that coal mined in the Fushun mines, operated by the South Manchuria Railway, increased from 1,343,198 tons in 1911 to 3,237,400 tons in 1920. Gold, iron, salt, natural soda, and magnesite were also worked to some extent. The constant application of the principal concessionaire in the country, the South Manchuria Railway, to industrial activities met with excellent results. Whereas in 1907 there had been only 77 factories in the Kwantung leased territory, capitalized at 1,924,174 yen and turning out products valued at 2,681,868 yen, by 1918 there were 197 factories capitalized at 41,722,501 yen and producing 111,194,323 yen in commodities. Similarly, factories in the railway zone increased from 41 (capital, 2,448,265 yen) in 1912, to 131 (capital, 33,736,311 yen) in 1918. Principal works were bean mills, flour mills, sugar refineries, distilleries, and iron and steel factories. The trade of Manchuria reflected the same condition. Imports of foreign goods steadily increased from 72,431,345 taels in 1913 to 136,926,411 in 1921; exports from 94,053,423 to 196,820,680 in 1921. The following table shows exports from Dairen, in tons:

	1908	1914	1920
Beans	182,629	255,112	567,129
Bean cake	204,627	512,823	1,131,208
Cereals	13,781	118,259	707,237
Coal	7,703	559,761	212,589
Sundries	28,646	98,518	278,935
Bunker coal	15,276	247,193	195,428

The increasing rôle played by the United States in the Manchurian trade may be adduced from the following: imports from the United States for 1910, 1919, and 1920, \$1,212,582, \$27,078,116, and \$15,871,554; exports for 1910, 1919, and 1920, \$8671, \$14,474,853, and \$16,514,377. The decline in 1921 (exports dropped to \$6,523,319) was due to the worldwide depression. The growth of the port of Dairen reflected the general advance. In 1908, 1357 vessels of 1,829,921 tons entered; in 1920, 2942 vessels of 4,864,904 tons; in 1921, 4592 of 6,328,734 tons. In 1920, American tonnage entering was 381,729, as compared with 421,028 British, and 3,408,369 Japanese. The increasing value of silver over the period 1914-24 necessarily contributed to the general well-being. From 1908 to 1915 the average value of the tael was \$0.67. In 1922 it was reported that more than 2220 miles of railway were in operation. These belonged to the following systems: South Manchuria Railway, 686 miles; Chinese Government Railways, 522 miles; railways under Russo-Chinese management, 1078 miles. For history see CHINA; JAPAN.

MANDATES. The decision of the Paris Peace Conference (see PEACE CONFERENCE AND TREATIES) to establish a mandatory system under supervision of the League of Nations instead of permitting the outright annexation of the former German colonies and Turkish territories by the victorious Allies, resulted in the creation of a very significant and novel form of international control over colonial possessions. Colonies with an aggregate area about 1,250,000 square miles

and a total population of more than 15,000,000 were placed under mandates of the League of Nations, and well-informed observers have predicted that the system will ultimately be extended to other colonies. Article 22 of the Covenant which was prefaced to the five major peace treaties provided that certain territories taken from the defeated powers and "not yet able to stand by themselves" should be administered by more civilized nations acting as "mandatories" or trustees for the League of Nations, in which, presumably, ultimate sovereignty is vested. There were to be three classes of mandates: Class A, including territories taken from Turkey; Class B, including former German colonies in central Africa; and Class C, comprising German Southwest Africa and the former German island possessions in the Pacific. The principal Allied and Associated Powers, to whom these areas were ceded by Turkey and Germany, reserved the right to distribute the territories in question, and to draft the mandates, before turning the system over to the League for permanent operation. Accordingly, the Supreme Council on May 7 distributed the B and C mandates as follows: German East Africa to Great Britain, Togoland and the Cameroons (q.v.) to Great Britain and France, Southwest Africa to the Union of South Africa, Samoa to New Zealand, Nauru to the British Empire, German New Guinea to Australia, and German islands north of the equator to Japan.

There remained the A mandates. Because of the uncertainty regarding the Turkish peace settlement, these were not distributed until the the San Remo conference of premiers in April, 1920. The San Remo decision, confirmed on May 5, allotted Syria to France, and Palestine and Mesopotamia to Great Britain. It had been intended that Armenia also should become an A mandate, but as neither the United States nor any other power cared to assume responsibility for Armenia's welfare, no mandate was issued (see ARMENIA).

As the premiers at San Remo not only assigned the mandates but also sealed a compact for exclusive Anglo-French exploitation of the oil resources in Mesopotamia, the United States government immediately addressed a note of protest, May 12, 1920, to Great Britain, insisting on equal treatment for subjects of all nations. Refusing to be referred by Lord Curzon to the Council of the League (Curzon letter of August 9), the Washington government insisted on Nov. 20, 1920, that the drafts of mandates must be communicated to it for criticism before final approval, and that the United States had a just claim to all privileges, in regard to mandates, enjoyed by members of the League. The first point, it may be noted, was satisfied subsequently by preliminary publication of draft mandates; the second was guaranteed by special treaties which the United States later negotiated with individual mandatory powers. The United States also objected to the assignment of Yap (q.v.) to Japan, and not until the Washington Conference (q.v.) was this dispute settled by a special treaty recognizing the Japanese mandate for assuring the United States of cable and wireless facilities.

Meanwhile work proceeded on the drafts of the mandates, for each mandated territory was to be entrusted to the mandatory power only on a conditional basis laid down in a separate

charter or mandate, drafted by the chief Allied powers, but approved and granted by the League Council. The C mandates, offering the least difficulty, were first formulated and received the Council's stamp of approval on Dec. 17, 1920. These were five in number: Union of South Africa mandate for former German Southwest Africa, Australian mandate for New Guinea, New Zealand mandate for western Samoa, British Empire mandate for Nauru Island, and Japanese mandate for the Caroline and Marshall Islands. In each of these territories the mandatory power was authorized to exercise full power of administration and legislation, subject to reservations for the prohibition of slavery and forced labor, of the arms and liquor traffic, of fortifications and military training of natives save for local defense, and subject also to a guarantee of religious freedom. Japan would gladly have added a provision for the open door, but the other powers, especially the Australasian Dominions, unwilling to throw their Pacific mandates open to Japan, refused. Difficulties with the Holy See regarding the Palestine mandate, and with the United States regarding Mesopotamia, delayed the definitive approval of the other mandates. On Aug. 1, 1922, the Council approved B mandates for northern Cameroon (British), southern Cameroon (French), western Togoland (British), eastern Togoland (French), Ruanda and Urundi (Belgian), and East Africa or Tanganyika Territory (British). A notable feature of these mandates was the inclusion of elaborate provisions for the welfare of the natives, the abolition of slavery, and equality of commercial and industrial opportunity in these territories among members of the League, in addition to the stipulations contained in the C mandates. The A mandates for Palestine (British) and Syria and Lebanon (French) were approved on July 24, 1922, and published by the League on August 12; that for Mesopotamia had long been drafted but had aroused so much international difficulty and was so vitally dependent on British relations with the natives that its confirmation was delayed (see MESOPOTAMIA.) The A mandates were particularly interesting; they were designed to be transitional measures to assist backward countries until fit for independence. Special provisions were inserted for the development of autonomy and for the protection of "antiquities" or archaeological remains.

All mandates imposed on the mandatory power the obligation to make regular reports of its administration to a Permanent Mandates Commission appointed by the League. This is undoubtedly the most unusual and the most valuable feature of the entire system; the knowledge that such reports will receive full publicity and open discussion has acted as a potent stimulus to good administration. Under the direction of Professor Rappard a special section of the League secretariat at Geneva has made a most thorough study of the voluminous reports, in order to provide the commission with some authoritative data. Two instances of the work of the Mandates Commission may illustrate the value of this work. At the 1922 meeting it developed that the frontier between the Belgian and British mandates in East Africa caused considerable hardship to the natives, because it was drawn regardless of tribal frontiers; in consequence of the Commission's recommendation, Belgium and Great Britain agreed to mod-

ify the frontier. Again, the imposition of a heavy dog tax on natives of Southwest Africa caused the Bondelzwarts rebellion of 1922, which was ruthlessly suppressed by the Union of South Africa; a Haitian delegate brought the matter before the Commission, and South Africa was severely criticized for its native policy, with the result that the policy was modified. Full information regarding the mandates and their administration is made available by the League of Nations in its publications containing minutes of the Mandates Commission and supplementary official documents. See AFRICA; LEAGUE OF NATIONS.

MANGIN, CHARLES MARIE EMMANUEL (1866-). A French soldier, born in Sarrebourg, Moselle. He served on the staff of Marchand's Fashoda mission in 1897 and played a prominent part in the conquest of Morocco from 1911 to 1913. In the latter year he was made brigadier-general. In the great War he commanded a division at the battle of the Marne and by his personal example of courage saved a threatening situation. He commanded at Verdun, where in March, 1916, he recaptured the fortresses Douaumont and Vaux. In the defensive of April, 1917, his tactics were criticized and an inquiry was held. He was exonerated. In July, 1918, he defeated the Germans north of Château-Thierry and forced them to retreat. During these operations he had under his command important American forces. Following the Armistice, he commanded the Allied Army of Occupation, with headquarters at Mayence. He was the organizer of the French "black army."

MANITOBA. A Canadian province with an area of 251,832 square miles; population in 1911, 461,394; in 1921, 610,118, an increase of 32.2 per cent. The rural population in 1921 made up 57.1 per cent of the whole, as compared with 56.6 per cent of 1911. Males, in 1921, continued in excess of females, the division being 320,567 to 289,551. The leading cities, with their populations in 1921, were Winnipeg, the capital, 179,087 (136,035 in 1911); Brandon, 15,397; St. Boniface, 12,821; Portage la Prairie, 6766. In 1916 settlers of American origin numbered 18,274. There were, besides the settlers of British descent, large colonies of German, Austro-Hungarian, and Russian farmers in the province.

Industry. To a large extent, the province's very rich natural resources remained undeveloped. The population was settled in the agricultural districts of the West and South, and as farming and pastoral pursuits were the leading activities, little attention was given to the forests, fishing grounds, water power, or mineral deposits. The characteristic of the period was the spread of diversified farming. The area under field crops in 1923 was 6,719,522 acres. The acreage under spring wheat in 1923 (2,915,915 acres) was less than that of 1911 (3,094,833 acres). Oats in 1922 were planted on 1,834,504 acres. Barley, rye, flax, and root crops showed considerable increases, and so did the forage crops. The total value of field crops in 1923 was \$60,706,700. The augmentation of the live stock indicated the new interest of the province. Cattle in 1923 numbered 691,711, against 409,718 in 1913; sheep in 1923 were 93,162, against 42,840 in 1913; swine in 1922 were 291,236 against 184,745 in 1913. In 1922, 51 dairy establishments produced a product

value of \$12,434,233 as against the total output of \$593,375 in 1910. Mineral areas included rich gold fields in the Pas district and at Elbow Lake; copper ore in the Flin Flon district; gypsum, and building materials. The total mineral production in 1922 was \$2,258,942. Other products yielded: furs, 1921-22, more than \$1,690,278; fish in 1921, \$1,023,187; lumber cut, 1921, \$1,398,067. In 1921 there were 1965 industrial establishments; meat packing, milling, etc., was the most important, capitalized at 100,441,542 and employing 20,732 workers (17,325 in 1910). Materials used were valued at \$68,216,070 and the product at \$123,470,393; in 1910 the product had been \$53,673,609. Out of the 3,270,491 horse power estimated as available, in 1923, 134,025 was being used.

Communications. In 1922 there were in operation 4585 miles of railway as compared with 3993 miles in 1913. The telephone system, provincially owned, had 240,186 miles of line in 1921. There were 68,463 telephones on the lines, 14,956 of which were rural. The Dominion railway from the Pas to Port Nelson (Hudson Bay), to make possible wheat shipments via Hudson Bay, was still under construction.

Government. Revenues and expenditures for 1913 were \$5,788,070 and \$5,314,849; for 1922, \$7,940,457 and \$8,381,667. The gross debt in 1922 was \$62,000,000, of which 75 per cent had been expended in the telephone system, public buildings, and roads. The Dominion subsidy for 1922 was \$1,470,991, and receipts from Dominion school lands, \$286,346. In 1922 there were 136,876 pupils in the 3782 public schools. The enrollment had been 83,679 in 1913. The University of Manitoba had 1570 students in 1921; the Agricultural College, 1124 students. The provincial budget in 1922 carried \$1,399,759 for education; in 1913, this had been \$668,832. Total expenditures for education in 1913 were \$5,036,795; in 1922, \$13,564,824. The province was represented by six members in the Senate and 15 in the House of Commons of the Dominion Parliament. Women were permitted to stand for Parliament. Proportional representation was adopted as the method for choosing the representatives for the city of Winnipeg.

MANLY, CHARLES MATTHEWS (1876-). An American mechanical engineer, born at Staunton, Va., and educated at Furman University and Cornell. After graduation he became assistant to Secretary Langley of the Smithsonian Institution in his work on aviation and built and piloted the first Langley aeroplane in 1903. He organized the Manly Drive Company in New York in 1905 and was its chief engineer, thereafter serving as consulting engineer to various corporations and to the British War Office (1915) in the development of large aeroplanes in the United States. During 1915-20 he was associated with the Curtis Aeroplane and Motor Corporation but later devoted his attention chiefly to consulting practice under Manly and Veal. He patented nearly 50 inventions in automotive transportation, power generation, and transmission. In 1918 he was a member of the United States Commission to the International Aircraft Standards Conference in London. He was associated with S. P. Langley in the production of his *Memoirs on Mechanical Flight* (1911).

MANN, ALBERT RUSSELL (1880-). An American agricultural educator, born at Haw-

kins, Pa., and educated at the New York State College of Agriculture and the University of Chicago. In 1908 he was appointed assistant professor of dairy industry at New York State College and in the same year was secretary of the State Commission of Agriculture. He was successively secretary, registrar and editor, professor of rural social organizations, acting dean, and dean (from 1917) of the New York State College of Agriculture. He was also director of the Cornell University Agricultural Experiment Station and director of extension work. He was a member of many scientific societies and the author of *Beginnings in Agriculture* (1911).

MANN, JAMES ROBERT (1856-1922). An American legislator (see Vol. XV). He was reelected to Congress for successive terms from 1903 to 1923. He was minority leader from the 62nd to the 65th Congress and was Republican leader up to the time of his death. He was recognized as one of the most efficient parliamentarians in the House and was perhaps its most conspicuous member for many years. He was a candidate for Speaker in 1922 but was defeated by Fred H. Gillett of Massachusetts.

MANNING, WILLIAM THOMAS (1860-). A Protestant Episcopal bishop (see Vol. XV). He was rector of Trinity parish from 1908 to 1921. In the latter year he was consecrated bishop of New York. During the War he served as volunteer chaplain at Camp Upton. He was a chevalier of the Legion of Honor of France and an officer of the Order of the Crown of Belgium. From 1922 to 1924 he was much in the public eye on account of controversies with the Rev. Percy Stickney Grant, because of his radicalism, and with the Rev. William Norman Guthrie, because of dancing and other innovations at his religious services in St. Marks-in-the-Bowwerie, New York City.

MANOURY, MICHEL JOSEPH (1847-1923). A French general, born at Maintenon, and educated at the Ecole Polytechnique in Paris. He served in the Franco-Prussian War of 1870 and was general of a division in 1905. In the latter year he received the command of the artillery of the forts of Paris and was president of the Commission of Military Schools. He commanded the 14th Army Corps at Marseilles in 1908 and the 20th at Nancy in 1909; in 1910 he was appointed military governor of Paris and a member of the special council of war. In 1914 he was placed in command of the French Reserve Force near Paris, and it was his successful attack on September 6 which first checked General Von Kluck's drive toward Paris. He was wounded at Soissons in March, 1915. He died at Orléans, France, in 1923.

MANSFIELD, KATHERINE (c. 1890-1923) (MRS. JOHN MIDDLETON MURRY). An English writer, born in New Zealand. She began writing at an early age and soon won her way to the front rank among contemporary writers of fiction. In 1913 she married John Middleton Murry. Her book of short stories, *Bias and Other Stories*, published in 1920, won much favorable comment. This was followed by *The Garden Party and Other Stories* (1922). A posthumous book of poems was published in 1924.

MANSHIP, PAUL (1885-). An American sculptor, born in St. Paul, Minn. He studied art in New York and Philadelphia, and in 1909, winning a scholarship of the American

SCULPTURE



FROM THE METROPOLITAN MUSEUM OF ART, NEW YORK

"PAULINE"

PAUL MANSHIP

Academy in Rome, he went to Europe for three years. In Europe he studied the work of Michelangelo and Donatello and found inspiration in Greek art. He was also influenced by the art of India. His debt to Greece may be traced in such pieces as "The Centaur and the Dryad," "Briseis," the "Infant Hercules" fountain made for the courtyard of the American Academy at Rome, "The Lyric Muse" and "The Little Brother." The beautiful patina of these pieces is a peculiarity of Manship's work. His gleanings from Hindu and Buddhist sculpture are seen in "The Dancer and Gazelles" and the "Flight of Night." While there is reverence for tradition in Mr. Manship's sculpture, there are also very modern notes in some of his figures, e.g. "Yawning." In 1914 he was elected an Associate of the National Academy; two years later he was made a full member. Among his works are the J. P. Morgan memorial at the Metropolitan Museum in New York City; the Civic Forum medal; and "Dancing Girl and Fauns" and "Indian and Prong-Horn Antelope" at the Art Institute, Chicago. The bronze statuette, "Yawning," is at the St. Paul Institute, and the portrait study of his daughter, "Pauline," is in the Metropolitan Museum. The group, "Dancers and Gazelles," was exhibited at the Luxembourg in Paris and also at the Corcoran Art Gallery, Washington and the Cleveland Museum. Copies of "Centaur and Dryad" are at the Metropolitan and at the Detroit Institute of Arts.

MANTLE, BURNS (1873-). An American newspaper writer, born in Watertown, N. Y. He became dramatic editor of *The Daily News* (New York) and dramatic correspondent of the *Chicago Tribune* in 1922. He was previously dramatic editor of *The Evening Mail* (New York) and Sunday editor of the *Chicago Tribune*. He was best known as the editor of *The Best Plays and Year Book of the Drama in America* (from 1919).

MANUFACTURES. See **BOOTS AND SHOES**; **IRON AND STEEL**; **LEATHER**; **MOTOR VEHICLES**; **PAPER AND WOOD PULP**; **PETROLEUM**; **RUBBER**; **SILK**; **SILK, ARTIFICIAL**; **TEXTILE MANUFACTURING**; **UNITED STATES, Manufactures**.

MANURES. See **FERTILIZERS**.

MANZ, GUSTAV (1868-). A German writer and editor of the *Tägliche Rundschau* of Berlin. He was a popular lecturer and was on the staff of the Lessing Hochschule of Berlin. He is the author of *M. Beer* (1892); *Das Tagebuch* (1893); *Das Lebende Wort* (1913); *Hundert Jahre Berliner Humors* (1916); and *Martin Luther im Deutschen Wort und Lied* (1917). He also edited Emil Gött's *Verbotene Früchte* (1894) and *Briefe an einen Freund* (1919), works by Möricke (1912), Scheffel's *Ekkehard* (1916), *Selected Writings of Theodor Storm* (1917), and Friedrich Vischer's *Auch Einer*.

MARCH, PEYTON CONWAY (1864-). An American soldier, born in Easton, Pa. He graduated from the United States Military Academy in 1888 and in the same year was commissioned 2d lieutenant in the artillery. He saw service in the Philippines in military operations and later as administrator. From 1903 to 1907 he was a member of the General Staff in the Army and in 1904 was observer in the Russo-Japanese War. He commanded the artillery branch of the American Expeditionary Forces from the outbreak of the War until 1918, when he was appointed acting chief of staff.

On May 20, 1918, he became general and chief of staff and held that position throughout the remainder of the War. He was awarded the Distinguished Service Medal and decorations of England, France, and other European countries.

MARCONI, GUGLIELMO (1874-). An Italian electrical engineer (see **VOL. XV**). During 1922-24 he was experimenting on new methods of transmission by which energy might be centralized in one direction and made to go in a straight line from one station to another. He made successful experiments in sending radio messages from Cape Verde to Cornwall, a distance of 2200 miles. During 1924 he was successfully experimenting with the reduction of power required for transmission of radio messages. See **RADIO TELEGRAPHY AND TELEPHONY**.

MARCOSSON, ISAAC FREDERICK (1877-). An American editor, born at Louisville, Ky., and educated in the schools of Louisville. From 1894 to 1903 he was on the staff of *The Louisville Times*. In 1903 he became associate editor of *The World's Work*, with which he continued until 1907, when he became a member of the staff and financial editor of the *Saturday Evening Post*. From 1910 to 1913 he was editor of *Munsey's Magazine*. During and following the War he traveled about Europe and other parts of the world to investigate conditions and contributed articles to the *Saturday Evening Post* and other periodicals. He wrote: *The War After the War* (1916); *The Rebirth of Russia* (1917); *The Business of War* (1917); *Adventures in Interviewing* (1919); and *An African Adventure* (1921). He was the author, with Daniel Frohman, of *Charles Frohman, Manager and Man* (1917).

MARIANNE or LADRONE ISLANDS. See **PACIFIC OCEAN ISLANDS**.

MARIENWERDER. See **ALLENSTEIN-MARIENWERDER**.

MARIETTA COLLEGE. A nonsectarian, coeducational institution at Marietta, Ohio, founded in 1835. The enrollment of the college increased from 200 in 1914 to approximately 310, exclusive of extension students, in 1923-24. The faculty increased during the period 1914-24 from 19 to 26, the library from 60,000 to 84,500 volumes, and the productive funds from \$700,000 to \$1,120,000 through an endowment campaign in 1921. A department of geology was established in 1919, and the entrance requirements were raised in the fall of 1922. Edward Smith Parsons succeeded G. W. Hinman as president in 1919.

MARINE, MERCHANT. See **SHIPPING**; **SHIPBUILDING**; etc.

MARINE CORPS, UNITED STATES. During the great War the Marine Corps served on vessels of the fleet, and on shore in France, Haiti, Santo Domingo, Nicaragua, Cuba, Peking, the Azore Islands and at naval stations at home and abroad. The Fourth and Fifth Brigades of marines and 12 replacement battalions served with the American Expeditionary Forces in France, and the First Marine Aviation Squadron with the northern bombing group in France.

The Fifth Regiment of Marines landed in France with the first expedition of American troops in June, 1917; with the Sixth Regiment of Marines and the Sixth Machine Gun Battalion of Marines it formed the Fourth Infantry Brigade of the Second Division, United States Army. This division was the first one ready

for service on the fighting line, and the remarkable work of the Fourth Brigade of Marines around Château-Thierry and in Belleau Wood gave the Corps world-wide fame. The regular strength of this brigade was 258 officers and 8211 enlisted men. During its service in France, chiefly between March 15, and November 11, 1918, its casualties were:—killed in action or died of wounds received in action, 2457; wounded, 8898; total, 11,355, almost 3000 more than the total number of officers and men at any one time. The authorized strength of the Corps in 1924 was 1093 commissioned officers, 158 warrant officers, and 19,500 men.

MARINE ENGINES. See SHIPBUILDING.

MARINUZZI, GINO (1882-). An Italian conductor and composer, born at Palermo. After completing his studies at the Conservatory in Palermo he was conductor at various theatres in Italy and made frequent appearances as guest conductor in Paris, Madrid, and Buenos Aires. From 1919 to 1921 he was with the Chicago Opera Association. In 1922 he became principal conductor at the Teatro Regio in Turin. He composed the operas, *Il Sogno del Poeta* (Palermo, 1889), *Barberina* (ib., 1903) and *Jaquerie* (Buenos Aires, 1918; Chicago, 1920). He also wrote a symphonic poem, *Sicania*, and an orchestral suite, *Siciliana*.

MARITIME REPUBLIC. See SIBERIA AND THE FAR EASTERN REPUBLIC.

MARKETING. See AGRICULTURE, HORTICULTURE.

MARNE, BATTLES OF THE. See WAR IN EUROPE, *Western Front*.

MARQUESAS ISLANDS. See PACIFIC OCEAN ISLANDS.

MARQUETTE UNIVERSITY. An institution under Roman Catholic direction at Milwaukee, Wis., founded in 1907. The student enrollment increased in the decade between 1914 and 1923-24 from 1187 to 3925, of which 330 were women. The number of members in the faculty rose from 254 to 330, and the number of volumes in the library from 30,000 to 75,000. In 1918 the university received \$333,333 from the Carnegie Foundation and in 1922 \$800,000 under the will of Mrs. Harriet Cramer. A gymnasium and a new building for the College of Dentistry were built, and a new science building and law building were under construction in 1924. Rev. Albert C. Fox, S.J., LL.D., succeeded the Rev. Herbert C. Noonan, S.J., M.A., as president in 1922.

MARQUIS, DON (ALD ROBERT PERRY) (1878-). An American newspaper writer and author, born at Walnut, Ill. For several years he was associated with Joel Chandler Harris in editorial work in Atlanta, Ga. Moving to New York, he wrote the *Sun Dial* column in the New York *Evening Sun*. In its conduct he achieved a distinctive reputation as a wit and philosopher. He gave it up to become director of a column in the New York *Tribune* in 1923. His writings include: *Hermione* (1916); *Prefaces* (1919); *The Old Hoak*, a play (1921); *Carter and Other People* (1921); *Noah an' Jonah an' Cap'n John Smith*, poems (1921); *Poems and Portraits* (1922); *Revolt of the Oyster* (1922); *Sonnets to a Red-haired Lady* (1922); and *The Old Hoak's History of the World* (1924).

MARRIAGE. See EUGENICS.

MARSAL, FRÉDÉRIC FRANÇOIS (1874-).

A French politician, born in Paris, and educated at the French universities. He pursued a military and political career. Recipient of many decorations, he wrote numerous books on finance and political economy. He was minister of finance in the governments of Millerand, Leygues, and Briand (1920-22) and again in 1924 in the reorganization of the Poincaré cabinet. He floated the great peace loan of 1920 and took measures to consolidate the floating debt of the French Republic, which in 1924 amounted to 70,000,000,000 francs. After the Radical victory in the 1924 elections, Marsal was chosen by President Millerand to read his message to Parliament, but the Radical majority in the Chamber refused to accept any cabinet named by the nationalistic French president.

MARSEILLES-RHONE CANAL. See CANALS.

MARSHALL, LOUIS (1856-). An American lawyer and publicist (see VOL. XV). He took part in many arbitrations and mediations between employers and laborers and was a member of the arbitration board which settled the New York clothing workers' strike in 1919. He was also chairman of the commission to fix the price of bread and secured the enactment of laws regulating private and foreign bankers and other reform legislation. In 1920-21 he was president of the Jewish Relief Committee which collected more than \$50,000,000 for relief of Jewish war sufferers. He was also a member of the international committee whose efforts resulted in treaties with Poland, Rumania, Jugo-Slavia, Czecho-Slovakia, and other countries, to guarantee equal rights to racial, religious, and linguistic minorities.

MARSHALL ISLANDS. See PACIFIC OCEAN ISLANDS.

MARTIN, EVERETT DEAN (1880-). An American sociologist, born at Jacksonville, Ill., and educated at Illinois College in Jacksonville and at McCormick Theological Seminary. In 1907 he was ordained to the Congregational ministry and served as pastor in several churches in Illinois. From 1910 to 1914 he was pastor of the Unitarian church in Des Moines, Iowa, and from 1916, lecturer on social philosophy at the People's Institute, New York. He was assistant director and secretary from the latter year of the Cooper Union Forum and acting director in 1921-22. He founded the People's School of Philosophy, lectured on social psychology at the New School for Social Research (1922), and was chairman of the National Board of Review of Motion Pictures. His book, *The Behavior of Crowds* (1920), attracted attention.

MARTIN, GLENN L. (1886-). An American airplane manufacturer, born at Macksburg, Iowa. In 1907 he began to build gliders and in the next year designed and built the pusher type of airplane. In 1909 he established one of the first airplane factories in the United States and built monoplanes, water aircraft, etc. He gave many exhibition flights in Canada and the United States and in 1912 moved his factory to Los Angeles. The War Department ordered his model 77 in 1913, and later the Army adopted it for training purposes. From 1914-16 he built for the government of Holland and produced several new models for the United States Army. In 1917 he organized his own company at Cleveland and began designing and building the Martin

bomber, the first American-designed airplane for Liberty engines.

MARTIN, HELEN REIMENSNYDER (1868-). An American author (see Vol. XV). Her later books include: *Those Fitzenbergers* (1917); *Gertie Swartz: Fanatic or Christian?* (1918); *Maggie of Virginsburg* (1918); *The Schoolmaster of Hessville* (1920); and *The Marriage of Susan* (1921).

MARTINELLI, GIOVANNI (1885-). An Italian operatic tenor, born at Montagnana. He began his musical career as a clarinet player in an Italian regiment and later studied singing with Mandolini. He made his debut in Verdi's *Ernani* in Milan (1910). In 1912 he sang at Covent Garden, and in 1913 he became one of the leading tenors at the Metropolitan Opera House, where, after the death of Caruso, he succeeded to many of the latter's rôles. He was also heard in Rome and Buenos Aires.

MARTINIQUE. An island colony of France, located in the Lesser Antilles in the West Indies. Its area is 385 square miles; population in 1923, 244,439. The chief commercial town was Fort-de-France, with a population of 26,399. The population was almost wholly Creole except for the considerable number of British Indian, Chinese, and African laborers. Sugar, rum, and cocoa remained the chief products. The sugar export, which reached 40,000 tons before the War, dropped to 16,460 tons in 1920. The 1921 figures show an increase to 24,213 tons. Rum exports in 1921 totaled 14,950,800 litres. Exports for 1913, 1920, and 1921 were 28,896,814 francs, 128,953,479, and 89,110,544. Imports for the same years were 22,144,315 francs, 132,186,517, and 84,508,370. France took nine-tenths of the exports and sent one-third of the total imports in 1920. That the increase in the trade was real, in spite of the depression of the franc, may be seen by the fact that the rum exports increased from 18,821,900 litres in 1913 to 33,109,100 litres in 1919, and 22,440,300 litres in 1920. Similarly, in 1911, 88 vessels of 156,000 tons entered Martinique ports, while in 1919, 766 vessels of 341,206 tons entered. The budget of 1924 carried 22,100,000 francs for expenses, and for receipts, 21,400,000. The deficiency was to be covered by an advance of 700,000 francs from the reserve fund.

MARX, WILLIAM (1863-). A German statesman, born in Cologne. He studied law and became well-known as a jurist. He was long active in the Clerical Party and served in the Prussian Diet. He was for 12 years a member of the Reichstag, and on Nov. 2, 1922, was appointed chancellor, succeeding Gustav Stresemann. He carried on the difficult affairs of the government in 1922, 1923, and 1924 and attended several of the most important conferences on reparations and other questions, including the conference on the Dawes Plan in London in August, 1924. Largely through his efforts, an agreement was finally obtained on the Dawes Plan. See GERMANY, *History*.

MARYLAND. Maryland is the forty-first State in size (12,327 square miles), and the twenty-eighth in population; capital, Annapolis. The population increased from 1,295,346 in 1910 to 1,449,661 in 1920, a gain of 11.9 per cent. The white population rose from 1,062,639 to 1,204,737; negro, from 232,250 to 244,479; native white, from 958,465 to 1,102,560. The foreign-born white population fell from 104,174

to 102,177. The urban population was 658,192 in 1910, 869,422 in 1920; while the rural population decreased in the decade from 637,154 to 580,239. The growth of the principal cities was as follows: Baltimore (q.v.), 1910, 558,485; 1920, 733,826; Cumberland, 21,839 to 29,837; Hagerstown, 16,507 to 28,064.

Agriculture. While the population of the State increased 11.9 per cent in the decade 1910-20, there was a decline in rural population from 50 per cent of the total in 1900 to 40 per cent in 1920. The number of farms decreased 2.1 per cent from 48,923 in 1910 to 47,908 in 1920; and the area in farms decreased 5.9 per cent, from 5,057,140 acres to 4,757,999; and the improved land in farms, from 3,354,767 acres to 3,136,728. The total value of farm property showed an apparent increase, from \$286,167,028 in 1910 to \$463,638,120 in 1920; the average value per farm, from \$5849 to \$9678. In interpreting these values, and indeed all comparative values in the decade 1914-24, the inflation of the currency in the latter part of that period is to be taken into consideration; the index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of land used for agricultural purposes decreased from 79.5 per cent in 1910 to 74.8 per cent in 1920. Of the total of 47,908 farms in 1920, 32,805 were operated by their owners, 1262 by managers, and 13,841 by tenants. The comparative figures for 1910 were 33,519, 988, and 14,416. White farmers in 1920 numbered 41,699, compared with 42,551 in 1910; colored, 6209, compared with 6372. The farms free from mortgage in 1920 were 19,292, compared with 21,084 in 1910; those under mortgage numbered 11,339 and 12,127 in those years. The number of dairy cows in 1920 was 188,537, compared with 166,859 in 1910; "beef cows," 13,704, compared with 18,816; mules, 32,621, compared with 22,367; swine, 306,452, compared with 301,583; sheep, 103,027, compared with 126,251. The estimated production of the chief farm crops in 1923 was as follows: corn, 23,580,000 bushels; wheat, 10,426,000; oats, 1,550,000; barley, 121,000; potatoes, 3,897,000; sweet potatoes, 1,056,000; tobacco, 27,489,000 pounds; hay, 362,000 tons; apples, 2,046,000 bushels; peaches, 631,000; and pears, 335,000. Comparative figures for 1913 are: corn, 22,110,000 bushels; wheat, 8,113,000; oats, 1,260,000; barley, 145,000; potatoes, 3,741,000; hay, 491,000 tons; and tobacco, 18,500,000 pounds.

Manufactures. Maryland is an important manufacturing State. There were in the State in 1909 4837 manufacturing establishments; in 1914, 4797; and in 1919, 4937. Persons engaged in manufacture numbered 125,489, 131,391, and 165,875; and capital invested amounted to \$251,226,828, \$293,210,925, and \$619,606,983, in those years. The products in 1909 were valued at \$315,669,150; in 1914, \$377,749,078, and in 1919, \$873,944,774. The large increase in the value of the products between 1914 and 1919 was largely due to the change in industrial conditions brought about by the War and cannot properly be used to measure the growth of production during the census period 1914-19; but the increase in number of establishments and in number of wage earners clearly indicates a decided increase in the value of manufactures. The manufacture of men's clothing ranks first in value of product: in 1909,

\$36,921,000; in 1914, \$39,048,000, and in 1919, \$72,589,000. Shipbuilding ranks second, with \$3,535,000 in 1909; \$4,521,000 in 1914; and \$67,310,000 in 1919; the extraordinary growth in the value of this product is due chiefly to the increase in shipbuilding during the War. Slaughtering and meat packing, in third place, had products valued in 1909 at \$13,683,000; in 1914, \$17,100,000; and in 1919, \$43,228,000. Fertilizers to the value of \$9,673,000 were manufactured in 1909; \$13,987,000 in 1914; and \$37,014,000 in 1919. The chief manufacturing city of the State is Baltimore, having in 1909 2502 manufacturing establishments, with a product valued at \$186,978,000; in 1914, 2502 with \$215,172,000; and in 1919, 2797 with \$677,878,000. In Hagerstown there were 76 establishments, with a product valued at \$3,197,000; in 1914, 113 with \$7,412,000; and in 1919, 122 with \$17,663,000. Other important manufacturing cities are Cumberland and Frederick.

Education. The educational problems of Maryland include a large rural population and a large colored population. Marked improvement was made both in administration and development of the school system during the decade 1914-24. In 1916 the school system was reorganized, and the issuing of teachers' certifications was made a State function. An equalization fund was established enabling every county to pay the State minimum salaries on a reasonable local tax rate for schools but without forbidding the county to pay more than the minimum if it so desires, by levying the tax rate above \$.67. This fund made it possible to secure a total salary increase for well-trained teachers of almost \$500,000, ranging from \$150 to \$700 per teacher. An extensive and intensive school campaign was carried on in 1921-22, as a result of which the people of Maryland became fairly familiar with the needs of the schools and the manner in which these needs might be met. The chief efforts were being directed to the organization, administration, and supervision of schools; to securing larger attendance at the State normal schools; establishing extension courses for teachers during the school year at State expense; promoting attendance at summer schools; and carrying out the provisions of the law passed in 1922 for more efficient supervision of both town and rural schools. Vocational education was carried on after 1917, and in 1921-22, 2240 pupils were enrolled in vocational courses, which was equivalent to one-sixth of the entire enrollment of the State outside of the city of Baltimore. All types of instruction which had developed in the national programme, except industrial rehabilitation, were in operation in Maryland. The total enrollment in the white elementary schools in 1921-22 was 188,296; in the white high schools, 20,127; a total white enrollment of 208,425. In the elementary schools for colored pupils were enrolled 46,573; in the high schools, 1392; a total colored enrollment of 47,965. The total enrollment in all schools, both white and colored, was 256,390, as compared with 237,125 in 1913. The percentage of illiteracy in the State was 8.7 in 1910 and 6.8 in 1920. Among the native white population it decreased from 3.7 to 2.5; among the foreign-born, from 12.3 to 14.3; and among the negro, from 28.6 per cent to 22.2.

Finance. For finance see STATE FINANCES.

Political and Other Events. Maryland is

usually reckoned Democratic, but in the decade 1914-24 there were marked fluctuations of power between Democrats and Republicans. In 1914, John Walter Smith, Democrat, was re-elected to the United States Senate, defeating Edward C. Carrington, Jr., Republican; the Democrats elected five members of the House of Representatives, and the Republicans one. In September of that year, the hundredth anniversary of the defeat of the British at North Point in Baltimore and of Francis Scott Key's writing of "The Star-Spangled Banner" during the British bombardment, was celebrated. In May, 1915, municipal elections in Baltimore, having approximately half the State's population, were won by the Democrats; James H. Preston was re-elected mayor over Charles H. Heintzeman. In November, 1915, Emerson C. Harrington, Democrat, was elected governor over Ovington E. Weller, Republican. The Democrats won control of the Legislature. In the same election, amendments to the State constitution were adopted, permitting increased home rule for Baltimore and the counties, and instituting the referendum except on sumptuary legislation. President Wilson carried the State the next year over Charles E. Hughes, Republican candidate for President. Dr. Joseph I. France, Republican, defeated David J. Lewis, Democrat, for United States Senator; and the seats in the House were divided between four Democrats and two Republicans. An amendment to the State constitution was adopted, effecting a drastic budget system for the State government. Special referendums were held on prohibition in local areas. Baltimore voted heavily against prohibition; most of the smaller areas voting also rejected prohibition. In 1917, the Republicans won the House of Delegates, and the Democrats the State Senate. The Legislature was Republican on joint ballot, for the first time in 20 years. In 1918, the Congressional delegation was divided equally, with three Democrats and three Republicans. A new charter was voted by the people of Baltimore, under the home rule amendment adopted in 1915. In May, 1919, the Republicans won a decided victory in the municipal elections of Baltimore, William F. Broening, Republican, defeating George Weems Williams, Democrat, for Mayor. In the November election, Albert C. Ritchie, Democrat, was elected governor over Harry W. Nice, Republican, by less than 200 plurality. The Legislature was Democratic. In November, 1920, Warren G. Harding, Republican, swept the State for president, against James M. Cox, Democrat; Ovington E. Weller, Republican, defeated John Walter Smith, Democrat, for United States Senator; the Republicans won four members of the House, and the Democrats two. In 1921, the Democrats elected the majority of the Legislature. In 1922, William Cabell Bruce, Democrat, was elected United States Senator over Dr. Joseph I. France, Republican; the six members of the House were divided equally between Democrats and Republicans; and the people adopted constitutional amendments increasing Baltimore's representation in the Legislature and reducing the number of State elections. In May, 1923, Howard W. Jackson, Democrat, was elected mayor of Baltimore over William F. Broening, Republican, and James H. Preston, candidate of the Citizens' party. In November, 1923, Albert C. Ritchie, Democrat, was re-elected governor by a

large majority over Alexander Armstrong, Republican. The Democrats won the Legislature.

Legislation. Maryland's Legislature met in even years until and including the 1924 session. No regular session occurs between 1924 and 1927. Beginning with 1927, sessions are to be held in the odd years. In 1914, the Legislature enacted much legislation demanded by public opinion, including a new tax law, and established a new tax commission; it also passed a law for a survey of the public schools in the counties, a workmen's compensation law, and a new oyster-planting law. It also submitted to the people the home rule and referendum amendments to the constitution. In 1916, the Legislature submitted to the people the budget amendment, providing for a budget to be prepared by the Governor, items in which could be decreased or eliminated by the Legislature, although that body could not increase or insert items. A modern school law was enacted, based on the report of the survey previously provided, and the State departments were partially reorganized. In May and June, 1917, a special war session appropriated an emergency fund, created a State Council of Defense, and passed laws to compel work and for other war purposes. In 1918, the Legislature enacted the annexation law, largely expanding the corporate limits of Baltimore, and ratified the eighteenth amendment to the Federal Constitution. In 1920, the Legislature instituted the merit system in the civil service of the State. In 1922, it enacted a measure reorganizing the State government into departments, and submitted a \$9,000,000 soldiers' bonus to the people; the latter was invalidated by the courts. This session also submitted to the people the constitutional amendment increasing Baltimore's representation in the Legislature and an amendment providing one State election every four years instead of every two. Under the terms of the latter, State elections would be held in every other even year, beginning with 1926, and State officials, including legislators, would be elected for four-year terms. The 1924 session was devoted to routine legislation. In 1920, 1922, and 1924 the Legislature refused to pass bills for State enforcement of the eighteenth amendment.

MARYLAND, UNIVERSITY OF. A State institution at College Park and Baltimore, Md., founded in 1807. The student enrollment increased from 1200 in 1914 to 3735 in 1923, the number of faculty members from 211 to 253, and the library from 25,000 to 34,425 volumes. The annual income increased from \$250,000 in 1914 to \$1,889,760 in 1923. Part of an extensive building programme was completed in 1923. It included a stadium, a gymnasium and armory, and a dairy manufacture laboratory, at a total cost of \$262,800, and a research laboratory for animal pathology at a cost of \$10,000, all at College Park. At Baltimore a new building was purchased and equipped at a cost of \$40,000 for the Schools of Dentistry and Pharmacy; a new X-ray laboratory was equipped in the university hospital at a cost of \$10,000, and a nurses' home was built; and the Baltimore College of Dentistry, the first dental college established in the world, consolidated with the School of Dentistry of the University of Maryland. The extension courses in commerce were reorganized as the College of Commerce and Business Administration. The university changed

from the trimester to the semester system. President, Albert F. Woods, A.M., D.Agr., LL.D.

MASARYK, THOMAS GARRIGUE (1850-). President of Czecho-Slovakia, born in Hodonin, Bavaria. He was educated in the Universities of Vienna and Leipzig. He taught for several years and for a time was professor at the New Bohemian University of Prague. He was head of the Czecho-Slovak realistic movement in philosophy, literature, and politics and founded several reviews. In 1891 he entered Parliament and resigned in 1893. He was elected a deputy in 1907. He resisted strongly the encroachments of Germany on Austria and the aggressive policy of Austria in the Balkans. At the outbreak of the War he retired to Italy and Switzerland. He later became a lecturer in King's College, London. He organized the Czecho-Slovak movement of independence and visited the United States in its behalf. On the establishment of the republic he was elected president and by a provision of the constitution is qualified to hold that office during his entire life. He is the author of several books, including *The Problems of Small Nations in the European Crisis* (1915). See CZECHO-SLOVAKIA.

MASEFIELD, JOHN (1875-). An English poet and dramatist (see Vol. XV). He continued to produce works in both prose and poetry during the decade. His later books include: *The Faithful* (1915); *Gallipoli* (1916); *The Old Front Line* (1918); *Enslaved, and Other Poems* (1919). He participated in the campaign in Gallipoli, and his description of operations there forms one of the most vivid pages in the written history of the War.

MASON, EDITH (1892-). An American dramatic soprano, born at St. Louis, Mo. After studying with several teachers in New York, Boston, Philadelphia, and Paris, she made her debut as Nedda in *Pagliacci* with the Boston Opera Company (Jan. 27, 1912). During the next three years she sang in Nice, Marseilles, and Paris. In 1915-17 she was a member of the Metropolitan Opera Company. Then followed engagements in Havana, Caracas, and Mexico City, until 1919. In 1919-20 she appeared in Monte Carlo and again in Paris, and in 1921 she became one of the leading singers of the Chicago Opera Association. In 1919 she married Giorgio Polacco.

MASON, MAX (1877-). An American mathematician, born at Madison, Wis., and educated at the University of Wisconsin and at Göttingen. In 1903 he became instructor of mathematics at the Massachusetts Institute of Technology and was appointed assistant in that subject at the Sheffield Scientific School of Yale, where he remained until 1908, when he accepted a call to Wisconsin. He became professor of mathematical physics there in 1911. He also lectured on his specialty at Harvard (1911). He made important studies on the calculus of variations, and the electromagnetic theory in pure mathematics. In the applied branches he contributed researches on submarine detection devices and acoustical compensators. During the War he was a member of the research staff at the United States Navy Experiment Station at New London and a member of the division of physical sciences of the National Research Council. He is the author of *The New Haven Mathematical Colloquium* (1910).

MASSACHUSETTS. Massachusetts is the

44th State in size (8266 square miles), and the sixth in population; capital, Boston. The population increased from 3,366,416 in 1910 to 3,852,356 in 1920, a gain of 14.4 per cent. The white population rose from 3,324,926 to 3,803,524; negro, from 38,055 to 45,466; native-born white, from 2,273,876 to 2,725,990; foreign-born white, from 1,051,050 to 1,077,534. The urban population mounted during the decade from 3,125,367 to 3,650,248; the rural population, on the other hand, decreased from 241,049 to 202,108. The growth of the principal cities was as follows: Boston (q.v.), 670,585 in 1910 and 748,060 in 1920; Worcester (q.v.), 145,986 to 179,754; Springfield (q.v.), 88,926 to 129,614; New Bedford (q.v.), 96,652 to 121,217; and Fall River (q.v.), 119,295 to 120,485.

Agriculture. While the population of the State increased 14.4 per cent in the decade, the percentage of the total population in rural territory, already small, decreased from 7.2 in 1910 to 5.2 in 1920. The number of farms decreased 13.3 per cent, from 36,917 to 32,001; the land in farms decreased 13.3 per cent, from 2,875,941 acres to 2,494,477; and the improved land in farms, from 1,164,501 acres to 908,834. The total value of farm property showed an apparent increase from \$226,474,025 in 1910 to \$300,471,743 in 1920; the average value per farm, from \$6135 to \$9389. In interpreting these values, and, indeed, all comparative values in the decade 1914-24, the inflation of the currency in the latter part of the period is to be taken into consideration; the index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The total percentage of land used for agricultural purposes in 1910 was 55.9 per cent, compared with 48.5 per cent in 1920. The percentage of improved land decreased from 40.5 to 36.4. Of the total of 32,001 farms in 1920, 28,087 were operated by owners, 1627 by managers, and 2287 by tenants. The comparative figures for 1910 were 32,075, 1863, and 2979. White farmers in 1920 numbered 32,880, compared with 36,793 in 1910. In 1920, 22,950 of these were natives, as compared with 28,431 in 1910. Foreign-born farmers, for the most part from Canada, numbered 8930 in 1920 and 8362 in 1910. Negro farmers numbered 103, both in 1910 and in 1920. There were, in 1920, 18 Indian farmers, compared with 21 in 1910. Farms free from mortgage in 1920 numbered 14,055, compared with 18,768 in 1910; those under mortgage, 12,632 compared with 13,014. The number of dairy cows in 1920 was 173,844, compared with 171,936 in 1910; "beef cows," 5850, compared with 20,100; sheep, 18,880, compared with 22,699. The development in agriculture was in the direction of market gardening and special crops such as tobacco and onions. The area in tobacco increased 65 per cent in the decade. The estimated production of the chief farm crops in 1923 was as follows: corn, 2,778,000 bushels; oats, 340,000; potatoes, 3,122,000; hay, 559,000 tons; and tobacco, 13,700,000 pounds. Comparative figures for 1913 are: corn, 1,944,000 bushels; oats, 315,000; potatoes, 2,235,000; hay, 575,000 tons; and tobacco, 9,455,000 pounds.

Manufactures. Massachusetts is one of the most important of the industrial States. There were, in 1920, 66 cities having more than 10,000 inhabitants, whose combined population in that year formed 81.6 per cent of the total for

the State and in 1919 reported 86.3 per cent of the value of the State's manufactured products. There were in the State, in 1909, 11,684 manufacturing establishments; in 1914, 12,013; and in 1919, 11,906. Persons engaged in manufacture numbered 644,399, 676,642, and 812,521; and capital invested amounted to \$1,279,686,558, \$1,548,960,733, and \$2,947,108,527, in those years. The value of the products in 1909 was \$1,490,529,386; in 1914, \$1,641,373,047; and in 1919, \$4,011,181,532. The increase in value of the products between 1914 and 1919 was in great measure due to changes in industrial conditions brought about by the War. The increase in number of persons engaged in manufacture, on the other hand, clearly indicates a considerable growth in the manufactures of the State. The most important industry in point of value of products is the manufacture of cotton goods, valued in 1909 at \$186,462,000; in 1914, \$197,322,000; and in 1919, \$604,938,000. The manufacture of boots and shoes ranks second, with \$236,343,000 in 1909; \$255,188,000 in 1914; and \$573,037,000 in 1919. Woolen, worsteds, and felt goods, in third place, were valued at \$141,967,000 in 1909; \$130,349,000 in 1914; and \$352,913,000 in 1919. The manufacture of leather ranked fourth, amounting in value, in 1909, to \$40,002,000; in 1914, \$45,265,000; and in 1919, \$129,595,000. The most important manufacturing cities, in point of value of products, are Boston, Worcester, Fall River, Lawrence, and New Bedford. There were in Boston, in 1909, 3195 establishments, with a product valued at \$244,793,000; in 1914, 3138 with \$284,802,000; in 1919, 3077 with \$618,922,000. In Worcester, in 1909, there were 580 with \$77,148,000; in 1914, 606 with \$82,829,000; and in 1919, 618 with \$208,706,000. Fall River had 288 manufacturing establishments, with a product valued at \$64,146,000 in 1909; in 1914, 315 with \$64,663,000; in 1919, 293 with \$163,246,000. Similar figures for New Bedford were: in 1909, 207 with \$53,238,000; in 1914, 233 with \$65,575,000; and in 1919, 267 with \$210,773,000. Other important manufacturing cities are Lowell, Lynn, Somerville, Brockton, Springfield, Cambridge, and Haverhill.

Education. Massachusetts, from its earliest history, has devoted its utmost efforts to improvement of the educational facilities and conditions of its inhabitants. Progress continued in the State in the decade 1914-24. The Legislature during that time passed many important measures affecting education; among the most notable was an act, in 1919, establishing and maintaining continuation schools and courses of instruction for employed minors. Another act of 1919 raised the minimum educational requirements for leaving school to seek employment from the completion of the fourth to the completion of the sixth grade; a third established special classes for mentally retarded children. In 1921 the provisions of Congress for promotion of vocational rehabilitation were accepted by the State; a measure was passed providing for physical education for pupils in the elementary and secondary schools; a minimum salary of \$750 was established for all full-time teachers in the public day schools; and three measures to promote civic education in the public schools were enacted, requiring courses in duties of citizenship, United States history and civics, and the Constitution of the

United States. The growth of the school system is indicated by the fact that in 1914 the total school enrollment was 576,510; in 1923, 685,645. The percentage of illiteracy in the State decreased from 6.2 in 1910 to 5.9 in 1920: among the native white, from 0.4 to 0.3; among the negro, from 9.7 to 8.2. Among the foreign-born white population illiteracy increased from 13.1 to 13.5.

Finance. For finance, see STATE FINANCES. Also see MUNICIPAL GOVERNMENT.

Political and Other Events. There was much of importance in the political history of Massachusetts in 1914-24. In the latter part of that period, the State was honored by the accession of its former governor, Calvin Coolidge, to the presidency. Elections for State officers are held annually. In 1914 Governor Walsh, Democratic candidate, was elected, while the Republicans were successful in winning the minor State offices. The Cape Cod Canal was formally opened on July 29, 1914. On June 25 of this year a fire destroyed a large part of the city of Salem, causing a loss of about \$12,000,000. In 1915 Samuel W. McCall, Republican, was elected governor, defeating Governor Walsh, and Calvin Coolidge was elected lieutenant-governor. A woman suffrage amendment submitted to the people was defeated by a large majority. In 1916 Governor McCall and Senator Henry Cabot Lodge were reelected. In the presidential voting, Charles E. Hughes won 278,765 votes, compared with 247,845 votes for President Wilson. Governor McCall was elected for a third term in 1917. In 1918, however, the Democrats developed sufficient strength to elect former Governor Walsh to the United States Senate, defeating Senator Weeks, Republican, who was a candidate for reelection. Calvin Coolidge was elected governor, defeating Richard H. Long, Democrat. Governor Coolidge was reelected in 1919 and again in 1920. A strike of the Boston police, in September, 1919, drew nation-wide attention. A movement had been carried on for some time for the unionization of the police force. This was opposed by Commissioner of Police Edwin U. Curtis, who denied the right of the police to join a labor union. He was strongly upheld in this stand by Governor Coolidge. The police abandoned their posts and a night of rioting ensued. The militia was called out pending the recruiting of a new force. No striking officer was reinstated. Major Henry L. Higginson, founder and sustainer of the Boston Symphony Orchestra for 37 years, died on Nov. 14, 1919. He provided for the continuance of the orchestra under a board of trustees. In the presidential election of 1920, Warren G. Harding received 681,153 votes and James M. Cox 276,691, and Governor Coolidge became vice president. The Republicans in 1921 elected Channing H. Cox governor. Henry Cabot Lodge was reelected to the Senate, but by a greatly reduced majority. Two women, elected to the State Legislature, were the first so honored. During the summer of 1921 a pageant celebration was held at Plymouth commemorating the Pilgrim Tercentenary. On Apr. 13, 1922, the Supreme Court held that women were eligible for any State office. This year saw a cleansing of questionable legal practices. Two district attorneys were ousted and later disbarred, along with several other practicing attorneys. Governor Cox was reelected in 1923. The historic Washington elm,

in Cambridge, was cut down on Oct. 27, 1923. It had been dying for many years.

Legislation. The Legislature in Massachusetts meets annually. The most important acts in the decade 1914-24 are noted below. In 1914 the Legislature submitted a constitutional amendment giving the suffrage to women. It was necessary to pass this also in the Legislature of 1915. The amendment, as noted above, was defeated by a large majority. In 1916 the Legislature amended the laws relating to judicial procedure and also passed a defense act and amended the workmen's compensation law. The Federal prohibition amendment was adopted by the Legislature of 1918. In 1919 the Legislature ratified the woman suffrage amendment, passed measures providing for absentee voting, passed a so-called red flag law, enacted a measure regulating the use of aircraft, and reorganized the executive and administrative functions of the State. In 1921 a daylight-saving law was passed, a State boxing commission was created, the appointment of policewomen in Boston was authorized, and the workmen's compensation law was amended. In 1921 the Legislature amended the laws relating to the employment of minors and to automobiles. It also amended the game laws and provided for systems of relief for neglected, dangerous, or uncontrollable feeble-minded persons. In 1922 the Legislature created a new State commission of administration and finance. It also revised the State banking laws and amended the election laws. A measure providing for more stringent enforcement of prohibition was defeated. In 1923 a measure was passed centralizing the personnel and financial side of the government under a commission of four, in which is a comptroller's bureau, a budget bureau, a purchasing bureau, and a bureau of personnel. A measure was also passed regulating the sale of coal and one to facilitate coöperative marketing of agricultural produce.

MASSACHUSETTS AGRICULTURAL COLLEGE. A State institution for agricultural training founded at Amherst, Mass., in 1867. The number of four-year students fell from 526 in 1914 to 431 in 1923-24, but the total enrollment, including those taking the short courses, rose from 936 to 950. The number of faculty members increased from 56 to 92, volumes in the library from 45,000 to 70,000, and the annual State appropriation from \$317,746 to \$876,950. Six new buildings were added. President, K. L. Butterfield (resigned in 1924).

MASSACHUSETTS INSTITUTE OF TECHNOLOGY. A nonsectarian institution for technical education at Cambridge, Mass., founded in 1861. In 1916 it was moved from its old quarters in Boston to a group of new buildings in Cambridge, facing the Charles River and having 800 rooms. The enrollment of students increased rapidly, with the exception of the war years, to approximately 3500 in each of the two years 1920-21 and 1921-22, and dropped again to 2950 in 1923-24. The faculty was increased during the same period from 268 to 375 and the library from 120,000 to 155,609 volumes. More than \$14,000,000 was added to the endowment, which was \$3,049,975 in 1914 and \$17,278,000 in 1923-24: of this, \$6,500,000 was given by George Eastman. The School of Naval Architecture was built from funds bequeathed to the Institute by C. H. Platt prior to the War. In 1917-18 army and

navy schools of aeronautics and a school for aeronautical engineers were maintained for the Federal government, and a school for deck officers was opened by the United States Shipping Board. Richard Cockburn MacLaurin, LL.D., was president until his death in 1920. He was succeeded by Ernest Fox Nichols, LL.D., who resigned in the following year because of ill health. President, Samuel Wesley Stratton, D.Eng., Sc.D., LL.D.

MASSEY, WILLIAM FERGUSON (1856-). A New Zealand statesman, born in Limavady, County Derry, Ireland. In 1870 he removed to New Zealand and was for several years engaged in farming. He was early identified with the political life of the country and held many important positions. From 1894 he was a member of Parliament. He was Prime Minister in 1912 and was later Minister of Finance, Railways, Land, Labor, Agriculture, Industries, and Commerce. In 1917-18 he represented New Zealand in the Imperial War Cabinet and in 1919 was a delegate to the peace conference in Paris. He was also a delegate to the Imperial conference in London in 1921. He wrote various pamphlets on miscellaneous subjects.

MAST, SAMUEL OTTMAR (1871-). An American zoologist born in Washteno County, Mich., and educated at Michigan and Harvard Universities. He was professor at Hope College (1899-1908); associate professor and professor at Goucher College (1908-11); and associate professor and professor at Johns Hopkins University (1911-). Professor Mast published numerous articles in journals, mainly on animal reactions, as well as *Structure and Physiology of the Flowering Plants* (1907) and *Light and the Behavior of Organisms* (1911).

MASTERS, EDGAR LEE (1869-). An American writer, born in Garnett, Kan. He was educated at Knox College in Illinois and for a time studied law. His first book of poems was published in 1898 and was followed by several others. He attracted wide attention only after the publication of *Spoon River Anthology* in 1915. This was one of the most sensational books of verse published in many years. He wrote *Songs and Satires* (1916); *The Great Valley* (1916); *Toward the Gulf* (1918); *Sturged Rock* (1919); *Mitch Miller*, a novel (1920); *Open Sea* (1921); *The Nuptial Flight* (1923), and *New Spoon River Anthology* (1924). He was a member of the National Institute of Arts and Letters.

MASURIAN LAKES. See **WAR IN EUROPE, Eastern Front.**

MATERNITY PROTECTION. Statistics in 1924 showed that the death rate among mothers, in the United States birth registration area, from causes connected with maternity, was not only greater than in 1915 but was higher than in all but one foreign country for which figures were available; and infant mortality, although it had decreased, was still higher than that of six other countries. Investigations over a number of years having revealed that employment of the mother during pregnancy was associated with a markedly high stillbirth rate, a high rate of premature births, and a high mortality in early infancy from causes directly related to the health of the mother before birth, legislative safeguards for maternity among working women began to be adopted in 1911 when Massachusetts enacted a law prohibiting the employment of women within a period of two

weeks before or two weeks after childbirth. Connecticut, Delaware, Missouri, and Vermont afterward made similar provisions. (See **WOMEN IN INDUSTRY.**) In 1921, after three years of effort, the Sheppard-Towner Act for the promotion of the welfare and hygiene of maternity and infancy was enacted. This act appropriates annually to each State accepting the provisions of the act the sum of \$5000 outright, with an additional \$5000 if matched from the State's own funds; while a still further sum is apportioned on the basis of population, when matched by State appropriations. Before the end of 1921 Delaware, Minnesota, New Hampshire, New Mexico, and Oregon had passed legislative acceptances of the act and had made administrative provisions. At the end of 1922, 42 States had accepted, 11 by legislative action, 31 through their governors pending the next session of their legislatures. The system was in operation in the fiscal year 1924 in 40 States; i.e. all but Connecticut, Illinois, Kansas, Louisiana, Massachusetts, Maine, Rhode Island, and Vermont; and for Hawaii an appropriation had been authorized for the fiscal year ending June 30, 1925. Porto Rico and Alaska had requested that the benefit be extended to them. The constitutionality of the Sheppard-Towner Act was challenged in 1923 but the constitutionality of the act was upheld by the Supreme Court of the United States as being an optional measure which imposed no obligation. Great Britain adopted a maternity and child welfare act in 1918. In 1923 the ministry of health reported 1950 maternity and infant welfare centres and 128 maternity homes in England and 222 maternity and child welfare centres in Wales.

MATHEMATICAL PHILOSOPHY. See **PHILOSOPHY.**

MATHER, FRANK JEWETT, JR. (1868-). An American art critic and professor (see **VOL. XV**). His more recent writings include: *Estimates in Art* (1916); *The Portraits of Dante* (1921); and *A History of Italian Painting* (1923). He became editor of *Art Studies* in 1923.

MATHEWS, ARTHUR FRANK (1860-). An American painter and teacher, born in Wisconsin, and educated at the schools of San Francisco and Oakland, Cal. In Paris he was the pupil of Gustave Boulanger and studied art in Europe for five years. He also made a study of architecture. His work included the reorganization of the California School of Design, where he was art director from 1890 to 1906. He has exhibited in the leading art centres of Europe, including the Paris Exhibition and the Salon, and at leading galleries in the United States; his work appears in permanent collections at the Metropolitan Museum, where he has a "California Landscape," at the State Capitol at Sacramento, Cal., the Oakland Library at Oakland, Cal., and the Masonic Temple in San Francisco. He also executed four triptychs for the University of California Library. He is a contributor of articles on art to reviews and is managing editor of the *Philopolis Magazine*.

MATHEWS, JOHN ALEXANDER (1872-). An American metallurgist, born at Washington, Pa., and educated at Washington and Jefferson College, Columbia University, and in London at the Royal School of Mines and as a Carnegie Research Scholar at the British Steel and Iron Institute. He was metallurgist with the Sanderson Brothers Steel Company (1902-08) and

thereafter was general manager and president of the Halcob Steel Company until 1920, when he became president of the Crucible Steel Company of America. He is an accepted authority on the metallurgy of iron. He directed his attention to alloy steels, especially electric furnace steel processes. Dr. Mathews received the first award of the Andrew Carnegie Gold Medal for Research in 1902 and was a member of the United States Assay Commission in 1900, 1905, and 1911.

MATTER, THEORIES OF. See CHEMISTRY.

MAUGHAN, RUSSELL L. (?-). An American airman who wrote a new page in the annals of aviation on June 23, 1924, when in a Curtiss pursuit plane he successfully made a dawn-to-dusk flight from New York to San Francisco in 21 hours and 48 minutes. This flight was undertaken by the Air Service to show the public the speed at which pursuit squadrons could be rushed from coast to coast in a war emergency.

MAURITIUS. An island British crown colony situated in the Indian Ocean 500 miles east of Madagascar. The area of the whole colony, which includes several small islands, is 720 square miles; the population in 1921 was 385,074, of which Indians and Indo-Mauritians numbered 265,884 and Chinese 6820. The capital and chief port, Port Louis, had 50,308 inhabitants in 1921. Sugar raising continued to engage almost the whole population. The sugar export in 1912 amounted to 206,677 metric tons; in 1919, it reached 302,826 tons; in 1921-22 it was 182,234 tons; in 1922, 292,744 tons. Aloe fibre and copra were the other exports. Total exports for 1913 and 1922 were £2,241,084 and £6,825,658. Total imports for 1913 and 1922 were £2,466,800 and £5,158,658. Imports included, in order of their value for 1921, machinery, cotton goods, iron and steel manufactures, ammonium sulphate, etc. In 1922, 451 vessels of 908,997 tons entered and cleared. In 1910, the tonnage had been 986,000. During the War the entire sugar crop was purchased by the British government at the prevailing high prices with the result that prosperity in the island was unexampled. This continued after the War and through the world-wide depression of 1920-21. Revenues for 1913-14 and 1920-21 were £742,846 and £2,678,000; expenditures, £681,098 and £1,649,000. On June 30, 1921, the colonial debt was £1,273,000. The municipal debt of Port Louis, contracted for harbor improvements in 1920, was £103,000. Accounts are kept in rupees, and conversions have been made at the nominal exchange rate of Rs.15=£1. The colony continued peaceful under British rule. The agitation of the Creoles for the return of the island to France in 1919 was short-lived, the continued prosperity stilling all dissent.

MAX, PRINCE OF BADEN (1867-). A German statesman, born in Baden Baden. After studying law, he entered the army but retired without having seen active service. He was president of the First Chamber of the Baden Diet from 1907 to 1918. On account of the fact that he was not identified particularly with any prominent party, he was chosen chancellor on Oct. 3, 1918. During the consideration of the armistice proposals made by the Allies on November 9, he issued a formal declaration of the abdication of the Kaiser, and on the following day resigned from office. See BADEN; GERMANY.

MAXIM, HUDSON (1853-). An American mechanical engineer (see VOL. XV). In 1915 and during the War he was a member of the United States Navy Consulting Board. He published *Defenseless America* (1915) and *Dynamite Stories* (1916).

MAYBECK, BERNARD RALPH (1862-). An American architect, born in New York City. He studied architecture in Paris and at the University of California. From 1892 to 1900 he was instructor in drawing, descriptive geometry, and architecture at the University of California. He was the originator and manager of the Phoebe A. Hearst competition for the architectural design for the University of California and from 1902 was dean of the Department of Architecture of that University. He designed buildings for the Panama-Pacific Exposition and other important buildings for several towns and cities. He was associated with the United States Shipping Board during the War and was a founder of the Council of Allied Arts.

MAYNARD, THEODORE (1890-). An American lecturer and author, born at Madras, India, and educated in India, in England, and at the Mt. Hermon School in Massachusetts. From 1909 to 1911 he resided in the United States and studied for the Congregational ministry. In 1911 he removed to England and in 1913 was received into the Roman Catholic Church. From 1921 he was professor of English literature in the Dominican College at San Rafael, Cal. He wrote *Drums of Defeat* (1916); *Folly and Other Poems* (1918); *The Last Knight* (1921); and *The Divine Adventure* (1921). In 1916 he was the winner of the Malory prize offered in London for the best volume of poetry.

MAYNC, HARRY (1874-). A German writer, born in Berlin, who studied at the universities of Berlin and Leipzig. He was made editor of the German classics published by the Bibliographisches Institut of Leipzig and lectured at the University of Marburg. He later became director of the Seminary of the University of Berne. He is the author of *Uhlands Jugendgedichte* (1899); *Eduard Möricke: Sein Leben und Dichten* (1901); *Die Altheutschen Fragmente von König Tirol und Fridebrand* (1910); *Wilhelm Meisters Theatralische Sendung* (1910); *Dichtung und Kritik: eine Rechtfertigung der Literaturwissenschaft* (1912); *Liencron* (1919); *Fontane* (1920); and *Immermann: Leben und Werke* (1921). He also edited the works of Uhland, Möricke, Goethe, Immermann, Gottfried Keller, and Fontane.

MAYO, CHARLES HORACE (1865-). See MAYO, WILLIAM JAMES.

MAYO, WILLIAM JAMES (1861-). (See VOL. XV.) The most momentous event in the history of the Mayo Clinic at Rochester, Minn., occurred in 1915, when W. J. and C. H. Mayo donated \$2,000,000 to establish the Mayo Foundation for Medical Education and Research in affiliation with the University of Minnesota. During the War in Europe W. J. Mayo was made chief surgical consultant to the Medical Corps, United States Army, with the rank of colonel. C. H. Mayo was made associate consultant in surgery at the same time.

MAYRHOFER, JOHANNES (1877-). A German writer, born at Hamburg, and educated in philosophy and aesthetics at the universities of Berlin and Münster. He was for four years private tutor in Copenhagen and later traveled

extensively in Europe. As a literary free lance in Hamburg, Berlin, and Regensburg, he began to write works of fiction and travel. He is the author of *Der Mutter Vermächtniss* (1903); *Gebrüder Plaschich* (1908); *In der Jasminlaube* (1909); *Der Kleine Abenteurer* (1911); *Jesuiten* (1916); *Der Kaiser des Sonnengottes* (1917); *Dilettanten der Liebe* (1919); *Was die Alster Rauscht* (1910); *Nordische Wunderfahrt* (1913); *Der Zauber des Südens* (1913); *Durch Länder und Meere* (1915); *Spanien* (1915); and *Türkische Lenzestage* (1917). He also wrote essays which include *Das Ideal des Schulmeisters* and *Ibsen*.

MEAD, ALBERT DAVIS (1869-). An American zoölogist, born at Swanton, Vt., and educated at Middlebury College and Brown, Clark, and Chicago Universities. He was instructor in comparative anatomy (1895-96), associate professor (1896-1900), and professor of comparative anatomy (1900-) at Brown University. Professor Mead published articles on the natural history of marine invertebrates and on the artificial culture of marine food animals.

MEAD, CHARLES LAREW (1868-). An American bishop, born at Vienna, N. J., and educated at New York University. In 1895 he was ordained to the Methodist Episcopal Ministry and from 1895 to 1920 served as pastor in churches in New Jersey, Maryland, New York, and Colorado. He was ordained bishop of the Methodist Episcopal Church in 1920. During the War he served with the Y. M. C. A. in France.

MEASLES. Beginning with 1916 studies were prosecuted in several countries which resulted in the possibility of immunizing children against measles. Natural insusceptibility to this disease is as good as nonexistent; and as it destroys 10,000 lives annually in the United States, much salvage of life may result from wholesale immunization. On account of the long incubation period it is possible to prevent the disease after the child has been exposed, and immunization should of course be practiced as soon after exposure as possible. The immunizing substance is ideally the whole blood or plasma of a person who has recently recovered from measles, but it has been learned that the blood of practically all adults still contains the original immunizing substance which prevents contracting the disease a second time. Hence, in an emergency any adult may furnish immunizing blood; usually the parents of the child are called on. About a pint of blood may be taken at a time, as it is possible to preserve it for six months, and in case of epidemics sufficient blood may be difficult to obtain. It is necessary, as in blood transfusion, to be sure that the blood donor is healthy. The individual immunizing injection is small in amount, about 2.5 cubic centimeters. This is called the immunizing unit. If great haste is expedient and no blood is available, it may be taken from a parent and injected directly into the muscles. Immunization will have three consequences. In a few cases it will fail, and the patient will have typical measles. In other cases the child will develop modified measles, a very mild form. Finally, and in the majority of cases, it will escape the disease altogether. To show what may be done under favorable circumstances, Zingher of the New York City Health Department secured 90 per cent complete immunity in

one large series of cases treated in this way.

MEASUREMENTS, PRECISION. See PHYSICS.

MEAT PRODUCTION. See LIVE STOCK.

MECCA. See ARABIA.

MECHANICAL. MUSICAL INSTRUMENTS. See MUSIC, *Mechanical Reproduction*.

MECHANICS, CELESTIAL. See ASTRONOMY.

MEDICAL PROGRESS. The theory and practice of medicine and surgery made great advances during the period 1914-24. The War afforded the widest opportunity for the practice of military surgery and for the prosecution of hygienic and sanitary measures under military conditions. In certain cases enforced sanitation was practiced among the civil population which came under military authority or where the people generally were governed more directly than usual in the stress of War circumstances. Naturally there was some relaxation of the efforts of research hospitals and the devotees of experimental medicine in their laboratories, but after the termination of hostilities these and other agencies attacked their various problems with redoubled vigor, besides investigating questions raised by the War itself. At no time in the history of the world was medical research better organized, with more coöperation among the institutions concerned, or with more good will of the general public. For discussions of the fields in which progress has been most notable and results most interesting, see ABORTION; ADRENALIN; ANÆMIA; ANGINA PECTORIS; ANTHRAX; BIOCHEMISTRY; BLOOD PRESSURE; BOTULISM; BUBONIC PLAGUE; CANCER; CHIROPRACTIC; DIABETES; DIET; DIPHTHERIA; EPILEPSY; GALL STONE DISEASE; GOITRE; HAY FEVER; HEART DISEASE; INFANTILE PARALYSIS; INFLUENZA; INSANITY; LEPROSY; MALARIA; MEASLES; NEPHRITIS; PELLAGRA; PNEUMONIA; RHEUMATISM; RICKETS; SCARLET FEVER; SCURVY; SECRETIONS, INTERNAL; SLEEPING SICKNESS; SMALLPOX; SURGERY, RECONSTRUCTIVE; SYPHILIS; TUBERCULOSIS; TYPHOID FEVER; TYPHUS FEVER; VITAMINE; WOUNDS; YELLOW FEVER.

MEDICAL SEPSIS. See RHEUMATISM, CHRONIC.

MEDINA. See ARABIA.

MEDITERRANEAN FRUIT FLY. See ENTOMOLOGY, ECONOMIC.

MEEKS, EVERETT VICTOR (1879-). An American architect and educator, born in Mt. Vernon, N. Y., and educated at Yale, at the School of Architecture of Columbia, and in Paris. For several years he was associated with Carrère and Hastings but after 1914 practiced alone. He was acting professor of architecture at Cornell from 1914 to 1916, and from 1916 he was on the faculty of the School of Fine Arts at Yale as head of the department of architecture. During the War he was assistant director of fine arts of the Army Overseas Educational Commission. He became a member of the Society of Beaux-Arts Architects, the Société des Architectes Diplômés par le Gouvernement Français, etc.

MEGGERS, WILLIAM FREDERICK (1888-). An American physicist, born at Clintonville, Wis. He studied at Ripon College and at Wisconsin and Johns Hopkins Universities. He was instructor in physics at Ripon and at Wisconsin, after which he was connected with the Carnegie Institute of Technology (1912-14). In

1914 he was called to the Bureau of Standards, where he filled the place of physicist. Dr. Meggers made special researches on topics connected with spectroscopy, astrophysics, photography, and measurements of standard wave lengths. On all these subjects he has published articles in technical journals and in the publications of the Bureau.

MEGRUE, ROY COOPER (1883-). An American playwright, born in New York City, and educated at Columbia University. He wrote a great many successful plays, including *Under Cover*, with W. Hackett (1913); *It Pays to Advertise* (1914); *Under Fire* (1915); *Potash and Perlmutter in Society*, with Montague Glass (1915); *Seven Chances* (1916); *Under Sentence*, with Irvin S. Cobb (1916); *Where Poppies Bloom* (1918); *Tea for Three* (1918); and *Honors are Even* (1920).

MEIGHEN, ARTHUR (1874-). A Canadian public official, born at St. Mary's in western Ontario, and educated at Toronto University. For a short time he taught school. He then moved to Winnipeg, where in 1903, after studying law, he was admitted to the bar. In 1908 he was elected as a Conservative to the Dominion Parliament and soon gained a reputation as a debater. He was reelected in 1911 and two years later was appointed Solicitor General. In 1915 he became a member of the Privy Council, and on the reorganization of the Cabinet in 1917, with a coalition membership, he was made Minister of the Interior; this post he retained until his appointment as Premier, in 1920, succeeding Sir Robert Borden. He also held the office of Secretary for External Affairs. He remained in office until the defeat of his government in 1922. In 1918 he was a member of the Imperial War Cabinet.

MEIKLEJOHN, ALEXANDER. See UNIVERSITIES AND COLLEGES.

MEILLET, ANTOINE (1866-). A French Orientalist (see VOL XV). He is the author of many valuable works, among the most recent of which are *Grammaire du Vieux Perse* (1915); *Caractères Généraux des Langues Germaniques* (1917); *Les Langues de l'Europe Nouvelle* (1918); *Aperçu de l'Histoire de la Langue Grecque* (1913-21); *Linguistique Historique et Linguistique Générale* (1921); *Grammaire de la Langue Polonaise*, with Mme. de Wilmann-Grabowska (1921), and *Introduction à l'Etude Comparative des Langues Indo-Européennes* (1922). See PHILOLOGY, MODERN.

MEINECKE, FRIEDRICH (1861-). A German historian. He was born at Salzwedel, studied at the Universities of Berlin and Bonn, and worked on the Prussian archives (1887-91). He was lecturer at the University of Strassburg (1896-1901), then at Freiburg, and in 1914 at Berlin again. He is the author of *Von Stein zu Bismarck* (1908); *Das Zeitalter der Deutschen Erhebung, 1795-1815* (1913); *Redwitz und die Deutsche Revolution* (1913); *Die Deutsche Erhebung von 1914: Probleme des Weltkriegs* (1917); *Preussen und die Deutschen im Neunzehnten und Zwanzigsten Jahrhundert* (1918); *Weltbürgertum und Nationalstaat* (1919); and *Nach der Revolution* (1919).

MEINHARDT, RODERICH (1882-). An Austrian writer. The son of Adam Müller-Guttenbrunn, the novelist, he was born at Vienna. He studied history and art at the university there and became literary adviser to several publishing houses. He is the author of *Nach der*

Heimat Möcht' Ich wieder (1920); *Die am Wege Blieben* (1920); *Untergang*, a play (1920); and *Wiener Totentanz* (1921).

MEISTER, ALOYSIUS (1866-). A German historian, born at Frankfort, and educated at the University of Strassburg and in Rome. He was appointed lecturer at the University of Bonn and in 1911 became professor at the University of Münster. He is the author of *Die Anfänge der Diplomatischen Geheimschrift* (1903); *Grundzüge der Historischen Methode* (1906); *Deutsche Verfassungsgeschichte des Mittelalters* (1907); *Friedrich der Grosse und das Preussische Westfalen* (1912); *Geschichte, Wissenschaft, und Unterricht* (1913); *Kabelkrieg* (1914); *Bismarcks Auswärtige Politik in 1871* (1915); *Die Deutsche Presse im Krieg und Später* (1916); *Richtlinien für das Studium der Geschichte* (1916); and *Der Neue Geschichtsunterricht* (1920).

MELANESIA. See ETHNOGRAPHY.

MELARTIN, ERKKI GUSTAF (1875-). A Finnish composer, born at Kexholm. He studied with Wegelius at the Helsingfors Conservatory and later under R. Fuchs in Vienna. For some years he taught theory and composition at the Helsingfors Conservatory. From 1908 to 1911 he was conductor of the symphony orchestra in Viborg and then returned to Helsingfors as director of the Conservatory. He is one of the most important of Finnish composers. His principal works are an opera, *Aino* (Helsingfors, 1907); four symphonies; two symphonic poems, *Siikajoki* and *Traumgesicht*; a violin concerto; incidental music to *Prinsessan Törnrosa*; four string quartets; and choruses, piano numbers, and songs.

MELDRUM, ANDREW MACKENZIE (1876-). An American educator, born at Kilwinning in Ayreshire, Scotland. He removed to the United States in 1894 and studied at the College of the Bible in Lexington, Ky. He also studied at Melbourne University. After being ordained as minister in the Church of Christ in 1902, he held pastorates in Oregon. From 1914 to 1916 he was field secretary and special lecturer of Spokane University, of which he became president in 1916. For many years he toured the world as an evangelist.

MELLON, ANDREW WILLIAM (1855-). An American Secretary of the Treasury, born in Pittsburgh, Pa., and graduated at the University of Pittsburgh in 1873. He at once entered the banking firm of Thomas Mellon and Sons of Pittsburgh, in which he was soon a partner. Later this firm developed into the Mellon National Bank, of which he became president in 1902, and the Union Trust Company and the Union Savings Bank, of both of which he was made vice president. He was long associated with H. C. Frick in the development of the coal, coke, and iron industries of western Pennsylvania and was an officer or director of many financial and industrial corporations. Mr. Mellon founded the town of Donora, Pa., established a large steel plant there, and built the first independent oil pipe line through Pennsylvania. His philanthropies were numerous, and he had much to do with the founding of Mellon Institute in Pittsburgh. In 1921 he was appointed Secretary of the Treasury by President Harding. He won an unusually high reputation as an authority on finance. In connection with his office he held the chairmanships of the Federal Reserve Board, the Farm Loan

Board, the War Finance Corporation, and the World War Foreign Debt Commission.

MELSTED, HENNING FINNE VON (1875-). A Swedish author (see Vol. XV). Among his works are *Osamja* (1915); *Folket i Fangenskap*, on Belgium in German captivity (1916); *Sveriges Fara* (1916); *Ensam*, a play (1917); *Gerda*, a novel (1918); *Mordbrännerskan*, a novel; and *Salomos Dom*, a play (1919).

MELTZER, SAMUEL JAMES (1851-1920). (See Vol. XV.) During the War in Europe, Dr. Meltzer was a major in the Medical Reserve Corps, and when the American Association for Thoracic Surgery was organized in 1918 he was elected president. Nearly up to the time of his death he was engaged in research along widely differing lines, notably in resuscitation by pharyngeal insufflation, injections of magnesium sulphate for anæsthesia, experimental pneumonia, etc., and published numerous reports, alone and with collaborators.

MEMEL. This little town, with a population of 41,500 in 1910, at the mouth of the Niemen River in the southeast corner of the Baltic, became, during 1919-24, an important bone of international contention. As a harbor, before the War, it was comparatively insignificant; most of the trade of the region went by way of either Danzig and Königsberg, or Riga and Libau. Lumber was floated down the river to be shipped to England and the Rhenish cities, as well as some flax, seed, cereals, and cattle, while British coal and Norwegian chemical fertilizers were imported. Port facilities were antiquated and terminal conveniences inadequate, for no railway connected Memel with its hinterland. It was only during the War that Germany built a line north to Polanga, to connect at Prekult with the Libau-Mitau railway. By Article 99 of the Treaty of Versailles, the city and a narrow strip of territory to the southwest, containing an area of 945 square miles and a population of 150,000, were cut off from Germany and taken under the control of the Supreme Council. To German protests the Allies replied that while the city was German, the surrounding territory was undoubtedly Lithuanian, and that possession of the port was necessary to assure Lithuanian economic independence. In view of the unsettled state of Lithuanian affairs, it was deemed advisable to send a French force to take possession of the city early in 1920 and to hold it in trust for Lithuania. Friction at once manifested itself. The French were accused of listening too readily to the pro-German officials, of suppressing the local Lithuanian press, of entertaining Polish sympathies, and then of continuing their stay unnecessarily after Lithuania had received *de jure* recognition (Dec. 20, 1922). The local Germans sought the creation of a Memel Free State, while the Poles were frankly obstructionist. The tardiness of the Allies in settling the problem goaded the Lithuanians, chafing already as a result of the loss of Vilna, to take matters into their own hands. On June 10, 1923, therefore, the so-called Committee for the Welfare of the Territory of Memel seized the city, interned the French soldiers, and after a local diet had confirmed the step, had the satisfaction of announcing that Memel had become a part of Lithuania and that the customs lines were abolished. Allied protests were unavailing; the Kovno (Lithuanian) government disclaimed all complicity or even knowledge of the affair. Allied

warships came and departed, and the French garrison left, after a stay of almost four years. The Council of Ambassadors, on Feb. 16, 1923, drew up a statement of principles by which the transfer of the district to Lithuania was to be accomplished; to this, in principle, too, the Lithuanians subscribed. The formulation of a specific convention was another matter. To September, 1923, negotiations dragged on between the Lithuanian government and the Council of Ambassadors and eventually ended in a deadlock because of the Lithuanian refusal to accept the machinery proposed in the draft convention for the regulation of international commerce, specifically Polish, by and through the port. The matter was here complicated by the Polish claims that Memel constituted the natural outlet for about 60,000 square miles of Polish territory, that Poland was part of Memel's economic hinterland, and that Poland's interests therefore needed safeguards. Lithuania then proposed the adjudication of the matter by the Permanent Court of International Justice; the Council of Ambassadors decided, however, to submit the controversy to the League Council. Thus requested, the League Council, late in 1923, invited Norman H. Davis, an American, and two others, to act as arbitrators. On Feb. 4, 1924, the commission set to work, and on Mar. 14, 1924, it reported to the League Council. On that day, as a result of the arbitrators' findings, three conventions were signed by Great Britain, France, Italy, Japan, and Lithuania, which, in effect, provided for the transfer of Memel to Lithuania; the establishment of the city and region as an autonomous unit with full legislative, judicial, and administrative rights; the guarantee to foreign nationals of the same rights accorded the people of Memel; the creation of a harbor board of three made up of a representative each of Lithuania, Memel, and the League of Nations; the free transit by sea, water, and rail of all hinterland traffic. In all the negotiations, a marked conciliatory spirit was displayed by the Lithuanians, and, in the opinion of Mr. Davis, they had made the fullest concessions possible. Poland, however, remained disgruntled. See LITHUANIA; POLAND.

MEMPHIS. The commercial metropolis of Tennessee. The area of the city was increased from 19.3 to 25.3 square miles; the population rose from 132,778 in 1910 to 162,351 in 1920, to 170,067 by estimate of the Bureau of the Census (1923), and by city estimate to 211,058 in 1924. The city created a planning commission which prepared a major and minor street plan and zoning system. A considerable amount of building was carried on, including a municipal auditorium seating between 12,000 and 14,000 persons, new waterworks, three large hotels, several office buildings, industrial plants, apartments, a long viaduct across the Illinois Central Railroad tracks, a railroad bridge 4500 feet long across the Mississippi, extensive river-rail interchange terminals, and many new school buildings and additions, including the new Southwestern College. The Mississippi River Federal Barge Line was operated by the government, carrying over 12,000 tons of freight monthly in 1924, in addition to freight handled by many river packet steamers.

MENCKEN, HENRY LOUIS (1880-). An American author and editor, born at Baltimore, Md. He was graduated at the Baltimore Polytechnic and at once began his journalistic

career on the *Baltimore Morning Herald*. Later he came to New York and was connected with the *Evening Sun*. In 1914 he became an editor of *Smart Set*; in 1921, a contributing editor of *The Nation*. He edited the *Players' Edition of Ibsen's Plays* (1909) and *The Free Lance Books* (1919-) and is the author of *Ventures into Verse* (1901), *George Bernard Shaw, His Plays* (1905); *The Philosophy of Friedrich Nietzsche* (1908); *The Artist* (1912); *A Book of Burlesques* (1916); *In Defense of Women* (1917); *The American Language* (1918); *Prejudices, First Series* (1919); *Second Series* (1920); *Third Series* (1922); and *On Democracy* (1922). In 1924 he undertook, with George Jean Nathan, the editorship of the new *American Mercury*.

MENDELISM. See BOTANY; HEREDITY.

MENDENHALL, CHARLES ELWOOD (1872-). An American physicist, born at Columbus, Ohio, and educated at Rose Polytechnic Institute and Johns Hopkins University. He was an aid on the United States Coast Survey, and during 1894-95, an assistant in physics at the University of Pennsylvania, after which he was an instructor at Williams. In 1901 he accepted a call to Wisconsin, where in 1905 he became full professor. His researches included studies on the absolute value of gravity, high temperature measurements, luminous efficiencies, and constants of radiation, on which he wrote important papers for various technical publications. During the War he was major in the science and research division of the Signal Corps and Air Service (1917-19) and chairman of the division of physical sciences in the National Research Council (1919-20). He also served as scientific attaché to the United States Embassy in London (1919).

MENDENDEZ, PIDAL RAMON (1869-). A Spanish philologist (see Vol. XV). He is the author of works on the history and literature of Spain. Among the most recent are *Antología de Prosistas Castellanos* (1917), *Cronicas Generales de España* (1918), *Estudios Literarios* (1920), and *Un Aspecto de la Elaboración del Quijote* (1921).

MENGELBERG, WILLEM (1871-). A Dutch orchestral conductor (see Vol. XV). In 1921 he made his second visit to the United States and conducted the newly established National Symphony Orchestra of New York for the second half of the season (Jan.-March). His sensational success brought about the amalgamation of the new orchestra with the Philharmonic Society and his permanent engagement as conductor for the second half of the Philharmonic season (Jan.-April). He retained at the same time his post as regular conductor of the Concertgebouw Orchestra in Amsterdam for the summer and fall; during his absence in New York this orchestra played under guest conductors.

MENOHER, CHARLES THOMAS (1862-). An American army officer, born in Johnston, Pa., and educated there and at the United States Military Academy. He went to France in 1917 in command of the 5th Field Artillery (Regular). He later commanded the school of instruction for field artillery at Saumur in France. He was in command of the 42d (Rainbow) Division and later the 6th Army Corps. He was appointed director of the Air Service on Jan. 2, 1919, and chief of the Air Service on July 1, 1920.

MENSHEVKS. See RUSSIA, *History*.

MENTAL MEASUREMENT. The rise of

intelligence tests during the decade 1914-24 constituted one of the most remarkable chapters in the history of applied science. Significant alike for its bearing on psychological theory and its effect on educational practice, the development of mental measurement was attended both by bitter controversy and enthusiastic hopes. The very nature of the undertaking, the effort to chart the resources and capacities of the human mind, could scarcely permit the scientific and lay public to remain either indifferent or uninterested. Moreover, the peculiar organization of the American school system, its freedom from tradition and from the control of a central authority, and its consequent readiness for pedagogical experimentation, all combined to give impetus to the movement for mental testing. If we add to this the preoccupation of the American public with the human quality of the recent immigration and the extraordinary opportunity afforded by the army mobilization for classifying the intellectual fitness of the racial stocks in the United States, we shall then be in a position to appreciate the extraordinary interest that has been taken in the new scientific technic.

The pioneer construction of tests and scales of intelligence was the work of two Frenchmen, Binet and Simon, in the decade before 1911. Although their work was immediately introduced into the United States, it was not until the publication of the Stanford revision of the Binet tests in 1916 that the movement passed out of the laboratory stage. After that date intelligence testing, from a theoretical scheme, became definitely a technic, which like all technics was to be perfected in actual practice. To understand the aims and purposes of intelligence testing it is necessary first of all to bear in mind the chronic grievance against schools and scholastic education. If the ordinary school examinations tested the practical capacity of the intelligence as much as they test the accumulated stock of book knowledge, there would never have arisen any need for special intelligence tests. While obviously the capacity to absorb book information and the ability to adapt oneself to new situations are not unrelated, it is none the less true that the two capacities are to a large measure autonomous and independent of one another. The question naturally arises why educators have for thousands of years persisted in measuring the parrot-like capacity for information instead of concentrating on the all-important faculty of general intelligence. The answer is quite simple. They had the instrument for measuring the first capacity but not for measuring the second. A written examination is a positive, we might even say scientific, measure of the amount of knowledge which a student possesses at the time he takes the test. To measure general intellectual capacities requires, however, something more than ink and paper. It requires judgment on the part of the examiner, and this judgment, if it is not to be capricious, must have for its support something corresponding to a general table of past performances. This support or tool has been lacking all through the ages, and it was supplied only through the perfection of statistical methods in the latter part of the nineteenth century. In point of fact, when we talk of measuring capacities we are really using a figure of speech to express our prediction of future actions. This prediction, to be reliable, must be

based on a proper interpretation of statistical probabilities, a task not at all simple and requiring expertness of a high order. All the disputes over the use of intelligence tests have hinged on the significance to be attached to certain statistical facts, and unfortunately there is no open sesame to the true analysis. While we may use mathematics to perfect our judgment, mathematics cannot make us dispense with the need for judgment.

The very notion of scales furnishes an interesting sidelight on the nature of the problem involved. Intelligence cannot be measured like certain chemical properties by the application once for all of a specific test. It is a growth; in other words, its manifestations vary with the age of the individual. Hence the necessity of constructing scales of tests, each test representing what experience has shown to be the average aptitude for a given age. The Binet scale was standardized on the basis of 400 Parisian school children. The tests were graded from the ages of three to 16. The intelligence of a child of three, for instance, was estimated on his ability to show nose, eyes, and mouth, his fluency in repeating number digits, etc. For later ages the tests were increasingly abstract, and it is indeed the general opinion that the upper tests of the Binet scale measure more than anything else the ability for abstract thinking. A school child was said to have the intelligence of that age all of whose tests he succeeds in passing. The natural thing to do then was to compare the mental age with the chronological age, but instead of measuring the discrepancy between the two, Binet found it more advisable to calculate their ratio. This ratio is the famous Intelligence Quotient or I.Q. It was seen to remain more constant for a particular individual than the arithmetical difference between the two ages. Thus it meant nothing to say that a child was one year ahead or behind his class, for a year at 12 and a year at six did not have the same significance. The intelligence quotient, representing as it did his classification among his peers, seemed to go with the child through all his years.

In importing the Binet scale into the United States it was found necessary to make extensive revisions in order to overcome differences of language habit. The Stanford revision was standardized on the basis of some 2000 children and adults. It postulated with the Binet system that the intelligence age of the average adult is 16—but properly speaking all that this means is that the tests measure a certain kind of growth up to the age of 16. Beyond that age different factors enter into consideration. The re-tests of individual children carried out at Stanford University seemed to confirm the relative constancy of the I.Q., successive determinations never varying more than 10 per cent. The Stanford-Binet scale is the most widely used of those embodying the principle of the I.Q. Its disadvantage of requiring individual examination has stimulated the development of group tests, graded by point scores. Of this type the best-known is the Yerkes test, under which partial credits are given for partial performance and the individual point score compared with the average point score for a chronological age. The resulting ratio is known as the coefficient of mental ability and differs from the intelligence quotient in that certain inferences cannot be made from it. In addition to

these two general types of mental tests, there are several devised to measure particular abilities and character traits. While all of them have some diagnostic value when interpreted by competent persons, the usefulness of the tests when applied by routine examiners is questionable.

United States Army Tests, 1917-19. The great importance of the army tests lies in the large number of subjects examined. The printed report, published in 1921 as a memoir of the National Academy of Science, has the magnitude of a volume of census returns. Altogether, in the period between September, 1917, and January, 1919, 1,726,966 men, including 42,000 officers, were tested. The vast majority were examined by means of group tests, but individual tests to the number of 82,500 were also given. The two general tests used by the army were the Alpha, a group test for literates, and Beta, a group test for foreigners and illiterates. All the tests, individual or group, employed the method of point score and partial credit, and the scores were later converted into letter grades. For the purpose of this conversion the tests were speeded up so that only 5 per cent could obtain the A grade. This procedure, justifiable from the point of view of statistical convenience, proved a source of much popular misconception. The device did not in any way affect the relative standing of the different individuals, but it did affect decidedly the sociological use to which some of the test statistics were afterwards put. Popular writers pointed with alarm to the fact that less than 15 per cent of the army recruits were A and B men and that the majority were C-, D, and D-. When the letter grading was transmuted into the Binet-Stanford system of mental ages, the way was opened for a misinterpretation even more serious. The comparison of the Stanford and the army scales was made by means of 653 soldiers, who were tested by both methods. On this weak bridge the entire array of scores was transported, and when the battle was over, it was found that the average mental age in the army had dwindled to 13 years and 4 months. The assumption of the Binet-Stanford tests was of an adult mental age of 16, but it should be remembered that these mental ages, even granting that they are applicable to adults, were standardized on the basis of what 80 per cent of a given age were able to pass. This norm has been criticized as being altogether too high, and it is evidently one of the factors at any rate responsible for the depression of the army's mental age.

It is naturally impossible in the space of this article even to begin to analyze either the detailed statistical results of the army examinations or the equally vast amount of scholastic computations that have accumulated since the official tests. Nevertheless the leading questions may be profitably discussed without recourse to complicated mathematics. The most important of these is obviously the question of the intelligence itself. A critically minded psychologist has observed that we should avoid all confusion if we only defined intelligence as that which the intelligence tests test. Unfortunately this solution is too simple to meet the problem. The intelligence tests were constructed not without certain preconceptions as to the functioning of the intelligence in the popular sense of the term. Yet it is necessary to consider the

intelligence tests independently of the reality they were constructed to measure, and to regard the intelligence quotient as the technical I.Q. of the Binet-Stanford scale not to be interpreted outside of its context. When we wish to compare the I.Q. with the intelligence as each of us conceives it, we must make a separate judgment. The distance between the I.Q. and the popular conception of intelligence may become ever so much smaller, either through the perfection of the tests or through a change in the popular conception; but there will always remain the necessity for comparison. The fact is generally admitted that the Binet-Stanford tests emphasize a certain kind of ability at abstract thinking. Now it may be true that human civilization has progressed through the perfection of abstract thought, but so long as we do not all of us feel a moral obligation to become mathematicians, it is not necessary to take the I.Q. rating too seriously. The intelligence tests do detect feeble-mindedness, but even feeble-mindedness is in the last analysis a judgment of society. Those who are congenitally unable to live up to the requirements of social life are segregated into institutions. The intelligence tests are able to detect feeble-mindedness only because in some degree they are representative of the existing social order. But it is far from necessary to possess a high I.Q. in order to enjoy in our republic the right to life, liberty, and the pursuit of happiness.

When we turn to the problem whether intelligence is hereditary, we come up against a maze of difficulties. In the first place, we must of course distinguish between intelligence as tested by the tests and intelligence as we conceive it to exist; even then we must leave room for errors of conception. Practically the only guide we have to the problem is the general notion that all things biological represent a growth or an evolution. It is customary to decompose this evolution into two sets of factors, environment and germ plasm. But these two sets of factors are after all abstractions on which we dare not base too far-reaching conclusions. The only proper use we can make of this analysis is to regard biological growth for any short period of time as translatable in terms of a mechanism of action and reaction. But this mechanism is only a rule of thumb which cannot be applied over long stretches of time without leading to absurdities. In the case of intelligence, opposing schools have stressed either one or the other of the two sets of factors, either germ plasm or environment. Those who have upheld the germ plasm theory have made the environment a passive spectator of a predetermined evolution of the germ plasm; on the other hand, the environmentalists have made the germ plasm a helpless *tabula rasa*, on which the external world writes what it will. The complexity of the problem is further evident when we realize that it has been impossible to frame any general and consistent theory of heredity that will account for the transmission of the grosser physical characteristics. It is not that heredity is a pure matter of chance but rather that we observe very little of the process. Intelligence, if we define it in Aristotelian fashion as the cutting edge of the individual, is probably more subject to environmental influence than the general frame, which in the long run, as we know, also evolves. In one sense we are sharpening or

blunting the blade by every specific act that we perform, but in another sense the general sharpness or temper remains stable. It is therefore quite plausible to assume that the general brightness of an individual may become visible in the period of school age, without arguing either for the predetermining of this brightness by heredity or the predetermining of the individual's future life by this brightness. The first assumption, if allowed to prevail, would mean the end of democracy and the inauguration of government by the hereditary I.Q. The acceptance of the second assumption would mean the end of all competition for honors and places, the entire extinction of the social struggle for existence. Needless to say, both of these assumptions would be far-fetched even if the intelligence scales were 100 times as accurate as they pretend to be at present and 100 times as representative of the true capacities of the human individual.

In conclusion we may touch on the question of racial differences. It is well-nigh useless to refer the uninitiated reader to the statistics on the subject because of the startling contrast between the microscopic accuracy of the arithmetical calculations and the hasty generalizations on which the calculations are based. The army examiners, employing a nonverbal performance test for illiterates and foreign-born, found evidence of superiority on the part of the native white stock over the recent immigrants from southern and eastern Europe and more particularly over the negro stock. The figures are difficult to interpret in view of the fact that the northern negroes, whose difference from the southern negroes is social rather than racial, were able to make an enormously better showing. It seems questionable whether the influence of language and other environmental factors was sufficiently eliminated even in the Beta test. The claim has therefore been made that the tests favored the habits of mind of the native white stock at the expense of the other stocks. That there are racial differences seems probable from all the biological and anthropological evidence on the subject. But we have no really sure way of estimating the extent of these differences except by the biological test that there is no natural bar to the cross breeding of the most distant races. As regards the subraces, peoples, and nationalities, it is for heuristic reasons best to consider the social reality as the changing element and the hypothetical germ plasm as relatively one. To do anything else would make the writing of history impossible. Instead of studying French civilization and German *Kultur*, we should then have to concentrate on the metaphysical *Ding an sich* of Gallic and Teutonic germ plasm.

Bibliography. Books on intelligence testing are legion. Pinter's *Intelligence Testing, Methods and Results* (1923) may be recommended to the elementary student. Terman's *Measurement of Intelligence* (1916) and *The Intelligence of School Children* (1919) give the point of view of the leader of the Stanford school. Vol. XV of the *Memoirs of the National Academy of Sciences*, entitled "Psychological Examining in the United States Army" (1921), is an indispensable work of reference. A good controversial discussion of the subject, induced by Walter Lippmann's attack on the army tests, may be found in the 1922 and 1923 volumes of *The New Republic*, and more scientific discus-

sions in the psychological periodicals, particularly *The Journal of Educational Psychology*, vol. xii and vol. xiii.

MENZIES, ALAN WILFRED CRANBROOK (1877-). An American chemist, born at Edinburgh, Scotland. He was graduated at Edinburgh University and later studied at Aberdeen, Leipzig, and the University of Chicago. He was assistant professor of chemistry at Henriot-Watt College in Edinburgh and professor of chemistry at Mungo's College at Glasgow. Meanwhile he also organized and directed (1904-08) summer courses for science teachers in Ireland. In 1908 he came to the United States and became connected with the chemical department of the University of Chicago (1908-12), and during 1912-14 he was professor and head of the department of chemistry at Oberlin. He resigned from Oberlin in 1914 to accept a call to the chair of chemistry at Princeton. He was also associate chemist with the Bureau of Standards in Washington (1918-19). His original researches were chiefly concerned with matters of physical chemistry, such as vapor pressure and vapor density, molecular weights, ebullioscopy, and hygrometry.

MERCHANT MARINE. See SHIPPING; SHIPBUILDING; etc.

MERCERIZATION. See TEXTILE MANUFACTURING.

MERCIER, DESIRÉ JOSEPH, CARDINAL (1851-). A Belgian prelate of the Roman Catholic Church (see VOL XV). During the War he was uncompromising in his opposition to the hardships imposed on the Belgian people by their German rulers and unceasing in his demands for the betterment of conditions. One of his pastoral letters, an eloquent exposition of the civic and national rights of Belgium, resulted in his arrest in January, 1915. Soon released, he remained throughout the German occupation a thorn in the side of the German officials and administration. He was one of the great figures of the War. In 1919 he published *War Memories*. He also wrote several books on philosophy, including *A Manual of Modern Scholastic Philosophy* (1917). In 1922 he visited the United States and was received with great honor.

MERCURY. See QUICKSILVER.

MERCURY BOILER. See BOILERS.

MEREDITH, EDWIN THOMAS (1876-). An American agriculturalist and public official, born at Avoca, Iowa, and educated at the Highland Park College in Des Moines. For several years he edited agricultural papers in Des Moines. In 1902 he established *Successful Farming*. He was a director in many financial institutions and was also active in politics. In 1914 he was a candidate for United States senator and in 1916 for governor of the State of Iowa. He served on the Industrial Conference in 1919 and was a member of several other boards engaged in agricultural investigations. In 1920-21 he was Secretary of Agriculture in the cabinet of President Wilson.

MERRIAM, JOHN CAMPBELL (1869-). An American paleontologist (see VOL XV). In 1919 he was chairman of the National Research Council, and in 1920 he became president of the Carnegie Institution at Washington, D. C. He was a member of many scientific organizations.

MERRILL, ELMER DREW (1876-). An American botanist, born at East Auburn, Me.,

and educated at the University of Maine and George Washington University. After serving on the faculty of the University of Maine and with the Department of Agriculture in Washington, he was appointed botanist by the Bureau of Agriculture at Manila, P. I., in 1902. From 1903 to 1905 he was in the service of the Bureau of Government Laboratories, and from 1906 he was connected with the Bureau of Science. In 1912 he was appointed associate professor of botany and head of the department at the University of the Philippines, where he became full professor in 1916. In 1919 he became director of the Bureau of Science in Manila; in 1923, dean of the California College of Agriculture. Professor Merrill carried on many investigations in the Philippines and elsewhere and described more than 2500 new specimens of plants. He was a member of many scientific societies and the author of *A Flora of Manila* (1912), *Enumeration of Bornean Plants* (1921), and many articles on the botany of North America, China, the Philippines and Malaya.

MERRIMAN, MYRA HUNT KINGMAN (MRS. JOSIAH C. MERRIMAN) (1873-). An American editor and writer, born at Tremont, Ill. She studied journalism, civics, and philanthropy at the Illinois State Normal School and was for many years a member of the editorial staffs of several papers in Chicago. She also acted as traveling South and Central American correspondent for newspapers. In 1894 she became a member of the staff of several papers in California. During the War she was a member of the board of directors of the Bureau of Registration for Woman's Service and was a member of several other important committees. She was secretary of the National Council of Women of the United States in 1920-21 and was a delegate to the International Council of Women in 1921. In the same year she was chairman of the official delegation of 40 women which investigated conditions in Europe.

MESOPOTAMIA, or IRAQ. A British mandate territory, lying between the Tigris and Euphrates Rivers and made up of the former Turkish vilayets of Bagdad, Basra, and Mosul. Area, 143,250 square miles; population in 1920, 2,849,282. The population is largely Arab by race and Mohammedan by religion. Turks, Kurds, Jews (in the towns), Christians belonging to Roman Catholic and Syrian Catholic churches, and some Persians were also to be found. By religions the population was divided into 1,146,684 Sunnis and 1,494,015 Shias (both Mohammedan), 87,488 Jews, 78,792 Christians, and 42,302 others. Basra, at the head of the Persian Gulf, was the chief town; Bagdad was next in importance.

Industry and Trade. Agriculture was the leading activity of the population, and wheat, barley, and rice were grown in considerable quantities. Irrigation was indispensable even in the northern regions and was a constant concern of the government. In 1919 the ancient canal, Saglawiyah near Felliya on the Euphrates, was reopened for the service of some 70,000 acres in winter and 36,000 acres in summer. The importance of the rôle played by irrigation may be gauged from these items in the 1919-20 budget: irrigation maintenance, \$648,800; new projects, \$2,358,388; flood protection maintenance, \$778,560; flood protection, new works, \$389,280. Other canals opened after the War were the Younoufieh to serve Bagdad, the

New Khalis from the Dial River, the Beni Hasan, and the Georgivah, both from the Euphrates. Agricultural experiments indicated the feasibility of cultivating cotton, tobacco, and ground nuts. Dates, as always, figured in the economic life of the country, and sheep were tended in the Mosul region. The lack of farm labor and limited funds retarded development. Local industries, concerning themselves with tanning and weaving, were to be found in the towns. Into the export trade, dates, grains, carpets, and wool, of the native products, entered largely, while piece goods, carpets, sugar, and tea were reexported from Bagdad particularly via the caravan routes. After the War cotton goods made up nearly half the total imports, the depletion of stocks and the demands from Persia because of the closing of the northern routes accounting for the increase. Other imports were sugar, coming via India from Java and China and destined for Persia and Mesopotamia (11 per cent of total in 1919); tea from India and Ceylon for Persia (3.5 per cent of total in 1919); silk (3.5 per cent of total in 1919); tobacco; metals and ores; soap. Total imports at the port of Basra for 1912, 1919, and 1921 were £2,653,000, £9,326,000, £7,237,000 (to this must be added the imports of Bagdad, 1919, £2,940,000; 1921, £6,470,000); total exports at Basra for 1912, 1919, 1921 were £3,246,000, £2,406,000, £1,898,000 (Bagdad, 1919, £4,940,000; 1921, £4,658,000).

Communications. River transportation continued to occupy a prominent place even after the War; particularly extensive improvements were made in the Tigris. The navigation of the two rivers was, as before, controlled by a British company. Basra was the scene of great harbor developments as well. Up to 1914 the only railway line was the standard gauge branch of the Bagdad railway from Bagdad to Samarra (75 miles). However, military exigencies caused the construction of the following: Basra to Nasiriyah (140 miles), Basra to Amara (109 miles), Kut-el-Amara to Bagdad (105 miles), Bagdad to the vicinity of Khanikin (103 miles), and thence to the Persian frontier. The Bagdad railway line was extended to Tekrit, and then, after the Armistice, on to Qalat Sharqat (total 186 miles). In all, some 1100 miles of line were built for military purposes. An outstanding event was the opening of the line from Basra to Bagdad (354 miles) in January, 1920, which made possible a comfortable train ride of 22 hours from city to city. The line from Bagdad to the Persian frontier at once reduced freight rates and thus facilitated intercourse.

Minerals. Oil was reported to exist in rich quantities north from Mandali to Bagdad. The Anglo-Persian Oil Company obtained concessions to work some of these fields. Wells were sunk at Quaiyarah, but in 1923 the yield was still inconsiderable. Asphalt was found at Hit on the Euphrates.

Government. Revenues for 1918-19 were £2,080,000 and expenditures, £1,117,000; for 1919-20, revenues were £3,437,000 and expenditures £3,692,000. Customs revenue, which forms about half the annual receipts, amounted in 1920-21 to £1,426,288; 1921-22, £1,622,232. The British forces stationed in the country were under the control of the Air Ministry; the local Iraq army was in the process of formation. The constitution, as finally completed late in 1923, contained many liberal sections, at the

same time that it showed the restraining hand of British influence. The usual constitutional guarantees were given: freedom for race, religion, language, and of speech, assembly, and worship; the Emir, however, was sovereign and irresponsible, although all edicts were to be signed by the prime minister; there was to be a nominated senate and an elected chamber to which the ministry was to be responsible; validity was assured for the laws of the Ottoman régime and the British occupation, an arrangement interpreted by observers as applying to the oil concessions held by the Anglo-French Petroleum Company; and all concessions and monopolies were to be granted only in accordance with the law.

History. The Tigris-Euphrates valley, as rich in historic associations as in natural resources, had been a focal point for the conflicting imperialist aspirations of Germany and Britain from the very inception of the Bagdad Railway, at the close of the nineteenth century. In June, 1914, on the eve of the War, Great Britain and Germany reached a secret agreement, not published until 1923, whereby Basra was to become the terminus of the railway, navigation rights in Mesopotamia were reserved to the British, and irrigation in lower Mesopotamia was to be undertaken by Great Britain. About the same time, the two Powers agreed, and Turkey provisionally assented, that an Anglo-German syndicate, 75 per cent British and 25 per cent German, was to obtain a concession for exclusive oil prospecting in Mesopotamia. This bargain, however, failed to receive final approval before the outbreak of war in 1914. Even before Turkey entered the War, London ordered British troops to concentrate against Mesopotamia, in September, 1914, to occupy Abadan Island at the head of the Persian Gulf, and to take further belligerent measures if necessary to protect the Anglo-Persian Petroleum Company's refineries, tanks, and pipe lines in southern Mesopotamia. After Turkey declared war, Indian troops were disembarked on the shores of the Shatt-el-Arab, occupied the city of Basra, on Nov. 22, 1914, and advanced upstream. General Townsend's ill-starred campaign against Bagdad, General Maude's later and more successful attack on the city, and the other military operations of the War are described elsewhere (see *WAR IN EUROPE, Turkish Front*).

In the occupied area, the British zealously courted the favor of the native Arabs by making concessions to native customs, by tactful treatment of Mohammedan religious interests, and by more than generous promises to Arab nationalism. After occupying Bagdad, General Maude issued a proclamation inviting the people to participate in the government, so that they might unite with the Arabs of other regions in realizing their racial aspirations. Meanwhile, however, by the secret Sykes-Picot Treaty of 1916, Great Britain and France had made an anticipatory division of the spoils, assigning Mesopotamia to Great Britain. The unrati-fied peace treaty of Sèvres (1920), and likewise the definitive treaty of Lausanne (1923), deprived Turkey of sovereignty over Mesopotamia; and the latter treaty left for future solution the problem whether Mosul should be included in the ceded area. The Mosul region was peculiarly attractive as an oil field reputed to be of vast value; it had been allotted to France

by the Sykes-Picot Treaty, transferred to England by another Anglo-French bargain in December, 1918, and included in the British mandate for Mesopotamia, notwithstanding Turkish protests on the score of self-determination. At the San Remo Conference of April, 1920, the Allies conferred on Great Britain a Class A mandate over Mesopotamia, and an Anglo-French oil agreement was concluded, whereby a 25 per cent share of the future oil output of Mosul was granted to France, and a pipe-line was to be constructed through Syria as an outlet for Mesopotamian oil. Against this oil agreement the United States government entered a vigorous protest, in a note dated Nov. 20, 1920; at the Lausanne Conference in 1923 the American delegation blocked a British attempt to obtain Turkish confirmation of the predominantly British Turkish Petroleum Company's monopolistic concession. The controversy regarding the Mosul oil field was further complicated by the Chester Concession (q.v.) and by claims advanced in behalf of Abdol Hamid's heirs. The British oil interests, it was unofficially reported, made efforts to conciliate Washington by quietly offering the several American claimants minor shares in Mesopotamian oil. In the meantime the uncertainty prevailing in regard to the future status of the country had encouraged the development of a strong nationalist agitation by young Arab officers, who quoted Wilson's speeches and various English and French manifestoes to prove Mesopotamia's right of self-determination. Popular antipathy to the efficiency of British tax collectors, to forced labor on irrigation works, and to British disregard of tribal and religious leaders, provided additional fuel for the smoldering fires of discontent which burst into open rebellion in 1920. The British army of 60,000 men had to be increased to 90,000 before the revolt was quelled, in December, 1920. Under these unfavorable circumstances the British endeavored to create the administrative machinery to fulfill their mandate. In the autumn of 1920 a Council of State was set up, under the tutelage of Sir Percy Cox, the British High Commissioner. Insistent Arab demands for a native government, reinforced by equally insistent protests by English taxpayers against the large military expenditures in Mesopotamia, whose cost, from the Armistice to the end of 1921, was estimated at £100,000,000, led the British government to consider favorably the claims of Prince Faisal (q.v.), son of the King of Hedjaz. The Council of State on July 11, 1921, unanimously offered him the crown, and after an almost unanimously favorable but hardly democratic plebiscite, 96 per cent for Faisal, he was officially proclaimed King of Iraq, at Bagdad, Aug. 23, 1921. The new kingdom of Iraq, nominally a sovereign state, was nevertheless subject to British supervision under the mandate, and to clarify this relationship, a treaty was signed on Oct. 10, 1922, by which Iraq agreed to be guided by the advice of the British High Commissioner in financial, military, and international matters, and Great Britain promised to facilitate Iraq's entry into the League of Nations, in due course. A subsequent protocol, signed Apr. 3, 1923, fixed the term of the earlier treaty, and implicitly of the mandatory relationship; the treaty was to terminate either on the entry of Iraq into the League or four years after the ratification of

peace with Turkey. The independence granted to Iraq was evidently of a very limited nature. The British continued to supervise native administration in the vital departments, a British Civil Administration continued to function temporarily side by side with Faisal's government, and the British Royal Air Force remained in military control of the country. In 1922, to give one instance of British policy, the minister of the interior was exiled to Ceylon because of his too pronounced nationalist views. The constitution or Organic Law drafted in 1923 and approved by the Council of Ministers made Mohammedanism the state religion and Arabic the official language, but assured equal civic rights to all, regardless of creed or race. Its political clauses provided the customary machinery of parliamentary government, with a responsible cabinet, but a sudden transition from Turkish oppression and tribal decentralization to genuine democracy, in a country with little popular education or political experience, could be hoped for only by the most optimistic of patriots. When the Constituent Assembly was inaugurated at Bagdad, Mar. 28, 1914, for the purpose of ratifying the Organic Law and the British treaty, strong opposition to the latter was promptly manifested. By this time it had become public knowledge that the treaty, with subsidiary agreements, including one dated Mar. 25, 1924, would enable Great Britain to maintain troops in Iraq until 1928 and perhaps longer; to train the native army, and to appoint administrative advisers for 15 years or more. The Arab kingdom, it appeared, was after all merely a British protectorate, confronted with political, educational, and financial problems of the utmost gravity but endowed with natural resources which might, under able management, enable the people to lay the economic and cultural foundations for genuine self-government in the future. On June 11, on the last day allowed the government by the British, the Iraq parliament approved the treaty and British control was accepted.

MESTROVIC, IVAN. See SCULPTURE.

METALLURGY. See COTTRELL PROCESS; ELECTRIC FURNACES.

METCHNIKOFF, ELIE (1845-1916). (See VOL. XV.) The death of the distinguished savant occurred at the age of 71. It appeared after his death that he had, whether by art or nature, overcome the handicap of short life which beset his near kin, none of whom had exceeded 55 years. He had drunk his artificially soured milk faithfully each day for 19 years and considered that his doctrines of survival had been upheld in his own case. His widow, Olga Metchnikoff, has written his biography.

METEOROLOGY. The decade 1914-24 witnessed a great expansion of the meteorologist's activities through increased emphasis on meteorology in military operations, aviation, agriculture, weather insurance, and numerous commercial and industrial fields. A prodigious advance was made in the organized collection and dissemination of weather information over land and sea by telegraph, cable, and radio. Daily synoptic charts now cover the larger part of the northern hemisphere, including the ocean areas, and the systematic exploration of the upper air by kites and pilot balloons has increased markedly in amount; appreciable improvement in daily weather forecasts has re-

sulted. Correspondingly rapid progress has been effected in theoretical meteorology.

By 1924 several capable physicists and mathematicians were at work on the foundations of weather forecasting, and order was slowly being evolved out of chaos, although as yet it was possible to supplement empirical knowledge of many phenomena with only partial explanations on physical and dynamic grounds. While the time seems remote indeed when forecasting can wholly cease to be an empirical art, nevertheless every advance, however small, in our theoretical understanding of the physical processes going on in the atmosphere provides increased insight which cannot fail sooner or later to react on meteorological practice and to lead to improvement in forecasting.

Meteorological Observations. To provide a solid basis for the improvement of day-to-day predictions, for the extension of forecasts over longer periods of time, and for the development of the mathematical theory of atmospheric phenomena, we need an adequate body of both surface and free-air observational data from land and sea, together with a skillful coordination of these facts of observation by the mathematician and physicist. Nothing can be done without sufficient observations, but facts do not as a rule explain themselves, and we cannot hope by simply looking at maps to reach the solution of our problems.

Moreover, there is no indication whatever that in order to reduce atmospheric phenomena to law it is necessary to discover new physical laws at present unthought of, or, despite the unfounded claims of some investigators, to seek the solution in some vague, hitherto unrecognized cosmic or electromagnetic influence.

Observational and Statistical Meteorology. The temperature of the air falls at an *average* rate, nearly the same in all parts of the world, of about 6°C. per kilometer increase of height up to an altitude which, according to latitude, season, and surface barometric pressure, varies from about 9 to 16 kilometers, beyond which the temperature ceases to fall in a vertical direction. This upper layer of zero lapse rate is called the stratosphere or isothermal layer; the lower region is known as the troposphere. The temperature of the stratosphere is below 200° Absolute over tropical regions, but is greater in higher latitudes and is above 220° Absolute over northern Europe. Roughly, the mean temperature of the air column from the surface to 20 kilometers is the same, and hence the pressure at 20 kilometers is the same, the world over. The diurnal temperature variation at the surface extends upward only one or two kilometers; the annual temperature variation in the troposphere diminishes somewhat with height and is quite small in the stratosphere. The tropopause, or boundary between troposphere and stratosphere, is relatively low in cyclonic areas, high in anticyclones.

To understand fully the weather of any given locality, and to anticipate its changes to any great extent in advance, it is necessary to take a worldwide view. Cold waves, periods of drought, abnormal seasons, etc., are intimately connected with the prevailing distribution of barometric pressure, and the resulting general circulation, over an entire hemisphere. Profound modifications of the pressure distribution are often first indicated in polar regions. Loss of heat from these regions results in the ac-

cumulation of great volumes of cold air which sooner or later must break out over lower latitudes and cause great periodical readjustments of pressure distribution over the hemisphere; and these in turn determine the winds, storm paths, and weather conditions in general.

So many factors are operating simultaneously and in such a complex manner to determine exactly what sequence of phenomena shall take place that it is hopeless to attempt to work out the relations involved *a priori* from theoretical considerations. Our immediate efforts must be directed toward ascertaining these relations empirically; the methods of mathematical statistics have come into extensive use for this purpose. The method of correlation has been used in the hope of empirically discovering relations which would be of value in long-range forecasting, but in general the correlation coefficients obtained up to 1924 are too small to render this method highly successful; prediction requires highly correlated variables. The present position of long-range forecasting in general is not at all hopeful; forecasts for more than a few days in advance, by whatever method, are made only at a great sacrifice of detail, and are most uncertain. Fair success has attended G. W. Walker's forecasts of the monsoon rainfall of India by the use of the correlation coefficients between the amount of this rainfall and sundry meteorological conditions over various parts of the globe in the spring of the same year or earlier. On the other hand, if correlation is resorted to only for the purpose of discovering relations between different phenomena, a small coefficient, if sufficiently larger than its probable error, is just as likely to give valuable information as a large one, although the interpretation of the coefficients frequently is difficult and uncertain, and the physical reasons for their existence impossible to assign.

The highest correlation coefficients found are those of Dines between pressure and temperature at the same levels in the upper air. Close to the surface the correlation between pressure and temperature is quite low, but from 4 to 8 kilometers the coefficients are well over 0.90, and when corrected for errors of observation some of them seemingly become unity, and this indicates direct proportionality between pressure and temperature at those levels. The surface temperature is governed by many factors, such as time of day, state of sky, etc., which higher up are absent or of lesser importance. Dines holds that the chief item in determining the temperature in the upper air is the dynamic heating and cooling due to vertical movement, while C. K. M. Douglas on the other hand maintains that the temperature variations in the upper air are mainly the result of the passage of different air currents, the temperatures of which depend on their place of origin and are low if the air comes from the far north, even though it may curve around a cyclone and arrive at the place of observation from the southwest.

Undoubtedly the relative importance of vertical motion and horizontal transport varies according to the geographic location of the place of observation and the height. From a summary of aërological data obtained in the United States, Gregg finds that south component winds are considerably warmer than north component winds at all levels in the troposphere, except when there is a temporary reversal in the

latitudinal temperature gradient or when the air follows a curved path around a cyclone or anticyclone, although the relation is somewhat more pronounced at one and two kilometers than above or below that height. A statistical study of kite data enabled Meisinger to devise a practicable and reliable method of constructing isobaric charts for the one and two kilometer levels over the eastern United States at 8 A.M. from surface data alone.

Climatic Changes. Some investigators hold that the earth is undergoing a gradual desiccation, but the consensus of the most expert meteorological judgment is that there is not as yet sufficient unimpeachable evidence to justify a belief in any progressive change of climate within historic times in any part of the world. Small and more or less periodic fluctuations, such as those accompanying the sunspot cycle, now exist, and can be traced back into the past through the evidence afforded by growth rings in large trees and other things; and the existence of well-marked local fluctuations of climate in the past is well established. So far as climatic changes during geologic time are concerned, there is a decided tendency to seek their explanation in purely terrestrial causes, with a lessened appeal to astronomical factors. The work of Humphreys and others has shown that dust veils in the very high atmosphere due to great volcanic explosions are effective in somewhat diminishing earth temperatures and may have been a contributing cause to the ice ages.

Atmospheric Circulation. At first sight it might seem natural that the motion of air should be directly from regions where barometric pressure is high to regions where it is low, but the most casual examination of a weather map shows that this is not the case; it is indeed the primary tendency, but this tendency is almost completely checked by the effect of the earth's rotation, and we get instead a circulation practically *parallel to the isobars*. The only forces acting on a particular volume of air are gravity, hydrostatic pressure, arising from the action of gravity on the rest of the earth's atmosphere, and friction, including internal friction due to viscosity and turbulence. The acceleration of the air under these forces is composed of two parts, acceleration relative to the surface of the earth, which is observable, and acceleration common to this surface itself, the latter giving rise to the so-called deflecting force of the earth's rotation. After a steady state has been attained, which takes but a brief time, *in the absence of friction* the direction of the wind is *along the isobars*, and the velocity is so adjusted that the force arising from the pressure gradient, tending to push the air in toward the region of low pressure, is just balanced by the tendency of the moving air to turn to the right, in the northern hemisphere, because of the earth's rotation, together with the outward tendency due to the centrifugal force arising from the curvature of the path. This resulting wind is known as the *gradient wind*. In the strata near the ground the retardation due to friction causes the air to lose some of the velocity necessary to maintain the balance, and the wind direction is more or less inclined away from the isobars toward the lower pressure.

If, as in lower latitudes, the influence of the earth's rotation is relatively small and friction is negligible, the pressure differences between

points at the same level in the atmosphere are mainly occupied in producing acceleration relative to the ground in accordance with the ordinary laws of hydrodynamics; that component of the gradient wind determined by the centrifugal force known as the cyclostrophic component is alone important as soon as the wind reaches a very moderate velocity. Such winds, which have been called Eulerian by Jeffreys, are exemplified in the tropical cyclone. If, as is generally the case in the comparatively slow-moving extratropical cyclone, the cyclostrophic component is negligible, the pressure differences are mainly occupied, in the absence of friction, in guiding the air under the influence of the earth's rotation; the resulting winds are known as geostrophic. If, as in land and sea breezes, friction is the main thing which the pressure differences have to overcome, the winds blow in the direction of the gradient, but without acceleration, and have been styled by Jeffreys antitriptic winds.

In the absence of direct observation, the gradient wind indicated by the surface pressure chart is the best estimate which can be given of the actual wind at an elevation of 1500 feet. For much greater heights, the surface map may fail to give a correct idea of the pressure distribution there. The law of approach from the surface wind to the undisturbed gradient flow above is very complex; a number of empirical formulas have been devised to express the variation of velocity with height in the lower levels; the best of these is probably one due to Chapman. The greatest insight into the motion of the air in the lowest strata has been given by the mathematical theory worked out since 1914 by G. I. Taylor, L. F. Richardson, F. J. W. Whipple, and others.

Friction and surface irregularities put the lower air into a very turbulent state; whirls and eddies of varying sizes are constantly being formed and reveal their presence in the gustiness of the wind and in the dispersion of the smoke from a chimney. While the spin of an eddy is maintained, the mass of air composing it is endowed with a special forced motion, but presently the eddy disintegrates, and the air which has been forcibly transported in the eddy mixes with its new surroundings. The result, even in the lightest wind, is the mixing of adjacent layers of air; the air transported by the eddies carries with it its momentum, heat, and water vapor, and thus the eddy motion causes a gradual diffusion of these in accordance with laws identical in form with those governing the diffusion caused by molecular motions. The lower layers gain in momentum and generally in heat, at the expense of the upper; the effect is to endow the lower atmosphere with a virtual or pseudoviscosity many thousand times greater than the ordinary molecular viscosity, and with a correspondingly great eddy conductivity for heat and for water vapor. The values of these coefficients of eddy conductivity and eddy viscosity depend on the configuration and nature of the ground surface, the temperature of this surface, the time of day, season, cloudiness, etc. Above the first one or two kilometers the influence of surface turbulence may generally be regarded as eliminated. Eddy motion or atmospheric turbulence has been found to play an important part in the diurnal and seasonal variations of wind velocity, and in the formation of clouds and fog.

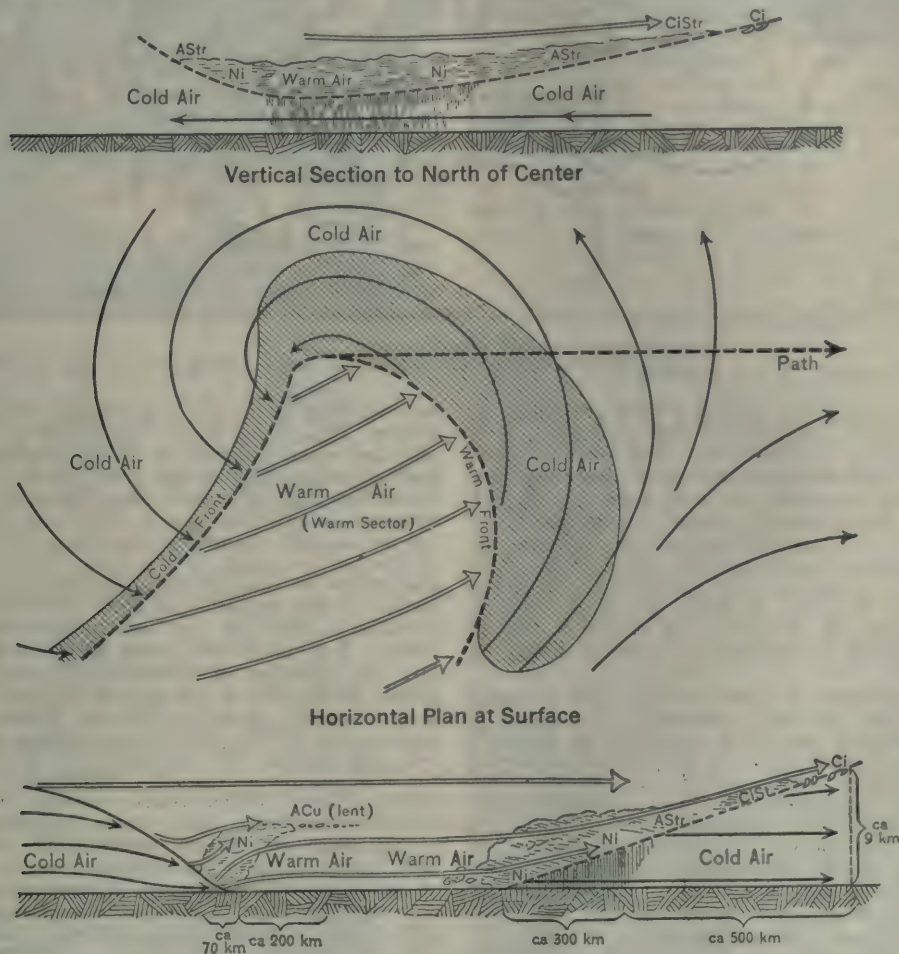
Cyclones. The instantaneous picture provided by the synoptic chart gives no indication of the true trajectories of the moving air; when these trajectories are worked out by special investigations, it is found that the cyclone is not composed of the same air circulating round and round the centre as the storm travels. Also, the maps show no signs of the distribution of temperature, wind, etc. which the existence of a vortex would imply; hence for some time the old vortex theory of extratropical cyclones has been in disfavor. Nevertheless, a vortex theory can be made to account for many facts of observation, and it may be shown that under the actual circumstances of the case it would be difficult or impossible to recognize the presence of a vortex, particularly from the surface map, even if one existed.

We know that the air is full of imperfect whirls or eddies of all sizes; and Fujiwhara has recently shown that under suitable circumstances large vortices are built up through the absorption of the energy of the numerous small whirls into whirls of the next larger size, and so on, and similarly a large vortex dissipates by successively developing series of vortices of the next lower order. Rayleigh in 1917 showed that, provided there were already some vorticity

in the atmosphere, all that was necessary to effect the development of a single large vortex was the removal of air from the region that would form the core. Thus the initial step of adding energy to the existing small imperfect vortices which we know to be in the air could be effected by removing a part of what would be the central portion of the resulting cyclonic vortex.

The old thermal convection theory of cyclones, which postulated the ascent of a large body of air as a coherent mass, is untenable, because it does not explain the observed relative coldness of the troposphere in cyclones. Sir Napier Shaw has suggested instead, as the process of the required removal of air, its eviction by a scouring action in the layers through which penetrative convection passes. The rising air drags up with itself a surprisingly large portion of these layers through eddy mixing; this might account for the development of a cyclonic vortex attended by a reduction of pressure and a consequent lowering of the temperature. Shaw's theory seems quite applicable to tropical cyclones, and appears capable of accounting for some at least of the extratropical ones.

On the other hand, the meteorologists of the

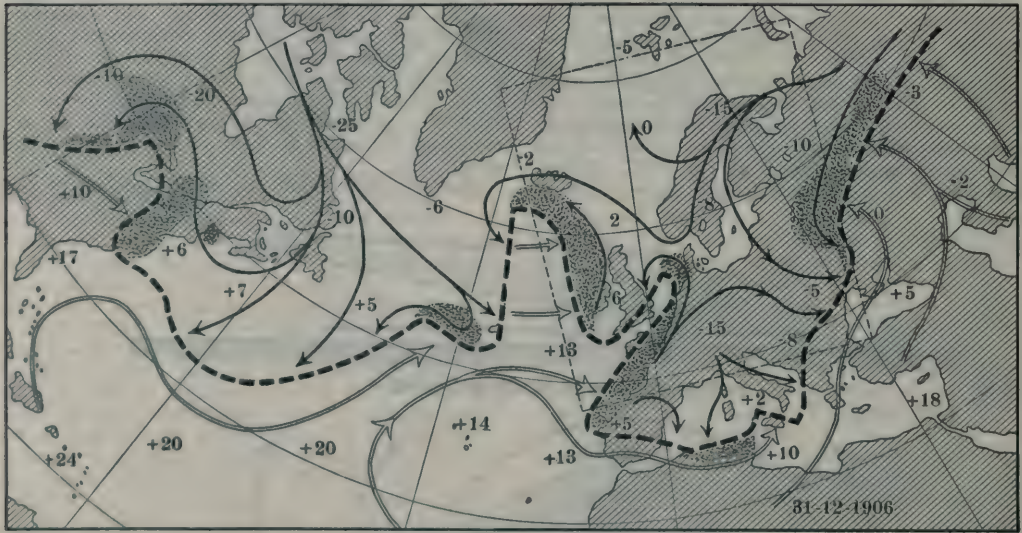


Vertical Section to South of Center
THE STRUCTURE OF THE NORMAL CYCLONE ACCORDING TO V. BJERKNES

Meteorological Institute at Bergen, Norway, have brought to light details of cyclonic phenomena, not known before, which have led them to quite another conception of the nature of an extra-tropical cyclone. Deprived of weather telegrams from the greater part of Europe during the War, the Norwegian meteorologists found their isobaric charts, which covered only a very limited area, of comparatively little use for forecasting, and they were led to a serious attempt to use in practice a method of forecasting which V. Bjerknes had originally evolved from theoretical considerations. Detailed reports from a very close network of stations revealed the existence in the normal cyclone of two lines of discontinuity, meeting at the centre and dividing the cyclonic area into quite unequal portions. These

the two fronts, apart from wet fog or drizzle, is attributed to the local instability of air passing over warmer sea or land; it is particularly prominent over the land in summer and over the sea in winter.

Detailed maps show that the line of discontinuity formed by the warm and cold fronts together extends continuously from cyclone to cyclone. After extensive experience with detailed maps, it becomes possible to recognize the line on less detailed ones; it is then found that the line completely surrounds the entire polar regions, and the name Polar Front has been given to it; the air on the northern side is of polar origin, that on the southern side of tropical origin. Heavy cold air flows out along the ground from polar regions, separated from



FRONT OF POLAR AIR, DEC. 31, 1906.

The rainstorm which is occurring near the Great Lakes arrived at the coast of Norway on Jan. 5, 1907.

two lines mark the boundary of a projection of warm air, generally from the southward, into a region of cold air. The line running from the centre towards the eastern or advancing side is called the steering line, or more recently the warm front; under normal conditions it is marked by a rise of temperature, preceded by a considerable and prolonged fall of rain. The other line, running from the centre in a south-westerly direction, is called the squall line, or cold front; it is marked by a sudden fall of temperature accompanied by a brief shower of rain.

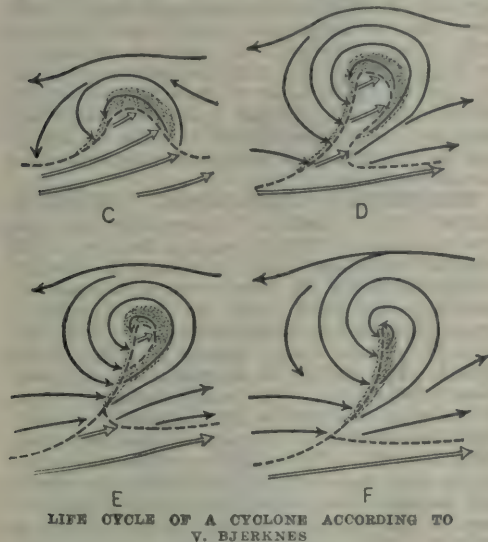
The cyclone is thus divided into a warm sector and the cold remainder. The lines of discontinuity have been explained as delineating the ground plan of a complicated surface of discontinuity which extends up into the free air and separates cold air of northern origin from warm air of southern origin. The rain in advance of the warm front is attributed to the general ascent of the warm air from the south up over the bank of cold air to the north, along a gentle slope; and the rain of the cold front is attributed to the undercutting of the warm air by the cold air in its rear with a somewhat steeper surface of separation. Rainfall in regions outside the two which are associated with

the overlying warm air by a surface of discontinuity. The Polar Front has a wavy form, cold and warm tongues of air alternately extending toward equator and pole and is in continuous undulating motion, sweeping the whole temperate zone from west to east, and producing the weather changes of temperate latitudes. At the northern ends of the warm tongues are the centres of the cyclones; the broad tongues formed by the expulsion of great masses of accumulated polar air are the anticyclones between. If a tongue of warm air extends too far, and a portion of equatorial air gets completely surrounded at the ground by colder air, the cyclone fills up and expires, and a secondary may develop at the point of overlapping of the two cold fronts. The poles are not of course the only possible sources of a discontinuity; the northern slopes of the Asiatic continent are an effective substitute, both winter and summer.

The above empirical representations of the facts of the synoptic charts have already proved of quite material assistance to forecasting in Norway. Bjerknes has, in addition, sought to give them a dynamic interpretation. He holds that the synoptic maps can be simulated by wave motion on either side of the surface of discontinuity. The discontinuity is considered

a natural consequence of the dynamic conditions of an atmosphere on a rotating globe. The cyclonic depressions of middle latitudes begin as convolutions of the surface of discontinuity due to the instability of adjacent warm and cold air in relative motion. At sea level they appear as collections of approximately circular isobars because the surface of discontinuity is not vertical but tends toward parallelism with the axis of the earth or even less inclined to the surface than this. The successive cyclones of the temperate zones are thus regarded as waves on the boundary surface between the cap of polar air and the surrounding warm air masses. The corresponding boundary line at the ground, the Polar Front, traverses the centres of depressions all the way around the earth. The extreme northern ends of the warm waves coincide with the centres of low pressure, and the cold waves of polar air between them constitute the moving wedges of high pressure. The examination of depressions individually, from their formation to their disappearance, shows that young depressions correspond to slight waves with small excursions from the equilibrium state; later, the amplitudes increase simultaneously with a deepening of the depression. The ascending currents starting from the warm wave gradually diminish the area of the warm sector of the cyclone. The tongues of polar air on both sides of it accordingly approach each other and finally close together, so that air of cold origin surrounds the cyclonic centre on all sides. The potential energy of the system of adjacent cold and warm air masses is then lost, and the cyclone begins to fill up. The missing asymmetry of structure makes the cyclone during its last stages slow-moving or stationary.

The warm, cold, and occluded fronts are now shown on the Norwegian weather maps, and forecasts are made in accordance with the principles of the Polar Front theory. In spite of



its great successes in correlating many of the facts of cyclonic phenomena, the theory has not been completely confirmed by such observations as are available to test it, nor is it altogether free from theoretical difficulties. Considerable further investigation, along the lines

of both the vortex and the polar front theories, is needed. Alternative conceptions of the mechanism of extratropical cyclones recently put forward by Kobayasi and by Ryd lead to the squall line as a consequence, not a cause, of the cyclone.

Meteorological Tides. The Tidal Institute of the University of Liverpool, founded in 1919, did much valuable work looking toward forecasting the effects of winds and barometric pressure on tides and on the level of the sea in general. Hayford succeeded in evaluating the effects of winds, pressure, and seiches on the levels of the Great Lakes.

Mathematical Meteorology. As a matter of research, Bjerknes and his colleagues have tried to formulate a mathematical theory of the general circulation of the atmosphere considered as a circumpolar vortex, on the basis of the polar front theory and the hydrodynamics of fluids in which the density is a function of other variables besides the pressure. Incidentally, they have also attempted to work out the course of the future weather in a limited region by mathematical calculations based directly on physical laws applied to initial data as complete as possible, mainly by employing graphical methods to solve the differential equations which embody atmospheric processes. L. F. Richardson, in an admirable study of theoretical meteorology, has coördinated practically every physical and dynamic process of the atmosphere in one systematic set of differential equations and has applied the calculus of finite differences to obtain an approximate analytic solution which might be employed in computing the coming weather. The value of the insight into the mechanism of atmospheric phenomena which such studies provide cannot be overestimated, but of course the calculations of coming weather by such methods are so prohibitively laborious, and the available observational data on which to base them are so imperfect and incomplete at best, as to preclude any thought of the immediate direct application of such methods in practical forecasting.

Miscellaneous. Valuable studies of the radiation of the sun, the nocturnal radiation of the earth, the return sky radiation, and atmospheric radiation have been carried out by Abbot and his colleagues, Dorno, Ångström, Boutaric, Kimball, and others. Brunt has estimated the total kinetic energy of the general circulation to be 3×10^{27} ergs, and the rate of dissipation to be such that 2 per cent of the effective incoming solar radiation must be converted into kinetic energy to maintain this circulation. Clayton, in Argentina, has made the variations of the solar constant a basis for forecasts; but the claim that fluctuations in the solar constant are responsible for all weather changes can hardly be substantiated. What connection, if any, exists between changes in solar radiation and any special weather conditions that may follow remains to be established. Vegard has concluded that auroras are produced by streams of negatively electrified particles (presumably from the sun) passing through the high atmosphere. The lower limit of the aurora is most frequently found at 100 or at 106 kilometers. Streamers extending to an altitude of 500 kilometers have been observed. Vegard's observations indicate that all the lines of the auroral spectrum, including the enigmatic green line, are due to nitrogen.

In a new study of the composition of the up-

per air, Chapman and Milne conclude that up to 110 kilometers nitrogen composes more than half the air, then becomes less predominant, until at 200 kilometers helium alone is present. Vegard's work on the aurora and its spectrum has led him to conclude that nitrogen is predominant to the very top of the atmosphere. Vegard's observations of auroras, as well as Lindemann and Dobson's study of the phenomena of meteors, indicates that the density of the atmosphere above 60 kilometers must be much greater than was formerly supposed. The latter account for this density by postulating a temperature of 300° Absolute for the air between 60 and 160 kilometers, brought about by the absorption of solar radiation in the ozone layer, but Vegard finds this incapable of explaining his observations and favors the hypothesis that the nitrogen is kept up by virtue of existing in the upper strata in the form of fine solid crystalline dust which is highly positively electrified through the photoelectric action of the short wave length solar radiation.

Scientific Organization. Existing international scientific organizations were disrupted by the War. In 1919 the International Research Council was formed to effect international co-operation in scientific work. A section of the International Geodetic and Geophysical Union of this Council is devoted to meteorology. The second meeting was held at Rome in 1922.

Necrology. The following eminent meteorologists died between 1914 and 1924: Henrik Mohn, Sept. 12, 1916; Cleveland Abbe, Oct. 30, 1916; Max Margules, Oct. 4, 1920, and Julius von Hann, Oct. 1, 1921.

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METEORS. See ASTRONOMY.

METHODIST EPISCOPAL CHURCH.

In 1924 there were about 15 different divisions of Methodists, aggregating about 8,000,000 members. The Methodist Episcopal Church was the largest branch. In the United States the membership increased from 3,566,542 in 1914 to 4,330,841 in 1923, the number of ministers from 17,804 to 18,706, and the number of churches from 26,206 to 26,621. The Sunday schools in 1914 numbered 26,840 with an enrollment of 3,746,521; in 1923, 26,345, with an enrollment of 4,366,529. The membership throughout the world increased during the same period from 4,161,306 to 4,952,212. Included in affiliation with the church in the United States was the

work in Denmark, Finland, Korea, China, Norway, Germany, Sweden, Switzerland, Italy, Mexico, Philippine Islands, and several countries in South America. In addition to these mission stations, there were grouped mission conferences in Austria, Bulgaria, Jugo-Slavia, Africa, Netherlands India, Porto Rico, Rhodesia, France, Russia, Alaska, Hungary, and Hawaii. Much of this work was carried on throughout the decade 1914-24 by the Board of Foreign Missions and the Women's Foreign Missionary Societies. The church had 80 hospitals, and during the year 1923 it cared for 148,000 persons. There were, in 1924, 38 homes for the aged and 45 for children. One of the great boards of the church, the Board of Pensions and Relief, had under its immediate care over 8000 retired ministers, ministers' widows, and ministers' orphans under 16 years of age. The annuity claim of this great company was about \$3,375,000 a year. The council of the boards of benevolence between 1920 and 1924 handled over \$66,000,000, which went to the home and foreign fields. In the United States there were 196 colleges, universities, and secondary schools, with over 89,000 students. Outside the United States, in the mission fields, were schools of all kinds, aggregating 3849, with 163,000 pupils. The publishing interests of the Methodist Episcopal Church were conducted by the Methodist Book Concern, which had three publishing plants, at New York, Cincinnati, and Chicago. Average sales were over \$5,000,000 a year.

After many years of effort to join the Methodist Episcopal Church and the Methodist Episcopal Church South, an agreement for union was reached and put before the General Conference of the Methodist Episcopal Church at Springfield, Mass., in 1924, which voted 802 to 15 in favor of the unification plan as agreed on by the Commission of the two churches. This led to the calling of a special session of the General Conference of the Church South, meeting July 2, 1924, at Chattanooga, Tenn.; after three days of vigorous debate, a vote taken on July 4 was 297 to 75 in favor of unification. In August, 1924, the plan had yet to go before the annual conferences of the churches of the South and North; if they gave it a two-thirds majority, unification would then be in effect; and the two General Conferences would be called to meet together.

METHODIST EPISCOPAL CHURCH, SOUTH. This branch of the denomination came into existence in 1845 through a division of the original Methodist Episcopal Church by General Conference action in 1844 when it became evident that the church could not find a policy on slavery acceptable to both sections of the country. It is the second largest branch of the church. The number of communicants increased from 1,996,877 in 1914 to 2,418,336 in 1923; the number of churches from 17,006 to 17,504; and the number of traveling preachers from 7203 to 7970. The number of Sunday-school pupils rose from 1,479,977 to 2,050,137; officers and teachers from 134,930 to 162,439; and members of the Epworth League from 133,380 to 247,552. The denomination maintained a large number of educational institutions, chiefly in the South, comprising 29 universities and colleges, 28 junior colleges, one Bible and Missionary Training School, 28 academies, and 8 mission schools. Its Board of Missions superintended missionary work in Brazil, Mexico,

China, Japan, Korea, and the Congo. Through the Centenary Movement projected in 1918, \$50,000,000 was raised for missionary work, and through the Christian Education Movement, inaugurated in 1920, \$20,000,000 was raised for educational work. A plan to unite the two largest branches of American Methodism was accepted by the General Conferences of both branches. Headquarters were in Nashville, Tenn.

METHODISTS, CANADIAN. Five organizations in Canada similar in their beliefs, the Methodist Episcopal Church, the Wesleyan Methodist Church, the Primitive Methodist Church, the Methodist New Connection Church, and the Bible Christian Church, united to found the Methodist Church in Canada in 1883. Besides Canada and Newfoundland, the denomination has churches in Bermuda affiliated with it. The organization and administration of the church is effected through 12 Annual Conferences, subdivided in many districts. The membership increased from 376,761 in 1915 to 407,264 in 1923, but the number of ministers declined from 2871 to 2106, the number of Sunday schools from 3824 to 3754, and the number of pupils from 420,210 to 407,264; the number of teachers and officers increased from 41,929 to 43,334. The denomination had under its supervision 17 colleges and universities. Foreign missions were maintained in China and Japan.

METHODISTS, COLORED. The Colored Methodist Episcopal Church was organized in 1870 as a separate body under the oversight and care of the Southern Church. According to statistics published by the denomination, the membership increased from 275,000 in 1914 to 366,315 in 1922; the number of preachers in 1914 was about 3000, compared with 3039 ministers and 2500 lay preachers in 1922. The number of pupils in the Sunday schools increased from 79,876 in 1917 to nearly 193,000 in 1922, and officers and teachers increased from 7098 to 18,884; Sunday schools fell from 4007 to 2543. Churches increased from 3000 to 3824. The denomination supported nine colleges and published three periodicals.

METHODISTS, WESLEYAN. The mother church of the denomination and the principal branch in Great Britain and Ireland. It was founded in 1729, the first society was formed in 1739, and the first conference held in London in 1744. The church in 1924 was composed of five main conferences: Great Britain, Ireland, Foreign Missions, France, and South Africa. The membership figures of the denomination showed an increase from 922,796 in 1915 to 933,167 in 1923; the number of churches grew from 17,671 to 18,081, and the number of lay preachers from 30,221 to 33,549. The Sunday schools increased from 10,794 to 11,312, but the number of pupils dropped from 1,121,682 to 1,055,699, and the number of officers and teachers from 143,182 to 133,431. A publishing house was maintained in London.

Primitive Method Church. Known in England as the Camp Meeting Methodists. Church membership increased from 206,812 in 1915 to 210,923 in 1923, but the number of churches fell from 4903 to 4623, the number of ministers from 1149 to 1091, the number of lay preachers from 15,537 to 13,939, and the Sunday schools from 4204 with an enrollment of 447,050, to 4026 with an enrollment of 419,632.

United Methodist Church. Membership in this denomination rose from 185,769 in 1915 to 186,257 in 1923, the number of churches from 3013 to 3043, the number of lay preachers from 6156 to 13,939; and the ministers decreased in numbers from 848 to 745, the Sunday schools from 2286 with 294,039 pupils and 40,744 officers and teachers, to 2216 with 274,056 scholars and 38,422 officers and teachers.

Wesleyan Reform Union. This denomination remained fairly stationary during the decade. Its membership in 1915 was 8526 as compared with 8593 in 1923, the number of churches (206) was the same in both years, the ministers numbered 25 in 1914 and 24 in 1923, and the lay preachers 500 in the earlier year and 432 in the latter. The Sunday schools numbered 195 at the beginning of the decade and 196 at the close.

Independent Methodist Churches. Membership of this denomination increased from 9215 in 1915 to 9639 in 1923, while the number of churches decreased from 163 to 144 and the ministers from 411 to 374.

Australasian Methodist Church. This denomination increased in membership from 149,878 in 1915 to 160,911 in 1923, while the number of churches dropped from 5147 to 4706 and the lay preachers from 8634 to 8218.

New Zealand Methodist Church. This denomination showed a slight decline during the years between 1915 and 1923. Its membership dropped from 24,218 to 22,916, its ministers from 198 to 181, lay preachers from 928 to 774, Sunday schools from 411 to 405 and pupils from 29,917 to 29,154. The number of churches, however, rose from 459 to 825.

Japan Methodist Church. Church membership increased from 13,838 in 1915 to 22,000 in 1923, and church buildings from 245 to 337, but the number of ministers decreased from 232 to 230.

METROPOLITAN OPERA HOUSE. See MUSIC, OPERA.

METZLER, WILLIAM HENRY (1863-). An American mathematician, born at Odessa, Ont., and educated at Toronto and Clark Universities. From 1892 to 1894 he was instructor in mathematics at the Massachusetts Institute of Technology and then accepted a call to Syracuse, where in 1896 he became Francis H. Root professor of mathematics and head of the department. During 1911-17 he served as dean of the Graduate School and in 1921 became dean of the College of Liberal Arts. Professor Metzler's original investigations, on which he published important results, included studies on symmetric functions, vanishing aggregates, and compound determinates. He served as editor of *The Mathematics Teacher* and the *Journal of Pedagogy*.

MEXICAN BEAN BEETLE. See ENTOMOLOGY, ECONOMIC.

MEXICO. A republic of North America with an area of 767,168 square miles, almost equal to the combined areas of Great Britain and Ireland, France, Germany, and Austria. Its total population of 14,100,000, according to the 1921 census, is 30 per cent less than the combined populations of New York and the New England States. Mexico City is the most important centre, with a population over 900,000. It is the capital of the republic and the chief centre of manufacturing, trade, and banking interests. Other important cities are: Guadala-

jara, 149,308, a railway, manufacturing, and agricultural centre of the west coast; Puebla, 101,000; Tampico, 94,378, the most important oil centre and second port of the country; Monterrey, 81,000; San Luis Potosi, 83,000; Vera Cruz, the chief port, 75,000; Merida, capital of Yucatan, 62,000; and Chihuahua, 48,310.

Industries. Mexico was known during 1914-24 principally for its enormous mineral resources, but a very noticeable movement from the rural to the urban centres was apparent, and Mexico was becoming more and more a manufacturing nation. Before the outbreak of the 1910 revolutions, Mexico was the leading industrial nation in the Western Hemisphere, south of the United States.

Petroleum. Prior to 1910, mineral oil was a very small factor in the economic life of Mexico. In that year, the total oil production was 3,634,080 barrels. By 1914 it had jumped to 26,235,403 barrels, an increase of over 700 per cent. Despite political disturbances, which damaged all other industrial enterprises, petroleum production increased steadily from 1914 to 1921, when the peak of production was reached with an output of 193,397,587 barrels, valued at \$182,936,817. Because of exhaustion of old wells and the uncertainty of property ownership, production in the next two years was less. The 1922 production was 182,278,457 barrels (\$167,397,872); 1923, 149,529,088 (\$142,916,885). Total production since 1901, when the first well was brought in, was 1,055,257,562 barrels, valued at \$828,241,710. (All conversions are made at the rate of two Mexican pesos to the dollar.) Mexico was the second largest petroleum producer in the world, standing second to the United States. In 1923, the United States produced 735,000,000 barrels; all other countries except Mexico, 116,000 barrels. Only about 15,000 acres of oil land were exploited in Mexico, while many thousands of acres more were said, on good authority, to contain oil deposits.

Mining. The mineral resources of Mexico were enormous. Except for a short time during the most disturbed period of the revolution, Mexico was the leading silver producing country in the world. The Spaniards worked the silver mines in the early part of the sixteenth century, and the natives before them. The principal minerals were silver, gold, copper, lead, iron, and zinc, although there were also deposits of coal, platinum, mercury, manganese, antimony, sulphur, bismuth, and graphite. The five most important minerals produced in Mexico were silver, gold, copper, lead, and zinc. In 1914, production in general was at an extremely low ebb. After that year there was a very noticeable revival of production; the year 1923 marked a decided increase over previous years. Production in metric tons for 1914, compared with 1922 and 1923, follows:

Mineral	1914	1922	1923
Gold	8.6	23	24
Silver	811	2,522	2,826
Copper	26,337	26,978	53,372
Lead	20,350	110,456	155,721
Zinc	4,620	6,142	18,481

Agriculture. About 5 per cent of Mexico's total area was available for agricultural purposes. Principally as the result of the applica-

tion of so-called agrarian reforms, production decreased greatly in the decade, and large quantities of food crops were imported annually into Mexico. The principal crops raised were corn, wheat, beans, sisal, and cotton. In 1914, production of food crops in Mexico was as follows: corn, 1,992,555,000 kilograms (106,203,181 pesos); wheat, 119,440,000 kilos (9,555,200 pesos); beans, 142,325,357 kilos (15,665,809 pesos). Importations during 1914 were: corn, 1,268,262 kilos (92,444 pesos); wheat, 4,222,737 kilos (30,814 pesos); beans, none. The 1922 production (last year for which official figures were available) was: corn, 1,773,905,089 kilos (104,034,305 pesos); wheat, 370,844,541 kilos (44,501,345 pesos); beans, 115,187,942 kilos (16,123,312 pesos). Imports during 1922 were: corn, 83,906,485 kilos (5,032,111 pesos); wheat, 5,912,812 kilos (548,546 pesos); beans, none. In 1923 the corn crop was exceptionally large, wheat was short, and the bean crop about the same as in 1922. Of the commercial crops, sisal and cotton were the most important. Sisal production in 1922 was 122,400,000 kilograms, and cotton, 38,644,932 kilograms. In 1923, cotton production declined to 27,029,318 kilos, while early 1923 reports indicated the estimated henequen (sisal) crop would be 156,750,000 kilos. The henequen crop for 1924 was estimated before the outbreak of the revolutionary disturbances of December, 1923, at 175,000,000 kilos. The cotton crop in 1924 was expected to be much larger than that of the past few years.

Manufacturing. Manufacturing in Mexico was limited but growing. The textile industry was, in 1924, the most important. In 1923 the Mexican textile mills consumed over 70,000,000 bales of raw cotton. On Oct. 31, 1923, the total investment in buildings and machinery alone was \$36,054,000. A total of 140 mills, of which 108 were in operation, employed 38,232 hands. The total sales effected during the six-month period, May 1 to Oct. 31, 1923, were valued at \$23,878,000. Other important manufacturing industries were boots and shoes, with an average annual production of over 700,000 pairs; lumber works; flour mills, of which there were 82 in operation in 1922, with a total capital investment of over \$6,000,000; hat factories, producing annually about 800,000 pieces; many chemical industrial establishments, producing some 25,000 tons of laundry soap, 4300 tons of candles, thousands of quarts of turpentine, varnish, etc., annually. Five cement factories had a total annual capacity of 310,000 metric tons. Various difficulties kept native production down, and large amounts had to be imported annually. Some 235 mills produced 121,000 metric tons of sugar in Mexico in 1923.

Commerce. The last year for which official figures were available was 1922. Imports then were valued at 303,808,370 pesos, and exports, including petroleum, at 865,933,272 pesos. (Two pesos equal one dollar.) In 1913, imports were valued at 192,292,462 pesos and exports at 300,405,552 pesos. It was significant that despite disturbed political conditions, Mexico's trade was maintained throughout the long period of revolutions. The year 1915 marked the lowest level; imports were 52,821,306 pesos and exports 251,202,988 pesos. Figures for the first six months of 1923 were: imports, 150,167,740 pesos; exports, 123,853,703, showing a distinct falling off in exports as compared with imports.

The highest trade totals were registered in 1921, when imports were 508,074,097 pesos and exports 728,227,156. It is interesting to note that in 1921, United States exports to Mexico had a value four times as great as the exports of 1910, the last normal year in Mexico. Based on United States exports to Mexico in 1910, 1921 exports of cattle were over 25 times as large; rice, 21 times as large; wheat flour, 12 times; corn, $3\frac{1}{2}$ times; cotton manufactures, 15 times; iron and steel products, $4\frac{1}{2}$ times; and meat and meat products, 4 times. Principal Mexican imports were textiles, foodstuffs, iron and steel products, and various manufactures. The leading sources of imports were the United States, Great Britain, France, and Germany. Principal exports were crude petroleum, raw minerals, henequen (sisal), coffee, vanilla, and cotton. The chief countries of destination were the United States, France, Great Britain, and Germany. In 1913, Mexican imports were divided as follows: the United States, 50 per cent; Germany, 13 per cent; Great Britain, 14 per cent; France, 9 per cent; all others, 14 per cent. In 1921, these percentages were: the United States, 67 per cent; Germany, 5 per cent; Great Britain, 9 per cent; France, 9 per cent; all others, 10 per cent. For the first half of 1923, Mexico's imports were divided as follows: the United States, 68 per cent; Germany, 11 per cent; Great Britain, 8 per cent; France, 4 per cent; all others, 9 per cent.

Pastoral Activities. In 1923, the live stock census taken by the government showed a general decrease of approximately 60 per cent in all live stock as compared with 1902, the year in which the last previous census had been taken. Restocking of Mexico's once famous ranges proceeded to only a limited extent, largely because of the uncertainty of land tenure after 1917, and partly because of the lack of capital.

Communications. The period 1914-24 was marked by serious damage to all rolling stock in Mexico, the latest revolutionary movement, that of December, 1923, to May, 1924, adding to the general disruption owing to the fact that about half of the railroads in the country were in the hands of the revolutionaries. Beginning with the creation of the National Railways of Mexico in 1907, by which means the Mexican government acquired 55 per cent of the stock of many of the most important lines, government control was gradually extended until at one time practically all important lines in Mexico were merged into one system, controlled and operated by the government. Following that day, rumors were recurrent that the National Railways were to be returned to their former owners, but denials were always made. On Mar. 10, 1924, an official report gave the ownership of Mexican railroads as follows:

National Railways (majority stock controlled by government, ...	13,205.495 kilometers
Government owned railways	516.765 "
Private railways	7,529.195 "
Total kilometers in operation	21,251.455
Total in miles	13,282

One of the most important single companies listed under "private corporations" was the Mexican Railway, a British corporation, which

ran its main line from Vera Cruz to Mexico City, with a total mileage of 474 miles. This line was taken over in 1916, merged with the National system, and returned in 1920. There were 24 important shipping companies whose boats made regular stops at Mexican ports. Four of these companies were American, operating 19 vessels calling at Mexican ports; 1 Spanish, with 5 vessels; 2 Dutch, with 9 ships; 1 Italian, with 4 vessels; 2 Norwegian, 5 vessels; 2 English, 3 vessels; 2 Mexican, 17 vessels; 3 German, 6 vessels; 2 Czecho-Slovak; 1 Japanese, 9 vessels; 1 French, with 15 vessels; and 1 Argentine company, with 3 vessels. The principal ports were, on the Gulf, Vera Cruz, Tampico, Puerto Mexico, Progreso; on the Pacific, Mazatlan, Salina Cruz, Manzanillo, and Acapulco. Serious port strikes and revolutionary disturbances at Vera Cruz damaged the port's business greatly, particularly during 1923, and its eminence as the leading port of Mexico was from then on seriously menaced by Tampico. During 1923, the Mexican government proclaimed Puerto Mexico and Salina Cruz on the Isthmus of Tehuantepec, and Guaymas on the Pacific, free ports. Formal opening was delayed by the revolutionary outbreak of 1923-24. There were in Mexico 55,786 miles of government-controlled telegraph wires, operating 567 offices, and 17,667 miles of privately owned wire, with 825 offices. There were, too, 27 government wireless stations despatching 153,386 radiograms in 1921. The government also controlled 1181 miles of telephone wire, served by 9 offices; while private companies controlled 51,461 miles of telephone wire and 862 offices. In 1922, 82,982 telephones were in service.

Finance. Compared with 1911, government revenues in Mexico increased over 160 per cent, but expenses mounted in proportion. While the financial statements of the last two or three years of the period showed a favorable balance, no mention was made in these statements of unpaid current obligations and the many claims arising from losses suffered during the long years of revolutions and from current confiscations of lands under the various state agrarian laws. In the 1922 and 1923 statements, no provision was made for a sinking fund to meet either interest or principal of any of these numerous obligations. In 1911, total government receipts were 111,142,401 pesos and expenditures 100,913,923; in 1922 receipts were 277,567,019 pesos and expenditures 267,137,468. It is of importance to note that the 1911 financial statement provided for an expenditure of almost 29,000,000 pesos for the public debt, an item which was entirely omitted in the 1922 balance sheet. The 1911 statement showed expenditures of 20,434,155 pesos for the War Department, and this had jumped to 111,021,291 pesos by 1922, not counting an expenditure of 12,917,432 pesos for the army uniform factory.

All sorts of taxation were greatly increased, and the year 1924 was ushered in with a general income tax and an increase in practically all other Federal taxes, as the financial situation of the government was admittedly very serious. Various schemes for floating a loan in the United States were reported from time to time, but none materialized. Very important steps were taken in the last few years in Mexico towards a complete financial rehabilitation, and if political disturbances should cease Mexico

would soon be once more among the favored nations financially. One of these innovations was the de la Huerta-Lamont agreement, commonly called the Bankers' Agreement of 1922, which provided a plan for the refunding of Mexico's foreign debt. Under the terms of this agreement, 30,000,000 pesos were paid by the Mexican government to the Bankers' Committee in New York during 1923, and provisions were made for an increase of an additional 5,000,000 pesos yearly until, by the fifth year, 50,000,000 would be paid. Despite the very serious financial embarrassment of the Mexican government during the last months of 1923 and the opening months of 1924, the payments falling due in 1923 (30,000,000 pesos), as well as the first payments corresponding to 1924, were faithfully made. Another important step in the financial history of Mexico was the adoption of a budget system in 1922. Under that budget, revenues for 1923 were estimated at 278,000,000 pesos, and expenses at 297,000,000. Although no official figures were available, decreased petroleum production and consequent loss of revenue, plus the losses due to the closing of Vera Cruz and other sources of customs revenues, decreased the 1923 figures far below original estimates. It seemed likely therefore that despite the fact that many of the budgeted expenditures were contingent on funds' being available, the years 1923 and 1924 would show considerable deficits.

The need of a circulating medium other than metallic currency was recognized in Mexico, but the abuses of overinflated paper currency, particularly during the years 1914-17, created a very strong feeling against that sort of circulating medium, and all paper money was excluded by law. Business was cramped in consequence. To remedy this situation, a sole bank of issue was projected, the opening of which was rumored and prophesied on many occasions. Important details of capitalization, and especially the question of control which the Mexican government wanted held in Mexico, had, to 1924, delayed formal plans. The banking crisis of 1922, when the important Banque Française du Mexique failed, drawing a number of smaller banks into bankruptcy with it, passed without the further serious economic disturbances which had at first been feared. Economic stringency limited practically all banking operations, and credit continued to be very restricted, and money tight. Compiled statements on the condition of Mexican banks on Oct. 31, 1923, showed the commercial banks with a total of 27,441,004 pesos cash on hand and total deposits of 85,104,510 pesos, while the banks of issue showed 14,045,729 pesos cash on hand and 35,586,575 pesos deposits, making a total of 41,487,303 pesos cash on hand and 120,691,085 pesos total deposits. The cash on hand was divided as follows: gold, 32,209,041 pesos; silver, 3,100,103 pesos; fractional silver currency, 5,834,577 pesos; and United States currency, 655,077 pesos. Mexico City predominated in commercial banking business, with more than 75 per cent of the deposits and an equal percentage of the total cash on hand.

Education. The school system in Mexico was largely under government control. From 1896, earnest attempts were repeatedly made to better the general standard; lack of funds and disturbed political conditions interfered seriously with projected improvements from 1910. Nevertheless, in 1922, the school budget amounted to

45,000,000 pesos as compared with 2,000,000 pesos in 1920 and 9,000,000 pesos in 1921. In 1907 there were 11,940 elementary schools supported by the national, state, or municipal governments, with 776,622 pupils, and 2499 private schools with 152,917 pupils. In 1922 these numbers were as follows: government primary schools, 8388; private, 1327 schools; 711,592 pupils in government schools; 108,183 pupils in private schools. The total number of teachers in 1922 was 20,407 in all primary schools. The highest per capita school attendance outside of the Federal District, which includes Mexico City, was registered in the extreme northern state of Sonora, and this was followed by Lower California, Coahuila, and Quintana Roo, in the order named. The lowest percentage of attendance per capita was in the State of Oaxaca. The Constitution of 1917 made school attendance compulsory for all children under 15 years of age. This same document forbade the establishment or direction of primary schools by religious bodies of any denomination, but there remained a comparatively large number of such schools established throughout the country. In recent years States passed individual laws aimed at religious schools, but these were not rigidly enforced. In 1916 it was officially stated that 80 per cent of the population in Mexico was illiterate. Determined efforts on the part of interested educators of note, chief among whom stood José Vasconcelos, resulted in reducing this high percentage by 1924 to about 65 per cent. Great strides were being made in Mexico toward a better and more general and accessible system of education, and the programme for the first half of 1924 called for the formal opening of the Benito Juárez Educational centre, in Mexico City, to accommodate 4000 children of both sexes, and equipped with library, swimming pool, etc. The Gabriela Mistral, in another section of Mexico City, was also to receive 4000 students, boys and girls, as well as some older students. A national stadium and a Hispano-American Flag Room and library were also to be opened, while on May 15, 1924, on the outskirts of Mexico City, the José María Morelos school was to begin functioning by receiving 5000 students. In May, 1924, it was planned to inaugurate the Technological Institute in Mexico City. In 1910, the National University in Mexico City was refounded, and in 1924 it possessed an enrollment of over 7000 students. A number of special schools were also maintained by the government; chief among them were schools of law and medicine, agriculture, engineering, mining, commerce, and fine arts. Over 150 libraries and 34 museums were established throughout the country in the larger cities. The National Library alone, in Mexico City, contained over 200,000 volumes.

HISTORY

From the accession of Gen. Victoriano Huerta as provisional president on Feb. 18, 1913, until the defeat and flight of Adolfo de la Huerta in 1924, Mexico passed through a series of revolutions, civil wars, and attempted revolutions, in all of which foreign economic interests, and especially the interests of the United States, were so significantly involved as to rival if not overshadow in importance the domestic agrarian, religious, and constitutional issues which were at stake. The Huerta government was from

the outset in ill favor with the Washington administration, partly because Huerta was considered to have been responsible for the killing of the deposed president, Madero, on Feb. 23, 1913; partly because President Wilson believed Huerta's rule to be an obnoxious "military despotism"; and partly, as the letters of Walter Hines Page disclose, because a strong suspicion prevailed at Washington that Huerta was merely the tool of Lord Cowdray, the British oil magnate. By refusing to recognize Huerta, President Wilson had made it almost impossible for the provisional government to borrow money. By lifting the embargo on arms, on Feb. 3, 1914, a step which played directly into Huerta's enemies' hands, for they controlled the North and alone could purchase munitions in the United States, the American government afforded valuable assistance to the rebels. It is doubtful whether the ensuing struggle between Huerta's Federalist forces and Carranza's Constitutionalists was plainly between despotism and democracy. The rebels were not exactly the whole-hearted defenders of peasant rights, for Carranza was himself one of the largest land-owners, while Huerta during his short term had already moved to alleviate agrarian distresses; the rebels made no secret of their enmity toward the Roman Catholic church and openly persecuted the clergy; the meddling of foreign interests whose great property rights made Mexico a peculiar concern was not to be overlooked; the ambitions of military leaders, the desire for plunder and power, were undoubtedly potent factors. In short, the conflict was due to a complexity of interacting causes. President Wilson's "watchful waiting" policy materially influenced the outcome. Huerta was soon beset by enemies. To the north he was pressed by Villa, Angeles, and Gonzalez; to the west by Buelna, Cabrera, and Obregon; to the south by Zapata and Alvarado. One after another of his ministers deserted him, Rojas, Lozano, Tamarez, and Moheno (May-July, 1914). The *coup de grâce* was struck when American suspicious aloofness turned into direct interference. The arrest of American marines bound on a peaceful errand at Tampico on April 9 was immediately apologized for, but Admiral Mayo's insistence that a salute be rendered to the flag, in which he was reluctantly supported by Wilson, and Huerta's refusal unless the Mexican flag be similarly saluted, were the factors leading to the break. On April 21 American marines landed at Vera Cruz for the purpose of seizing the custom house. But firing from the houses made it necessary to clear the streets and take over the terminals and cable and telegraph offices. In the fighting 18 marines were killed and 70 wounded. The storm of resentment was universal in Mexico. Carranza might have joined Huerta in defying the United States had it not been for the cooler counsels of Villa. Thus isolated, Huerta was compelled to accept the proffer of mediation tendered by the A. B. C. Powers, i.e. Argentina, Brazil, Chile. Mediators met at Niagara Falls on May 20, but no solution presented itself that was at once acceptable to the Huertistas, the Carranzistas, and the Americans. Carranza's generals, in a conference at Torreón in July, 1914, expressed themselves as unequivocally opposed to any treatment with Huerta short of unconditional surrender. The result was a decision to continue the fighting. This turn of

affairs hastened Huerta's fall; he resigned on July 15. His successor, Francisco Carbajal, remained in office less than a month. The Constitutionalists now hastened their advance. San Luis Potosí fell on July 17, Guaymas on July 18, Manzanillo on July 24, Guanajuato on July 28; Pachuca, Toluca and Morelia, August 9-10. On August 13 a protocol was signed arranging for the peaceful capitulation of Mexico City. On August 15, General Obregon rode into the capital at the head of 15,000 men. On August 20 Carranza made his triumphal entry.

Carranza's accession failed to inaugurate the peaceful reign of democracy. In September the bandit Zapata, erstwhile Constitutionalist, resumed his lawless activities on the refusal of Carranza to accept his agrarian reforms. Another revolt was the work of Gen. P. Orozco in the neighborhood of Aguascalientes. Late in August a counterrevolutionary movement was inaugurated near Puebla by 20,000 former Federal soldiers under the leadership of Generals Almazan, Aguilar, and Argumedo. Villa, however, was the most formidable enemy of the new government. On September 23 he declared war on Carranza, and with no decisive results hostilities dragged on. A convention of military delegates called by Carranza in October in Mexico City moved to Aguascalientes where it was dominated by Zapatistas and Villistas. On October 30, the convention decreed the retirement of both Carranza and Villa and on November 2 elected Gen. E. Gutierrez provisional president. Carranza refused to heed the decree of the convention, and, establishing himself at Puebla, prepared for trouble. On November 24 the Carranzista forces were withdrawn from Mexico City, leaving the capital a prey to the Zapatista bandits, who were at once joined by Villa. Meanwhile the Americans had evacuated Vera Cruz and possession was taken by Carranza. Amid the conflicts between the rival factions the state of the civilian population was anything but happy. From the provinces came reports of churches desecrated, of violence done to priests and nuns, of towns and estates plundered. The lot of the clergy was particularly unfortunate and elicited the commiseration of Pope Benedict XV on Oct. 25, 1914.

The history of the next two years is the story of the varying fortunes of Villa and Carranza, of Constitutionalists and "Conventionists." A third party, for a brief time, was injected into the squabble, when Gutierrez, who had been unseated on Jan. 17, 1915, gathered a force and established headquarters at Pachuca. On January 26, having been defeated in skirmishes about the city, Villa evacuated Mexico City and retreated northward. In February he encountered the forces of Gutierrez and Carranza in separate battles of San Luis Potosí and won decisive victories. On February 13 he captured Guadalajara, but early in March "Conventionists" retook Mexico City. Thence on, his star declined. In three disastrous attempts to capture Celaya from General Obregon, Villa lost in killed and wounded more than 20,000 men. In May he had to give up Monterey and suffer defeat at Paredon and Trinidad Station. In all these forays Mexico City was always the focal point. During 1915, Constitutionalists and Conventionists each held the city for three periods, to the infinite harm of the population, native and foreign. Levies were imposed on foreigners,

and shops were pillaged; rioting became a commonplace. By June the city was almost completely isolated, and the dearth of food presented a very real danger. This, and the continued protests of foreign nations against the destruction of lives and property, once more brought the United States on the scene. On June 2, President Wilson issued a declaration of policy which held out the promise of aid to any party capable of winning a decisive victory. This served as a spur to renewed activity. Mexico City was taken, lost, and taken again in the month of July by Constitutionalists under Gonzales. Meanwhile the United States had invited the ambassadors and ministers at Washington of Argentina, Brazil, Chile, Bolivia, Guatemala, and Uruguay to a conference for the consideration of Mexican affairs. The conference assembled in August, and in an appeal dated August 11 it called on the warring factions to get together for an amicable discussion of their differences and the best interest of their country. Villa consented; Carranza refused on the ground that he could not tolerate "that the interior affairs of the republic be handled by mediation or by the initiative of any foreign government." Regardless of this check, the conferences met once more in New York City on September 18 and decided that recognition would be accorded that group which could give evidence of possessing "material and moral capacity necessary to protect the lives and property of natives and foreigners." Three weeks later the conference accorded *de facto* recognition to Carranza. With the other nations, Colombia and Nicaragua joined a little later. Immediately after, 200 of Zapata's officers laid down their arms, and Gutierrez likewise surrendered. Villa alone remained. His next move was startling and could be interpreted only as the result of a desire to force American intervention. On Jan. 11, 1916, a band of Villistas stopped a train near Santa Ysabel, removed a party of 19 engineers on their way to open a group of mines, and in cold blood killed all but one.

Indignation in the United States reached fever heat. Resolutions were immediately introduced in Congress demanding intervention; the President's "watchful waiting" policy was strongly attacked. Only calmer counsels prevented the passage of the resolutions and the forcing of the President's hand. Information divulged by Secretary Lansing indicated how precarious was the position of Americans in Mexico and on the border. Figures showed that 76 Americans had been killed in the three years preceding Jan. 1, 1916. Of these, 24 had been killed from causes arising directly out of revolution; 44 by bandits, Indians, and civilians; and 8 in a railroad accident which was a result of the disorders. Between 1913 and 1915, 20 American civilians, 16 American soldiers, and 62 Mexicans were killed on the American side of the border. Two months later the events occurred which led the United States to intervene directly. On March 9, the border town of Columbus, N. M., was suddenly raided at night by some 1500 Villistas, and 11 civilians and 9 troopers were killed. With the almost unanimous consent of Congress, the President despatched a punitive expedition under General Pershing across the border in hot pursuit of Villa. Carranza's conduct throughout the preceding discussions had been extremely ungracious. Conditions laid down by

him, though onerous, were accepted; the pursuing forces were not to cross the line within six miles of any town on the border or to occupy any city or town; railroads could be used only in case trains were not guarded. From Casas Grandes three divisions of troops radiated in different directions. Near Guerrero a clash took place which resulted in the rout of Villa and his men. The most important conflict, during the chase, ironically enough, took place between Americans and official Mexican troops. On April 12, a detachment of cavalry, about to encamp outside the city of Parral, was suddenly attacked in the rear and, both flanks and compelled to retire to a nearby village for shelter. Only the arrival of reinforcements at nightfall prevented the occurrence of what might well have been a tragedy. Villa, however, was not heard from, though the American occupation continued. In May, Generals Scott and Funston met with Generals Obregon and Trevino, but without result. On May 22, Carranza, in a long note in which he questioned the sincerity of American purposes, demanded the immediate withdrawal of the American troops. The American reply was the sending of all available regulars to the border and the calling out of the militia of Texas, Arizona, and New Mexico. On June 18 the entire organized militia and national guard of all the other states were called into the service. By July 31, 112,000 militia troops were transported to the border. Border raids continued from time to time, and small detachments occasionally crossed the boundary line in pursuit. On June 20, Secretary Lansing replied to Carranza and bluntly refused the withdrawal of the American troops. On the same day American troops were attacked at Carrizal by Mexicans and after a hot fight were compelled to retreat. The Americans killed and wounded numbered 16; the captured, 24. A few days later the prisoners were released. During the following month the American troops gradually withdrew northward. On July 4, in a note to the State Department, Carranza suggested mediation on the part of Latin-American countries as a way out of the difficulties. From Sept. 15, 1916, to Jan. 15, 1917, a commission assembled in the United States; but it was made up of only American and Mexican delegates. While the commissioners sat, civil war again broke out. In October and November, 1916, Villistas were active in the neighborhood of Chihuahua. During the prolonged sittings of the commission it became evident that the only real question under discussion was the right of the United States to send punitive expeditions into Mexico. On November 24 a protocol was signed by all the delegates which called for American withdrawal in 40 days, though the United States reserved the right to pursue bandits who had invaded American territory. It was not clear in 1917 just what had been accomplished. Mexico refused to accept the protocol; the problem of guarding the American border was left unsolved; and those larger questions of international relations which had been the peculiar concern of President Wilson were not touched on. On Feb. 5, 1917, the withdrawal of troops from Mexico was complete, and the militia on the frontier was rapidly being reduced about the same time that Henry P. Fletcher, American ambassador, left for Mexico.

On Oct. 22, 1916, delegates had been elected

to a Constitutional Assembly. This body, representing only adherents of a *de facto* government, met at Sueretaro on December 1, and by Jan. 31, 1917, it had completed a new fundamental law. The document contained many advanced provisions; the presidency could be held for only a single term; suffrage was to be universal without distinction of sex; a radical labor code provided for an eight-hour day, the minimum wage, compulsory profit sharing, and a free employment bureau; the religious orders were expropriated, their churches, schools and hospitals confiscated, and the schools secularized. The most famous provision, Article 27, restored communal lands to Indian villages; authorized each state or territory to fix the maximum area which any person might own and to subdivide excess holdings; deprived religious organizations of the right to own land; and, probably most important of all, declared ownership of all minerals and petroleum resources to be vested "in the nation." Only Mexicans by birth or naturalization were to have the right to acquire ownership of lands or to obtain mineral and oil concessions; foreigners could receive such rights only by agreeing to renounce their rights of appeal to their home governments. On Mar. 11, 1917, Carranza was elected president. Most of the events of the next three years hinged on Article 27. It had been incorporated in the constitution against Carranza's wishes and as a result of the agitation of the more radical followers of Obregon. Immediately on its promulgation, state after state formed agrarian commissions which proceeded to confiscate and redistribute the land in the interest of the Indian peons. Carranza, in order to check these local commissions, found it necessary to appoint a National Agrarian Commission for the administration of the matter on a more scientific basis. It thus became evident that something like an agrarian revolution had been started. International complications soon arose to thwart this attempt at putting the Mexican house in order. The nationalization of the subsoil struck at the foreign ownership of the very rich oil fields in Mexico. On Feb. 19, 1918, the Mexican government proceeded to inaugurate this policy by imposing area taxes and ground taxes on foreign concessions. Other decrees of a similar purport followed during the year. Protest, of course, was inevitable, and, as events proved, unavailing. On April 2, Mr. Fletcher, on behalf of the American government, filed a note declaring that "the seizure of property at the will of the sovereign without legal process equitably administered and without provision for just compensation has always been regarded as a denial of justice and a cause for diplomatic representation." The refusal of foreign operators to conform with the governmental decree was followed by a refusal to issue drill permits. The lower Mexican courts upheld the government; not until much later was the air cleared. Appeal taken to the Supreme Court finally brought in 1922 the decision that while under Article 27 the right of ownership by the state to all subsoil resources could not be questioned, nevertheless all individuals and companies who had purchased properties for the express purpose of exploiting their mineral and oil deposits were to be protected in their private rights. The retroactive character of the article was therefore disclaimed. On this basis, drilling

permits were once more issued in 1922, and partial operations were inaugurated after a four-year cessation of activities.

The ensuing years of Carranza's administration could hardly be characterized as fulfilling the high democratic hopes entertained for the Constitutionalist movement. Peace, of course, Mexico never enjoyed. Banditry continued to operate in defiance of the Mexican soldiery, though possibly with their connivance, too. In reprisal for Mexican outrages, American border troops often found it necessary to cross the frontier in pursuit of raiders. During 1919 alone, more than 300 serious outbreaks were reported to the Senate Committee on Foreign Relations. A particularly flagrant act was the capture and holding for ransom of William Jenkins, a United States consular agent, on October 19. Despite the strong protests of the State Department, the Mexican government refused to release Jenkins on the ground that he was implicated in his own abduction. On December 4, however, he was suddenly set free. While commerce increased under Carranza and taxes were being collected more widely than before, anarchy in government was conspicuous. Official corruption flourished; dissension among the leaders added to the prevailing unrest; the constitution, with its radical pretensions, was flagrantly disregarded. How unstable affairs were, the events of 1920 indicated. As the presidential election campaign progressed through 1919 and 1920 it became evident that Obregon, with the support of the army, the radicals, and the foreign interests, was going to win over Carranza's nominee. Carranza's action was typical. Obregon was summoned to Mexico City under arrest. Meanwhile the state of Sonora had broken out into open revolt because of Carranza's attempt to control it. By the end of April the West and North were under arms. In the interim Obregon had made his way safely from Mexico City to the insurgents' camp and was in the field. On April 23, the revolutionists proclaimed a new provisional government with Adolfo de la Huerta as president. On May 7, after the city of Vera Cruz had capitulated to the insurgents, Carranza fled from the capital and made for the seacoast, ostensibly to escape the country. His flight was impeded at almost every step. On May 21, after having surrendered himself to the troops of General Herrera, he was treacherously shot and killed while asleep in a hut near the village of Tlaxcalantongo in Puebla.

On May 24, 1920, the Mexican Congress chose Adolfo de la Huerta as provisional president; in the September election Obregon was victorious, meeting with only a nominal opposition. He was inaugurated on Dec. 1. Obregon's administration was marked by steady progress. His sympathies with labor and the agrarian elements were indicated in legislation designed to further their prosperity through the enforcement of the labor code and the agrarian articles of the constitution. The restoration of lands formerly held by villages and tribes, which had been expropriated by individuals, steadily proceeded, and so did the partitioning of the great estates. During the first half of 1923 alone, over 600,000 acres were restored and 1,500,000 acres turned over to peasants by the Mexican Agrarian Commission. Federal lands, including water rights, were thrown open to homesteaders. No attempt was made to inter-

fere with the Socialist régime of Governor Corriillo in Yucatan. From 1921, the rehabilitation of the railways made a continuous advance; even building was undertaken on a large scale. The army was reduced to 50,000 men, and the pay of the official bureaucracy was cut. A consistently friendly attitude was displayed toward foreign nations and their nationals. On July 13, 1921, President Obregon invited all interested countries to send representatives to constitute a permanent Mexican claims commission; in November, France, Great Britain, Italy, Spain, and the Netherlands accepted. Steps were taken to clear up the tangle of the national debt. In September, 1921, Thomas W. Lamont of J. P. Morgan and Company arrived in Mexico for the purpose of effecting arrangements for the funding of the bonds held by Americans, British, French, Dutch, and Belgians. The accrued interest on Mexican external bonds now amounted to some \$200,000,000. In September, 1922, an agreement was reached with the international bankers by which the Mexican government pledged itself to set aside annually for the service of the debt the entire proceeds of the oil export tax, 10 per cent of the gross revenues of the national railways, and all the net operating revenues of these railways. Late in 1922 the first interest payment on the bonded indebtedness was deposited in New York. Nothing exhibited better the honest purposes of the administration than the attitude adopted toward Article 27. In spite of an active interventionist propaganda carried on in the United States by oil interests, to which Senators King and Fall lent their influence, Obregon refused to be turned from his course. He declined to formulate a treaty with the United States, based on the recognition of American property rights, before his own government was recognized. In 1922 he signed a decree declaring that Article 27, in accordance with the decision of the Mexican Supreme Court, was not retroactive; but further concessions he would not make. The responsibility for nonrecognition now shifted to the United States, for Mexico had met all foreign demands relative to the external debt, the outstanding claims, and the retroactive character of the offensive constitutional article. The United States delayed until the spring of 1923, when two American commissioners were despatched to Mexico City to treat with the government. During the course of the ensuing negotiations, the Mexican government evinced a conciliatory disposition by enacting a new petroleum law on April 26; it confirmed the validity of concessions obtained before May 1, 1917, but required concessionnaires to revalidate their claims within three years. Likewise, Obregon endeavored to facilitate a settlement of the land problem by increasing the size of estates permitted to individual owners and by granting immunity from expropriation to large irrigation companies having colonization contracts with the federal government. A provision for indemnification, in public bonds, of landowners who had suffered from confiscatory measures between 1913 and 1917, failed to satisfy the American commissioners, who demanded payment in money. Not until August 15 was a final agreement reached. In regard to oil and minerals, the subsoil rights acquired and exploited by American companies before May 1, 1917, were validated, but the provisions of the constitution were to be applied after that date.

The same understanding was applied to agrarian lands so that all titles acquired after 1917 were subject to the agrarian reform laws. To this agreement were appended conventions calling for the creation of two mixed claims commissions, one for the settlement of American claims arising from disorders of the revolutionary period, the other to deal with all other claims of nationals of either country against the other. In accordance with this agreement, the United States formally recognized the Obregon government on Aug. 31, 1923. France quickly followed suit, but the British foreign office continued to withhold recognition, perhaps because of uncertainty regarding the security of British oil interests. On its part, the Mexican government carried out the agreement in regard to oil rights by a decree dated Nov. 10, 1923; subsoil rights acquired and exercised, or about to be exercised, prior to the promulgation of the constitution in 1917, were respected, but henceforth in all titles to land included in the national domain, the nation's ownership of subsoil resources was to be expressly reserved. The land agreement did not prevent energetic continuation of Obregon's programme of land reforms. On the contrary, almost 300,000 hectares were distributed between August 4 and November 20, under a decree permitting landless citizens to claim homesteads on public land.

The agreement with the United States was undoubtedly the outstanding event of the year 1923, but notable also were the adoption of a budget allotting \$15,000,000 for payment on the international debt account, the assassination of the once prominent revolutionary leader Francisco Villa on July 20, the expulsion of the papal representative, Mgr. Filippi, and the beginning of a momentous electoral campaign. The two last-mentioned occurrences require further notice. Mgr. Filippi incurred the displeasure of the government by participating in an open-air religious ceremony to celebrate the laying of the cornerstone of a shrine in defiance of the orders of the governor of the state (Guanajuato). The Federal government promptly supported the governor in his prohibition of Catholic ceremonies out-of-doors, and Mgr. Filippi was compelled to leave Mexico at once. This episode evoked protests not only from the Vatican but from numerous Catholic organizations in Mexico itself and in other countries, but it was only one of numerous anti-clerical measures. The law passed by the Durango state legislature later in the same year, limiting to 25 the number of clergy for each religious denomination in the state, which at that time had over 200 priests, was a typical manifestation of the anti-Catholic feeling prevalent among many of the local politicians. Such interferences with religious liberty alienated many of Obregon's supporters and were in some measure responsible for the organization of a counter-movement, modeled on the plan of the Italian Fascisti (q.v.), to defend, among other things, the interests of the Catholic Church.

The presidential campaign, in anticipation of the elections scheduled for July 6, 1924, was begun quite early in 1923 and soon overshadowed all other interests. President Obregon himself was debarred from becoming a candidate for reelection under the terms of the constitution of 1917, but two members of his cabinet appeared as candidates for nomination by the government

party, the Cooperatistas. General Plutarco Calles, resigning his post as minister of the interior, appeared first in the field, in September, and anticipated an easy victory as President Obregon's personal choice. But a majority of the Cooperatista party, it developed, preferred the finance minister, Adolfo de la Huerta, who had played a conspicuous rôle in the recent negotiations with the United States. After seemingly hesitation, de la Huerta yielded to the promptings of his friends, resigned from the ministry, and in October entered the lists against Calles. President Obregon now hastened to support his protégé Calles. Through a new finance minister, Alberto Pani, Obregon accused de la Huerta of gross extravagance and responsibility for Mexico's virtually bankrupt condition. Nevertheless, the Cooperatista party, assembling in convention at Mexico City, defiantly nominated de la Huerta as its candidate, and the latter promised to stand on the Cooperatista platform of promoting coöperative enterprises, indemnification of landowners for estates divided among the peasants, and protection of municipal home rule. The Social Reform party, the National Independent party, and several other organizations likewise rallied to de la Huerta's standard, in support of what might be called liberal conservatism, i.e. agrarian reform of a moderate type. General Calles, on the other hand, was nominated by the National Agrarian party, and pledged himself not only to maintain the constitution but also to carry out the agrarian reform in a thoroughgoing fashion and to champion the interests of the workingmen. A minor candidate was General Flores, nominated by the Reformed Revolutionary party. Meanwhile excitement had been raised to an extraordinary height by various provincial elections, important because each faction was eager to control the local governmental machinery and thus to secure victory in the coming national contest. In several of these local contests blood was shed. Claiming that the Federal administration was interfering in the state elections and violating state sovereignty, the de la Huerta faction resorted to desperate measures. On Dec. 5, 1923, they issued the Plan de Vera Cruz, a plan for a new insurrection, and at once the military forces in the states of Vera Cruz, Chihuahua, Michoacan, Tamaulipas, and San Luis Potosí accepted the call to rebellion. Once more the country fell a prey to civil war, with all its accompaniments of banditry, confiscation, and "executions." The rebels soon gained other states, Yucatan, Oaxaca, Guerrero, Guanajuato, Jalisco, Colima. Their armies moved against the capital. In the provinces the movement clearly revealed its conservative character; its energy was directed hardly less against "reds" and labor unions than against the Obregon government. Ostensibly, however, the aims of the rebels were declared by de la Huerta to be the respect of life and property, legislation regarding the rights of labor and capital, indemnification for expropriated landowners, respect of elections, abolition of the death penalty, woman suffrage, and educational reform. Other reasons for the rebellion were later divulged, or alleged, by President Obregon. Officials of the Aguila Oil Company, it was charged, had aided the de la Huerta forces, although on the other hand Doheny, American oil operator, admitted lending the Obregon government \$5,000,000 to suppress the rising; there

was some ground for suspecting, therefore, that this new civil war, like some of its predecessors, was at least tainted with oil. Yet another cause of the break between Obregon and his former lieutenant was disclosed by the president; during the Lamont negotiations of 1922 de la Huerta had obtained Obregon's consent to an otherwise unacceptable debt settlement by telegraphing to him the news, subsequently revealed to be untrue, that Lamont had guaranteed the basis of a new bank to aid in the financial reconstruction of Mexico. Without this bank, the debt settlement had proved unduly burdensome. In the light of this charge, it is almost paradoxical that the United States Government should have favored Obregon against de la Huerta; yet such was the case. The United States Government sold arms to Obregon, refused arms to the rebels, and threatened a naval demonstration against the latter in January, 1924. Thanks in part to the benevolence of Washington and also to the loyalty of large elements in the Mexican population, notably of organized labor, Obregon emerged victorious. Although several notable successes were achieved by the Huertista forces under their able commander, General Estrada, in December, 1923, the tide soon turned. The Federal forces recaptured the important railway centre of Puebla on Dec. 22 and began to press back the lines which had been closing in on the capital. Throughout January, 1924, the opposing armies were deadlocked. Early in February Obregon's troops took the seaports of Vera Cruz and Tuxpam; soon afterward Guadalajara fell; the states of Michoacan, Guanajuato, Jalisco, and Colima were reclaimed; several of the insurgent armies were dispersed, and their commanders captured or put to flight. By the end of March the rebels had lost all except portions of Yucatan, Campeche, Tabasco, and Chiapas, and the outcome had become sufficiently clear to warrant Charles B. Warren in presenting his credentials on March 31 as ambassador from the United States. In April, Yucatan and Chiapas were cleared of rebels. De la Huerta himself fled from Mexico. Rounding up the remnants of the once imposing Huertista army was a slow process, but it had been virtually completed by the date set for the presidential elections, July 6.

With de la Huerta eliminated, General Calles was able to enter the elections without formidable opposition. Calles himself had suspended his political campaign to serve in Obregon's army against the insurgents and resumed his candidacy only in the last week of March, after the danger had been averted. More distinctly than ever he was now stamped as the approved candidate of the Obregon government; and more than ever, in view of the Huertistas' attacks on labor radicalism, he was supported by the working classes as well as by peons hungry for land and by middle-class liberals. He openly endorsed the radical land-reform policy of Emiliano Zapata, thus winning favor with the peasantry. He voiced a wish that wages in Mexico might be as high as in the United States, a wish that was not less effective politically because it was utopian. Yet he took pains to dissociate himself from Bolshevism or "red" Socialism. His opponent, General Flores, stood on a platform of "progress, order, and honesty," and was generally supposed to enjoy the support of conservative business and landed interests, the moderate wing of the working class,

the moderates, and Catholics of clerical tendency. The election was held on July 6 in what for Mexico may be considered an exceptionally peaceful manner. Official returns came in so slowly that the definitive announcement of the result was not expected before autumn; Calles, however, was generally believed to have been the victor.

One unfortunate aftermath of the Huerta rebellion was the failure of the Mexican Government to meet the payments due on June 30 under the Lamont-de la Huerta agreement. Not only had the civil war made heavy drains on the treasury, but, President Obregon explained, he had been unable to obtain a foreign loan; moreover, the obligations incurred by the agreement were accepted on the basis of de la Huerta's false statement that he had obtained the promise of a loan for irrigation works and for the establishment of a central bank of issue. Failing this loan, it had been impossible, even by the most drastic economies and sacrifices, to fulfill the bargain of 1922.

MEXICO, CULTURE OF. See ETHNOGRAPHY. **MEYER, ADOLF** (1866-). A Swiss neurologist, born near Zurich. He studied at many universities in Europe and in 1892 came to the United States, where he was on the staff of the University of Chicago and of several hospitals. From 1902 to 1910 he was director of the Pathological Institute for the New York State Hospitals and from 1910 professor of psychiatry and director of the Henry Phipps Psychiatric Clinic at Johns Hopkins Hospital. He was a member of many medical and scientific societies and wrote much on neurology, pathology, and psychiatry.

MEYER, EDUARD (1855-). A German historian (see VOL. XV). He discarded his English and American degrees in 1919. Among his works are *Die Aufgaben der Höheren Schule und die Gestaltung des Geschichtsunterrichts* (1918); *Cæsars Monarchie und das Prinzipat des Pompeius* (1919); *Preussen und Athen* (1919); and *Ursprung und Anfang des Christentums* (1920-22).

MEYER, HERMAN HENRY BERNARD (1864-). An American bibliographer, born in New York City. He studied at Columbia University and at Pratt Institute Library School and was for several years engaged in the profession of engineering. From 1905 he was chief of the periodical division of the Library of Congress and was also chief of the order division and chief bibliographer there. He wrote many books, including *Inland Waterways of Europe* (1910); *Employer's Liability and Workman's Compensation* (1911); *Capital Punishment* (1912); *Europe and International Politics* (1914); *Divorce* (1915); *Monroe Doctrine* (1919); *Scientific Management* (1920); *Treaty-making Power* (1920), and *Income Tax* (1921).

MEYERHOFF, OTTO. See HILL, ARCHIBALD V.

MIAMI CONSERVANCY FLOOD PROTECTION. See FLOODS AND FLOOD PROTECTION.

MIAMI UNIVERSITY. A coeducational institution at Oxford, Ohio, founded in 1809. The student enrollment increased from 651 in 1914-15 to 1556 in 1923-24, the faculty membership from 51 to 102, and the number of volumes in the library from 47,000 to 71,500. An addition was built to the library at a cost of \$142,000; the university hospital, the indus-

trial arts building and Wells Hall, a dormitory for girls, were completed; and work was under way on Ogden Hall, a new men's dormitory, a freshman dormitory, the McGuffey addition, and a new recitation building, in 1924. A tract of 93 acres was added to the campus. President, Raymond M. Hughes.

MICHAELIS, SOPHUS (1864-). A Danish author (see VOL. XV). His later publications include: *Hellener og Barbaren*, a story of the Persian wars (1914); *Digte*, poems (1919); *Dommeren, a novel* (1921); *Himmelskibet* (1921); and *Manden fra Elba* (1921).

MICHELSON, A. A. See PHYSICS.

MICHIGAN. Michigan is the twenty-second State in size (57,980 square miles), and the seventh in population; capital, Lansing. The population increased from 2,810,173 in 1910 to 3,668,412 in 1920, a gain of 30.5 per cent. The white population rose from 2,785,247 to 3,601,627; negro, from 17,115 to 66,082; native white, from 2,189,723 to 2,874,992; and foreign-born white, from 595,524 to 726,635. The urban population of the State increased from 1,327,044 to 2,241,560; the rural decreased from 1,483,129 to 1,426,852. The growth of the principal cities was as follows: Detroit (q.v.), 1910, 465,766; 1920, 993,678; Grand Rapids (q.v.), 112,571 to 137,634; Flint (q.v.), 38,550 to 91,599; Saginaw, 50,510 to 61,903; Lansing, 31,229 to 57,327. The phenomenal growth of Detroit during the decade was due to its extraordinary industrial development, chiefly in the manufacture of automobiles and their accessories.

Agriculture. Michigan is one of the important agricultural States. Conditions during the decade 1910-20 reflected the fluctuations of production and value in the period during and following the War. This general situation is discussed in the article AGRICULTURE and in separate articles on the chief agricultural products. While the population of the State increased 30.5 per cent in the decade 1910-20, the percentage of the population living in rural territory declined from 60.7 in 1900 to 52.8 in 1910 and 38.9 in 1920. The number of farms decreased 5.1 per cent (from 206,960 in 1910 to 196,447 in 1920). The area of land in farms, however, showed a slight increase, from 18,940,614 acres in 1910 to 19,032,961 acres, or 0.5 per cent; and the improved land in farms from 12,832,078 to 12,925,521 acres, or 0.7 per cent. The total value of farm property showed an apparent increase, from \$1,088,858,379 to \$1,763,334,778, or 61.9 per cent; the average value per farm from \$5261 to \$8976. The prices of farm land increased materially, stimulated by war prices for farm products. In interpreting these values, and, indeed, all comparative values in the decade 1914-24, the inflation of the currency in the latter part of the period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The percentage of land used for agricultural purposes in 1910 was 51.5 per cent; in 1920, 51.7 per cent. The percentage of improved land in farms increased from 34.9 to 35.1. Of the total of 196,447 farms in 1920, 159,406 were operated by owners, 2319 by managers, and 34,722 by tenants. The corresponding figures for 1910 were 172,310, 1961, and 32,689. White farmers in 1920 numbered 195,714,

compared with 206,014 in 1910; colored, 733, compared with 946. Farms free from mortgage in 1920 numbered 72,869, compared with 88,705 in 1910; those under mortgage, 78,758, compared with 82,631. The total number of cattle in 1920 was 1,586,042, compared with 1,497,823 in 1910. Dairy cattle, 1,256,141, compared with 767,083; sheep, 1,209,191, compared with 2,306,476; hogs, 1,106,066, compared with 1,245,833. The estimated production of the principal farm crops in 1923 was as follows: corn, 60,190,000 bushels; spring wheat, 125,000; winter wheat, 16,456,000; oats, 48,508,000; rye, 6,538,000; barley, 3,466,000; potatoes, 30,013,000; hay, 3,320,000 tons; and sugar beets, 897,000 short tons. Comparative figures for 1913 are: corn, 50,112,000 bushels; wheat, 12,776,000; oats, 45,000,000; rye, 5,362,000; barley, 2,108,000; potatoes, 33,600,000; and hay, 2,520,000 tons.

Mining. Michigan is an important producer of two minerals, iron ore and copper, the relative production of which, in the decade 1914-24 is indicated by the following figures. For iron ore, the production in 1914 was 10,796,200 long tons; 1915, 12,514,516; 1916, 18,071,016; 1917, 17,868,601; 1918, 16,899,341; 1919, 15,438,930; 1920, 17,510,742; and 1921, 7,283,492; while in 1922 there was shipped from the mines 12,457,856 long tons. Of copper there was produced in 1914 164,344,058 pounds; in 1915, 265,283,378; 1916, 273,692,525; 1917, 255,710,128; 1918, 226,794,139; 1919, 178,826,486; 1920, 154,695,073; 1921, 86,370,028, and 1922, 121,712,365. The decrease in output of both iron and copper ores in the last two years of the period was due chiefly to the general business depression whose results were shown in diminished use of iron and copper. In addition to these two minerals, there are also produced considerable quantities of manganiferous ore, salt, sand and gravel, and stone. The total value of the mineral products of the State in 1921 was \$69,551,198, compared with \$166,338,818 in 1920; \$122,973,774 in 1919; \$158,312,121 in 1918; and \$57,743,555 in 1914.

Manufactures. Michigan is one of the most important manufacturing States. It ranks first in the automobile industry, which acquired great importance in Detroit and other cities. There were, in 1920, 28 cities of more than 10,000 inhabitants, forming 51.6 per cent of the total population of the State; and these, in 1919 reported 81.8 per cent of the total value of the State's products. In 1909 there were in the State 9159 manufacturing establishments; in 1914, 8724; and in 1919, 8305. Persons engaged in manufacture numbered 271,071, 320,611, and 549,069; and capital invested amounted to \$583,946,965, \$869,143,114, and \$2,340,954,312, in those years. The value of the products in 1909 amounted to \$685,109,169; 1914, \$1,086,162,432; and 1919, \$3,466,188,483. The extraordinary increase in value of products, 1914-19, was, however, due largely to the change in industrial conditions brought about by the War, and cannot properly be used to measure the growth of manufactures during the census period, 1914-19; but the increase in number of persons engaged in manufacture clearly indicates a decided growth in the manufactures of the State. The most important industry in point of value of product is the manufacture of automobiles, the output of which, in 1909, was valued at \$96,651,000; in 1914, \$398,289,-

000; and in 1919, \$1,620,383,000. Foundry and machine shop products, ranking second in this respect, were valued in 1909 at \$45,399,000; in 1914, \$64,576,000; and in 1919, \$324,354,000. The manufacture of steam, gas, and water engines, which developed chiefly after 1914, is third in importance, with a product valued in 1919 at \$101,989,440. Shipbuilding, in fourth place, had a product valued in 1909 at \$5,034,000; in 1914, \$2,823,000; and in 1919, \$85,155,000. The chief manufacturing city of the State is Detroit, having 2036 manufacturing establishments in 1909, with a product valued at \$252,939,000; in 1914, 2036 with \$400,348,000; and in 1919, 2176 with \$1,234,520,000. Detroit is the chief city in the country in the manufacture of automobiles and parts. Grand Rapids, the city of great furniture manufacturing establishments, in 1909 had 524 manufacturing establishments, with a product valued at \$42,231,000; in 1914, 594 with \$49,792,000; and in 1919, 611 with \$109,135,000. Other important manufacturing cities are Flint, Lansing, and Saginaw.

Education. Educational progress in Michigan during the decade 1914-24 was steady and marked. In relation to the other States of the Union, according to the reports of the Russell Sage Foundation, Michigan rose from nineteenth place in 1910 to tenth in 1918. Only nine States made a more rapid growth in the period 1890-1918. During the decade much important legislation was enacted, including laws providing for a minimum term of nine months, for one year of professional work above a four-year high school course for teachers, and State supervision of private, parochial, and denominational schools; a consolidated school law under which 43 rural high schools had been organized at the end of 1923; a tuition law which furnished high school advantages to the students of inaccessible communities; and State aid measures for partially impoverished districts and for classes for various types of handicapped children. The decade was also notable for the growth of the normal schools and teachers' colleges and for the vastly increased attendance, together with much new building, in the normal schools, the University, and the land grant college. The school population of the State increased from 815,849 in 1913 to 1,038,897 in 1922; and the enrollment in the public schools from 595,725 to 752,525. The total amount spent for education in 1922 was \$54,059,857. The percentage of illiteracy in Michigan decreased from 4.2 in 1910 to 3.9 in 1920. Among the native white population it decreased from 1.3 to 0.8 per cent; and among the negro, from 6.9 to 4.9. Among the foreign-born there was an increase of from 9.6 to 10.5.

Finance. For finances, see STATE FINANCES. **Political and Other Events.** The decade 1914-24 contained an abundance of political happenings. It saw the rise of Henry Ford as a political figure in the State and nation. Elections were held in 1914 for governor and other State officers and for a Congressman. The Democrats reelected Woodbridge N. Ferris as governor, but the remainder of the State ticket elected was Republican. The Republicans also carried the Legislature. A "blue sky" law passed by the Legislature of 1913 was declared invalid in 1914 by the Federal Court of the eastern district of Michigan. The 1915 Legislature reenacted the law in valid form.

At the presidential preference primary election in April, 1916, Henry Ford received a plurality of the Republican votes, and the State delegation, in obedience to his mandate, voted for him on the first ballot at the national convention, but later swung to Charles E. Hughes. In the State elections of this year, Albert E. Sleeper, Republican candidate, was elected governor, with the rest of the State ticket; Charles E. Townsend, Republican, was reelected United States Senator. In the presidential voting, Charles E. Hughes received 339,097 votes; President Wilson, 286,775. At this election a constitutional amendment providing for State-wide prohibition was adopted; it became operative on May 1, 1918. At the State elections held in April, 1917, all candidates on the Republican State ticket were elected. On Dec. 22, 1917, four Germans were convicted of activities against the United States. These included attempts to destroy the Welland Canal and several bridges. Elections were held in 1918 for United States Senator and for governor and other State officers. As candidates for the Senate, Truman H. Newberry, Republican, and Henry Ford, Democrat, were nominated; Newberry was elected by a plurality of 7567. Shortly after the election, charges of having expended money in the primaries in excess of the limit fixed by Federal law were made against him, and an investigation was undertaken by a Federal grand jury in New York. It was held that the investigation should be by a Federal grand jury in Michigan. A protest was filed with the Senate Committee on Elections against Newberry's right to a seat, but it was not sustained. Albert E. Sleeper, Republican, was reelected governor, and the Republicans elected all the members of the Legislature except two. At the State elections in April, 1919, women for the first time exercised full suffrage rights in Michigan. The woman suffrage constitutional amendment was ratified at the general election in November, 1918, after rejection in 1912 and again in 1913. A proposed amendment to the liquor law, permitting the sale of light wines and beers, was defeated at this election. In October, 1919, the Federal Department of Justice began grand jury proceedings in the western Michigan Federal court district to investigate charges of excessive expenditures by Truman H. Newberry in his election to the Senate. This body, on Nov. 29, 1919, returned indictments against 135 persons on the charge of violating the Federal laws. Those indicted included Senator Newberry, his brother, John S. Newberry, and many others prominent professionally, industrially, and politically. Senator Newberry and 15 others were found guilty. An appeal was taken to the United States Supreme Court, and the convictions were reversed on the ground that the act under which they were convicted was invalid in that it applied to elections and not to primary nominations. At the State election in April, 1919, an amendment was ratified authorizing the issue of \$50,000,000 for State highway improvements. At this election the entire Republican State ticket was elected.

At the general election in 1920, the Republicans made a clean sweep, and by the largest majority in the history of the State, Alexander J. Groesbeck was elected governor. The Republicans carried all 13 Congressional districts and elected every member of both houses of the

Legislature. In the presidential contest of this year, W. G. Harding received 762,865 votes; J. M. Cox, 233,460. A proposed amendment to abolish parochial schools was defeated. Elections were held in 1922 for State officers and for United States Senator and representatives in Congress. Charles E. Townsend, a candidate for reelection, was nominated in the primaries. The Democrats nominated Woodbridge N. Ferris, who had been governor of the State from 1913 to 1917. The chief issue in the election was the Newberry case. Senator Townsend had defended Senator Newberry in addresses during the Senate investigation and the campaign. Mr. Ferris was elected. He was the first Democrat to be elected to the United States Senate for Michigan in 70 years. The Republicans, however, reelected Governor Groesbeck and the rest of the State ticket, carried 12 of the 13 Congressional districts, and elected all but five of the 132 members of the Legislature. Several months before the general election of 1922 the Supreme Court decision reversing the conviction of Senator Newberry and his political associates in the campaign of 1918 was handed down. About the same time, after a Senate committee investigation, a resolution to unseat him was rejected by the Senate. However, directly following the election of this year, when the Newberry case was the chief issue in the Senatorial campaign, Newberry resigned as Senator, and Governor Groesbeck appointed James Couzens, mayor of Detroit, to succeed him. In the State election held in April, 1923, the Republicans elected their entire State ticket. In the presidential primaries held in April, 1924, President Coolidge received a large majority of the Republican votes. In a contest for the Democratic presidential nomination, Henry Ford defeated Senator Ferris. Ford was entered in the Democratic primaries without his consent, after having given notice that he would support President Coolidge. The State delegation to the national convention in New York therefore disregarded the plurality for him in the primaries and presented Senator Ferris to the convention as Michigan's choice for the presidential nomination.

Legislation. The most important acts of the Legislature in the decade 1914-24 are noted below. A war loan of \$5,000,000 was authorized for carrying on recruiting service and for caring for the dependents of enlisted men. The Legislature of 1919 authorized the creation of a State police force. It also created an Industrial Relations Commission with the duty of investigating general industrial conditions and created a State public utilities commission. Statutes defining and punishing criminal syndicalism and sabotage were passed. On Jan. 2, 1919, the Legislature ratified the Federal prohibition amendment and on January 10 the Federal woman suffrage amendment. In 1921 the Legislature approved a constitutional amendment authorizing a bond issue of \$30,000,000 for the soldiers' bonus. This amendment was ratified in the election in April of the same year. Bills were passed consolidating and centralizing State governmental authority. As a result, 33 departments, commissions, and bureaus were condensed into five departments, and a State administration board was created, consisting of the governor, secretary of state, treasurer, auditor-general, attorney-general, superintendent of public instruction, and high-

way commissioner. A special session in this year was held to put into effect the soldiers' bonus. A second special session was held as a result of a deficiency in the State appropriations. The Legislature of 1923 passed a measure punishing bribery of public employees; enacted a measure making it unlawful to publish or to accept wagers on races, games, or uncertain events; passed a uniform flag law; made the sale of narcotics a felony; amended the child labor laws, and gave to the State Prison Commission the management of industrial plans for prisoners. A special session of the Legislature was held in September, 1923, to rearrange the State Senatorial districts and to reapportion the Congressional districts, as the constitution directs must be done every 10 years; but a deadlock prevented the passage of a redistricting bill. In 1923 Governor Groesbeck inaugurated a system for building State concrete roads on State account with prison labor. In 1924 about 800 State prisoners so employed were paid \$1.25 a day and their keep.

MICHIGAN, UNIVERSITY OF. A coeducational State institution at Ann Arbor, Mich., founded in 1837. The enrollment of the university increased from 6258 in 1913-14 to 11,762 (estimated) in 1923-24. The faculty was increased in the same period from 535 to 848 members, the library from 350,000 to 546,000 volumes, and that portion of the income derived from the mill tax levied by the State was increased from \$1,029,060 to \$3,000,000. Many new buildings were erected during the decade. Two women's dormitories were built in 1915 and a third was completed in 1920. The natural science building was constructed in 1915, the general library in 1918, a laundry building in 1917, the Michigan Union in 1918, and the storehouse in 1916. In 1922 the storehouse and the storehouses were doubled in size by a new addition. The new university hospital building was begun in 1919, and it was expected that it would be completed by 1925. During the year 1923 the new engineering shops and laboratories, the Teachers' Training School, the William L. Clements Library of American History building (the gift, with the library collection itself, of Regent Clements), and the first unit of the new physical science building were completed. An addition to the Dental College in 1922 doubled its accommodations for students. The first unit of the literary building, the first unit of the new medical building, and the first unit of a large group of new buildings for the Law School were begun in 1923. From July 1, 1917, to June 30, 1925, the special appropriations from the State for new buildings, lands, and equipment amounted to \$9,950,000. Senator James Couzens gave \$600,000 for a new nurses' home, and an anonymous donor gave a new group of law buildings. Another anonymous donor gave \$150,000 for a research expedition to the Near East. The dental course was lengthened to four years in 1918. The Honorary Fellowship in Creative Art was held in 1921-23 by the American poet, Robert Frost, and in 1923-24 by Dr. Robert Bridges, the poet laureate of England. Marion LeRoy Burton, Ph.D., LL.D., succeeded Harry Burns Hutchins as president in 1920.

MIDDLEBURY COLLEGE. A coeducational, nonsectarian institution at Middlebury, Vt., founded in 1800. The college grew rapidly in

size during the decade 1914-24, with an enrollment for the earlier year of 340 students and for the later, 538. The faculty increased correspondingly from 31 to 50 members; the library, from 45,000 to 50,000 volumes. The productive funds were increased from \$600,000 to \$2,182,732. In 1915 the Mead Memorial Chapel was given to the college by John A. Mead. Paul Dwight Moody, D.D., succeeded John Martin Thomas, D.D., LL.D., as president in 1921.

MIKKELSEN, EJNAR (1880-). A Danish explorer (see VOL. XV). Among his publications are *Tre Aar paa Gronlands Ostkyst* (1914); *Norden Far Loo og Ret*, a story (1920), translated as *Frozen Justice* (1922); and *John Dale*, a novel (1921).

MILHAUD, DARIUS (1892-). A French composer, born at Aix-en-Provence. After graduation from the Paris Conservatoire he settled in Paris as composer and lecturer. One of the most rabid of the futurists, he believes that the works of Beethoven and Wagner ought not to appear on any modern programme. In 1923 he visited the United States, conducting some of his works and lecturing at several universities. He wrote an opera, *La Brébis Egarée* (Paris, 1923); a ballet, *L'Homme et Son Désir* (Paris, 1921); three symphonies for string orchestra; two symphonic suites; *Poème* for piano and orchestra; five string quartets; and other chamber music.

MILHAUD, GASTON (1858-1918). A French philosopher. With his death in 1918, French philosophy lost a rare type of scholar, combining a vast fund of historical and scientific erudition with a creative critical mastery. He sided with the pragmatists in their attack on the stereotyped intellectualism of the schools but was withal a rationalist who had faith in reason and in its spontaneous self-imposed discipline. His *Descartes Savant* was published posthumously in 1921. It is a collection of well-documented studies revealing a side hitherto little known of the thinker often styled "the patron saint of French philosophy."

MILITARISM. See WAR IN EUROPE.

MILITARY TRAINING CAMPS. See ARMIES AND ARMY ORGANIZATION.

MILTIA. See ARMIES AND ARMY ORGANIZATION.

MILK SUPPLY. See DAIRYING.

MILLAY, EDNA ST. VINCENT (1892-). An American author, born in Rockland, Me. She received her bachelor's degree from Vassar College in 1917 and since then has lived in New York City. She is the author of *Renascence and Other Poems* (1917); *Figs from Thistles* (1920); *Second April* (1921); *Aria da Capo* (1921); *The Lamp and the Bell* (1921), and *Two Slatterns and a King* (1921). Her work is finely conceived, and she is regarded as one of the foremost poets in America to-day.

MILLE, PIERRE (1864-). A French novelist (see VOL. XV). He developed an entertaining and artistic novel along the lines of the old-fashioned "romance." Among his later writings are *Le Monarque* (1914); *Sous Leur Dictée* (1917); *Trois Femmes*; *Histoires Exotiques et Merveilleuses*; *Nuit d'Amour sur la Montagne* (1920); *L'Ange du Bizarre* (1921); *Myrrhine*; *Images Exotiques et Françaises*; *Monsieur Barbe Bleue . . . et Madame* (1922).

MILLER, ALICE DUER (1874-). An

American author, born in New York City. She graduated from Barnard College in 1899 and in the same year married Henry Wise Miller. Her stories cleverly portray certain aspects of social life. Her works include: *The Modern Obstacle* (1903); *Calderon's Prisoner* (1904); *Less Than Kin* (1909); *Blue Arch* (1910); *Are Women People?* (1915); *Come Out of the Kitchen* (1916); *Ladies Must Live* (1917); *Wings in the Night* (1918); *The Charm School* (1919); *Manslaughter* (1921); and *Are Parents People?* (1924).

MILLER, DAVID HUNTER (1875-). An American lawyer, born in New York City. He graduated from the New York Law School in 1910 and in the year following was admitted to the bar and began practice. He served as special assistant in the Department of State in Washington in 1917 and 1918 and was attached to the mission of Colonel House in Paris. During the peace negotiations he acted as technical adviser to the American Commission and with J. B. Hurst drew up the final draft of the Covenant of the League of Nations. After a short service in the Department of State he became counsel to the German government on the Upper Silesian question before the League of Nations in 1921. He served in the Spanish-American War and was the author of *Secret Treaties of the United States* (1910); *Reservation to Treaties* (1919); *International Relations to Labor* (1921), and many monographs and articles on international and legal subjects.

MILLER, DAYTON CLARENCE (1866-). An American physicist, born at Strongsville, Ohio, and educated at Baldwin University and Princeton. During 1888-89 he was professor of natural science at Baldwin University and in 1890 went to the Case School of Applied Science as instructor in mathematics and physics, where he became professor of physics in 1895. Dr. Miller contributed important papers to scientific journals on the velocity of light in magnetic field, relative motion of earth and ether, efficiency of incandescent gas light, photographic registration of sound waves, quality of musical sounds, and similar subjects. In 1914 he gave a course of lectures before the Lowell Institute. Besides his many papers, he is the author of *Laboratory Physics* (1903), *Boehm on the Flute and Flute Playing* (1908), and *The Science of Musical Sounds* (1916).

MILLER JOHN ANTHONY (1859-). An American astronomer, born at Greensburg, Ind. He studied at Indiana, Stanford and Chicago Universities. He was instructor in mathematics at Indiana and superintendent of schools in Rockville, Ind., after which he taught mathematics at Stanford and returned to Indiana in 1894, where in 1895 he became professor of mechanics and astronomy. In 1906 he was called to the chair of mathematics and astronomy at Swarthmore College, of which he became vice president (1913-), and director of the Sproul Observatory (1911-). He was chief of the solar eclipse expedition sent by the University of Indiana to Spain in 1905 and of that sent by Sproul to Brandon, Colo., in 1918. His studies of stellar parallax, the solar corona, and measurements of double stars resulted in valuable contributions to the progress of astronomy. Dr. Miller is the author of *Trigonometry for Beginners* (1896) and *Analytic Mechanics* (1915).

MILLER, RICHARD E. (1875-). An American artist (see VOL. XV). He was elected to the National Academy in 1915 and in the same year won the medal of honor of the Panama-Pacific International Exposition. He had in the previous year been awarded the Potter Palmer medal and the \$1000 prize of the Art Institute of Chicago and the Thomas S. Clark prize of the National Academy of Design.

MILLERAND, ALEXANDRE (1859-). A French statesman (see VOL. XV). He was general commissioner of the Republic of Alsace and Lorraine in 1919-20, and Minister of Foreign Affairs in January, 1920. In the same year he became President of the French Republic. After defeat in both Houses of Parliament, when the majority voted not to sustain any government named by him, President Millerand resigned on June 11, 1924. Among his later publications is *La Guerre Libératrice* (1918).

MILLIKAN, ROBERT ANDREWS (1868-). An American physicist, born at Morrison, Ill. He studied at Oberlin and Columbia and in Göttingen and Berlin, and in 1910 became professor of physics at the University of Chicago. In 1921 he became director of the Norman Bridge Laboratory of Physics at the California Institute of Technology at Pasadena. He also lectured at California (1917) and at Amherst (1917). His original researches had much to do with the composition of matter. He was the first to succeed in isolating an electron. Professor Millikan's brilliant successes gained for him the Comstock prize of the National Academy of Sciences in 1913 and the Nobel prize in physics in 1923. During the War he was vice-chairman of the National Research Council and afterward chairman of the science and research division of the Signal Corps, with the rank of lieutenant-colonel. In addition to membership in many scientific societies at home and abroad, he is a fellow of the American Academy of Arts and Sciences, a member of the American Philosophical Society, and since 1915 a member and foreign secretary of the National Academy of Sciences. He is the author of textbooks and other volumes which include: *A Course of College Experiments in Physics* (1898); *Mechanics, Molecular Physics, and Heat* (1901); *Electricity, Sound and Light* (1908); and *The Electron* (1917).

MILLS, JAMES EDWARD (1876-). An American chemist, born at Winnsboro, S. C., and educated at Davidson College and at the University of North Carolina. During 1900-10 he taught at the State university and became associate professor in 1904. After some years on the faculty of the University of South Carolina, he became professor there in 1913. In 1921 he was appointed technical director of research and development work for the Chemical Warfare Service at Edgewood Arsenal. During the War he was a captain in the Engineer Corps (1917) and then passed to the Chemical Warfare Service (1918). His special researches, on which he published papers, had to do with subjects in the field of physical chemistry, such as molecular attraction, heats and vaporization of liquids, and specific heats.

MILLS COLLEGE. A college for women at Oakland, Cal., founded in 1885. The number of students increased from 127 in 1914 to 546 in 1924, the faculty from 37 to 72 members and the library from 15,000 to 31,000 volumes. The

productive funds rose from \$260,550 to \$1,290,284, the endowment from \$452,280 to \$1,470,938 and the annual income from \$71,545 to \$471,545. An ambitious building programme was carried on during the period. Alumni Hall was completed in 1916; Warren Olney Hall, a \$120,000 residence hall, in 1917; an annex to Science Hall in 1918; Orchard House in 1918 at a cost of \$65,000; Meadow House in 1921 at a cost of \$70,000; and the Mary Keyser Chemical Laboratories, grouped about a central court, in 1922. Aurelia Henry Reinhardt, Ph.D., LL.D., succeeded Luella Clay Carson, Litt.D., as president.

MILLSPAUGH, ARTHUR CHESTER (1883-). An American administrator of Persian finances, born at Augusta, Mich., and educated at Albion College, the University of Illinois, and Johns Hopkins. After teaching political science for two years and working in the drafting office of the United States State Department for three more, he became acting foreign trade adviser in 1921-22. When Persia requested that an American financial adviser be sent to Teheran, Dr. Millspaugh was appointed, and he and his staff reached the Persian capital in November, 1922. He found the Persian treasury empty and the fiscal administration a chaos, but with the help of the Persian authorities and the military, he straightened matters out. A budget was established, taxes were collected, and brigandage greatly diminished.

MILLSPAUGH, CHARLES FREDERICK (1854-1923). An American botanist, born at Ithaca, N. Y., and educated at Cornell University and the New York Homeopathic Medical College. For several years he practiced medicine and from 1891 to 1893 taught botany at West Virginia University. In 1894 he was appointed curator of the department of botany of the Field Museum of Natural History; from 1897 to 1923 he was professor of medical botany at the Chicago Homeopathic Medical College. He was also lecturer on botany at the University of Chicago. Millspaugh carried on explorations in the West Indies, Brazil, and other parts of South America, and was the author of *American Medical Plants* (1887), *Flora of West Virginia* (1891), and many articles in scientific and popular journals.

MILNE, A (LAN) A (LEXANDER) (1882-). An English journalist and playwright, educated at Cambridge. He is best known in America for his plays. He was assistant editor of *Punch*, 1906-14, and served with the Royal Warwickshire Regiment during the War. His plays include: *Wurzel-Flummery* (1917); *Belinda Make-Believe* (1918); *Mr. Pim Passes By* (1919); *The Romantic Age* (1920); *The Truth About Blayds* (1921); *The Dover Road* (1922); *The Great Broxopp* (1923) and *Success* (1923). Among his other publications are *The Day's Play*; *The Holiday Round*; *Once a Week*; *Once on a Time*; *Not That It Matters*; *If I May*; *Mr. Pim*; *The Red House Mystery*; *The Sunny Side*.

MILNER, ALFRED, first VISCOUNT (1854-). An English statesman and administrator (see Vol. XV). After a long retirement from politics, he became a member of the war cabinet, without portfolio, in 1916, and in the following year conducted a mission to Russia. In 1918 he was Secretary of State for War and in 1919 Secretary of State for Colonies. In 1920 he was head of the Commission to Egypt

and made the report on conditions there which resulted in the establishment of the independent rule of that country.

MILWAUKEE. The largest city in Wisconsin. The population rose from 373,857 in 1910 to 457,147 in 1920 and to 492,087, by estimate of the Bureau of the Census, for 1924. The board of public land commissioners was active in city planning between 1914 and 1924. A zoning ordinance regulating the height, use and area of buildings in the various districts of the city was adopted in 1920. Land was acquired for a civic centre adjoining the public library-museum and the auditorium. It involved the condemnation of 11 additional city blocks, the construction of a mile-long, 180-foot plaza extending to Lake Michigan and the enlargement of Juneau Park at the end of the plaza where the outlined lake drive will begin. A park and boulevard system, in coordination with the directed platting of new subdivisions, and the construction of playgrounds within half a mile of each child were under way in 1924. The greater part of the land along Lake Michigan has been acquired by the city. The garden homes housing development, which was entered into jointly by the city and county in 1920, was said to be the first of its type in the United States. Land was purchased, and by 1924, 105 houses were completed and sold to citizens on the installment plan, to be owned on a coöperative basis.

The greater harbor project involving the construction of an outer harbor in Kinnickinnic Bay, the development of an extensive system of docks and warehouses, and the unification of railway terminals was carried forward by the harbor commission. Land in Jones Island was reclaimed for the outer harbor by dredging the waterway and filling behind new bulkheads. The Federal government was constructing 1700 additional feet of caisson breakwater. A \$13,000,000 modern sewage disposal plant on Jones Island, operating on the activated sludge system of disposal and capable of handling 100,000,000 gallons of sewage a day, was half completed in 1924, and 33 miles of deep intercepting sewers and 9.4 miles of main sewer were being built. In 1921 the city completed a municipal street lighting system of gas-filled incandescent tungsten lamps. A new intake and new \$1,000,000 pumping station were constructed, a trailer system of ash and garbage collection was installed, and mechanical snow loading machines were adopted. The health department also was very active, supervising the health of children in the schools and holding child welfare clinics. The continuation school, completed in 1923, under an independent tax levy and governed by an independent board selected by employers and employees, was praised as a model school by educators in the United States and Europe. Almost 7000 children and apprentices were enrolled for day sessions and over 6000 adults at night, pursuing courses of study in 100 subjects. The public library, extending its service, was the first to supply a trained worker in adult education to reach the various extension classes, clubs, trade unions, and other organizations, and giving each hospital patient bedside book service. The Art Institute first received municipal support in 1918, which culminated in 1922 in an agreement whereby the city was to acquire full ownership in 1932. In

1923 a civic symphony orchestra was started, giving concerts biweekly in the auditorium. Milwaukee attained the best financial standing and credit of all the cities in the country as the result of a scientific budget system. The elimination of all bonds for operating expenses, the rapid changing of all departments to a cash basis, half completed in 1924, and the economies made possible by a centralized purchasing department paying cash for all work, including contracting. An amortization fund, established in 1923, was expected ultimately to wipe out the entire public debt. The offices of 12 aldermen-at-large were discontinued. See CITY PLANNING.

MILWAUKEE-DOWNER COLLEGE. A college for women at Milwaukee, Wis., founded in 1849. The number of students increased from 278 in regular courses and 67 in extension in the year 1914-15 to 352 in regular courses and 98 in extension in 1923-24, and the number of faculty members from 37 to 42. The library increased from 10,875 volumes and 1400 pamphlets to 19,400 volumes and 10,000 pamphlets, and the productive endowment funds rose from \$216,207 to \$799,857. The curriculum was expanded during the 10 years by the introduction of a two years' course in occupational therapy, first offered during the War, and courses in public school music, with diploma at the end of two years, library economy, and Spanish. The degree of Bachelor of Science in Nursing was introduced in 1918. Lucia R. Briggs, M.A., succeeded Ellen C. Sabin, M.A., Litt.D., as president.

MILYUKOV, PAVEL NIKOLAEVITCH (1859-). A Russian politician and historian. He was educated at the University of Moscow from which he was expelled for a time for taking part in students' riots. After graduation he lectured at the university till dismissed in 1894 because of his liberal opinions. He was later appointed professor at the University of Sofia, Bulgaria, and afterwards lectured successfully in the United States. Returning to Russia in 1905, he took part in forming the constitutional democratic party (Cadets), becoming its leader and editing its organ *The Retch*. He was elected to the third and fourth Dumas. In 1914 he favored the Allies but felt that the men then ruling Russia should be overthrown. Later he opposed Kerensky's policy. After the Armistice he went to London and then to Paris, and in 1921 he directed the journal, *Last News*.

MINE, SUBMARINE. In the War the submarine mine played a most important part. The numbers used and the areas planted were so enormously greater than in any previous war—indeed, than in all previous wars combined—as to make such former use seem trivial. The various types of mines were much improved during the War and the methods of planting and sweeping were revolutionized. Both the British and Germans were much impressed by the use of mines in the Russo-Japanese War and were prepared at the outbreak of hostilities to use them in great numbers. At this time, due to war experience, the Russian mine was probably the best but, as the Germans picked up Russian mines early in the war, they were able to improve their own. British, French, Italian, and American mines were improved by experience and from inspection of captured German mines, but it was not until September, 1917, that the

improved British mine began to be turned out in adequate quantities. The improved American mine began to be manufactured in enormous numbers in the latter part of 1917. Some new types of mines were developed during the War such as the depth bomb (see BOMB, DEPTH) and the British net mine. The Leon drifting mine, which was brought out just before the War, was used with great effect in the Dardanelles where the conditions exactly suited it.

As each nation endeavors to keep the design of its mines as secret as possible, descriptions of British and American mines are not published. The plans of the German mines were derived from a careful examination of captured ones. The mooring rope reel was secured to the mine-case and not to the anchor. Anchor and mine were held together by a device locked with a sal-ammoniac plug. When dropped, mine and anchor sank slowly to the bottom where they remained until the dissolving of the sal-ammoniac plug allowed glycerine to escape from beneath a plunger in a dashpot. The mine was then released and rose until, at the required depth below the surface, the reduction of pressure allowed a clamp to securely grip the anchor rope. The main firing circuit was closed by the tension on the mooring rope as soon as the mine started upward, but the battery was still inoperative. Several contact horns protruded from the case, each horn consisting of a small lead cylinder enclosing a glass tube that contained the electrolytic fluid. Directly below each horn and inside the case there was a brass cylinder that had in its upper part the terminal plates of a battery the wires from which passed through a wooden plug into the detonating fuse, though each zinc wire is brought to the filling hole where the circuit is kept broken while the mine is being handled. Over each lead contact horn was screwed a brass safety cylinder that was removed before the mine was dropped. When one of the contact horns was struck by a passing vessel, the lead cylinder was bent and the glass container inside it broken. The electrolyte then poured into the brass cylinder beneath and completed the formation of a battery that produced a current and exploded the mine. Though their efficiency was admitted, neither the German nor the Russian mine was copied in England as their cost (about \$1000) was deemed excessive.

The Leon floating mine was invented by a Swedish officer. It is cylindrical in shape and may be dropped in the usual way or expelled from a torpedo tube. The weights are so adjusted that it floats with its axis vertical. The upper half contains the explosive and firing mechanism and the lower half is divided into a water reservoir, that fills where the mine is dropped, and the compartment for the depth mechanism. The latter consists of a battery and motor, driving a propeller on a vertical shaft, and a hydrostat which starts the propeller to lift the mine when it sinks beyond the designed depth and stops it when it reaches the upper limit. With the chamber filled the mine is only slightly heavier than water and is easily kept from 5 to 15 feet below the surface.

At the outbreak of war the Germans promptly laid minefields along their own coast and began laying small areas or lines off the British coast. The first British minefield was laid ear-

ly in October north of Ostend and designed to check the passage of German submarines through the Channel. Others were placed off British harbors. During 1915, 15 small minefields were laid off the Belgian Coast and others in German waters. In that year the Germans first began to use submarine mine-layers and in 1916 the British also used them. In the latter part of 1916 the British laid the Belgian Coast barrage, 12 miles off the Belgian Coast and 40 miles long, supplemented by mine nets about a mile from the mines.

Early in 1917 a deep net barrage was laid across the Straits from the Goodwins to Snouw Bank, supplemented with deep set mines. The nets dragged and the field had to be swept and relaid. During the year 1917, 15,686 mines were laid by the *Abdiel* (ex-destroyer) and five mine-laying submarines. But it was not until September, 1917, that an efficient mine began to be turned out in adequate quantities to warrant undertaking any of the extensive projects that had been under consideration.

The greatest of these projects was the closing of the entrances to the North Sea—the channel at Dover and the northern passage from the Orkneys to Norway, the latter requiring a mine-field 250 miles long. The mines were dropped at 300-foot intervals and there were 10 rows at a depth of 65 to 80 feet, 4 at about 160 feet, and 4 at about 240 feet. The work was begun in March, 1918. In May, the American Mine Squadron No. 1, consisting of nine large mine-layers having a total capacity of 5530 mines, arrived at Invergorden, Scotland. The work was completed in the next five months. The British laid 13,546 of their own mines; the American squadron laid 56,571 American mines and 899 British; total, 70,117. The Dover barrage contained 9500 mines.

The mine played a most important part in the war. Its threat of danger curbed the activities of U-boats by compelling them to proceed to their destinations by difficult channels over vastly longer distances; and, of about 200 boats lost, 43 are known to have been destroyed by mines. Probably 7 or 8 of those whose fate is unknown were sunk in minefields, while many others were so badly injured as to force a return to base. The British losses from mines were:—5 battleships (13 lost from all causes), 1 cruiser (13 lost), 2 light cruisers (12), 5 sloops (18), 20 destroyers (64), 4 submarines (54).

Extensive mining operations were carried out in the Mediterranean and elsewhere but compared to the great North Sea work they were relatively small. The vast number of mines laid across harbor entrances and other routes of commerce and of war vessels made the operation of mine-sweeping as important as mine-laying. The entrances to many ports were swept daily and the channels leading to others were constantly patrolled and swept if mines were reported in them or in their vicinity. On Nov. 11, 1918, the total number of minesweepers in the British service alone was 726, and large but lesser numbers were in use by the other Allies (including the United States). See *VESSELS, NAVAL*, *Minelayers* and *Minesweepers*; *Naval Operations under WAR IN EUROPE*; *BOMB, DEPTH*; *PARAVANE*; *BOMBING OF VESSELS*, etc.

MINE HOISTS. See *ELECTRIC MOTORS IN INDUSTRY*.

MINE LAYER, MINE SWEEPER. See *VESSEL, NAVAL*.

MINERALOGY. Developments in this science during the decade 1914–24 included the discovery and description of several new mineral species, experiments in the artificial production of minerals, and the study of mineral properties, chemical and physical, with the use of more refined or elaborate methods than were previously available. Among general works for students of the subject published during the period may be mentioned Bayley's *Descriptive Mineralogy* (1917), a new work, not a revision of an old one.

New Minerals. The possibilities of the occurrence of undiscovered species are still far from exhausted, apparently, for many new compounds or specific variations of known types were brought to notice each year. The listing of the new names is hardly warranted in this place, as all of them are of minor importance in both distribution and economic value, and many are simply varieties of known forms distinguished by some special property.

Experiment and Research. For investigations of the fundamental characteristics of minerals, the work of the Carnegie Geophysical Laboratory was of signal importance. Its endowment of technical equipment and the skill of its staff put the institution on a unique basis in this branch of research. One of the tasks it undertook was the investigation of the rock-forming silicates, in which much interest centres on account of their bearing on the formation and conditions of stability of the ingredients of igneous rocks. Rankin, in a study of the system lime-alumina-silica, reproduced such minerals as quartz, tridymite, cristobalite, corundum, wollastonite, sillimanite, and anorthite, besides many calcium silicates not known to occur in nature but present in certain artificial products. The results throw light also on the compounds formed in the hardening of Portland cement. Andersen experimented with the system anorthite-forsterite-silica and explained some of the features of the basic igneous rocks. Johnston, Merwin, and Williams discovered important features of calcium carbonate, particularly that the substance has three phases, two of which only had been known to occur in nature. For the experiments of Bowen in the crystallization of melts, see *GEOLOGY*. Allen determined the true chemical structure of the mineral bornite, one of the important copper ores. The artificial production of diamonds continued to attract interest, and the latest trials have been made by Sir Charles A. Parsons, the English inventor, who secured transparent crystals up to seven-tenths of a millimeter in diameter. Contrary to the conclusions of Moissan, who first succeeded in making diamonds, the more recent work indicated that great pressure and heat were not the essential factors in effecting the crystallization of carbon in a molten bath: it appears that the diamond forms at a temperature around 690°C., below the freezing point of the iron matrix, through the reactions of occluded gases. The results, if not wholly successful, were very suggestive and will doubtless encourage further investigation.

A means of distinguishing artificial rubies, the manufacture of which has been brought to a high state of perfection, was given by Michel. The artificial stones have a concentric banding

and lines of bubbles, arising from the process of depositing the molten aluminum oxide. The pear-shaped melt shows an optic axis diagonal to the longer diameter. No methods had been found to make synthetic emerald, topaz, peridot, or phenacite. The disperse colors of quartz, according to Watson and Beard, may be referred to the effects of small amounts of foreign substances, of which the commonest are manganese, iron, and titanium oxides. Amethyst contains more than the average amount of manganese, which is present in colloidal form and imparts a purple color. Rose quartz is probably not attributable to an inorganic substance, for it can be bleached by heat, after which the color cannot be restored by exposure to the sun's rays. Blue quartz contains fine rutile crystals which are arranged after a definite pattern and cause dispersion.

MINIMUM WAGE. A conspicuous feature of minimum wage legislation in the United States was that, although 10 of the 14 laws in force in 1923 applied to male minors as well as to females, in no case had an attempt been made to extend such legislation to men. Such restriction of wages, an unquestionable limitation of the right of free contract, was held justifiable under the police power as a protection to public health, safety, and morals, in the case of women as mothers and potential mothers; but not justifiable in the case of men, who, furthermore, were more successful in bargaining for themselves. Massachusetts, in 1912, was the first State to adopt such a minimum wage law. It was followed in 1913 by nine States: California, Colorado, Minnesota, Maine (declared unconstitutional in 1914), Nebraska (repealed in 1919), Oregon, Utah, Washington, and Wisconsin. Arkansas and Kansas passed their laws in 1915; Arizona, in 1917; the District of Columbia, in 1918; and North Dakota, Porto Rico, and Texas, in 1919; and in 1923 a law became effective in South Dakota. With the repeal of the Texas law in 1921, there were 13 States, in addition to Porto Rico and the District of Columbia, with such legislation, although no action had been taken under the Colorado act. A minimum wage bill was passed by the Senate but defeated by the Assembly in New York in 1924. Almost all the laws were general in scope, covering "any trade, occupation, or industry in which women and minors are employed"; although in some States certain occupations were specified or excluded, and in no State had a rate for domestic service or farm labor been fixed. In many instances there were clauses restricting the number of working hours and requiring that overtime be paid for at an increased rate; another common provision was that for the issuance of certificates to defectives, allowing them to work for a lower rate than that prescribed. With the exception of the Massachusetts law, all the State measures involved the power to fix a minimum, prescribed in the statute in three States, while in the others it depended on an award of a board or commission, based on a study by the body of living costs. In Massachusetts, which had the award system of determining the wage, the law was not mandatory and depended for its enforcement on public sentiment. An effort to make violation of the law a misdemeanor and punishable as such and so to bring the Massachusetts bill into line with all the others in this respect, was defeated in 1923, when a spe-

cial commission, after an investigation, brought in an adverse report. In most States the amount of the award is based on a study of the cost of living and is given in terms of a weekly wage rate. To what extent the wages of women and minors were affected by this legislation from 1914 to 1924 is difficult to determine. The fixed minimum varied, in the same year, not only with age and experience and class of labor, but also with regard to the population of localities; in addition to this, the rise in the cost of living and the inflation of currency must be taken into account. Attempts to set a living wage for women, however, seem to have aimed generally at a weekly rate from \$8 to \$9 between 1914 and 1917; in 1918, in Washington, at \$9 for minors and \$13.20 for experienced adults. In 1923, \$13.30 and \$12 for the experienced adult in Massachusetts and South Dakota, respectively, compared with a minimum of \$16 in California and Arizona, and a minimum as low as \$7 for smaller towns in some of the States. Available records indicated that the setting of a minimum had little if any tendency to decrease the maximum wage. Activity during the decade consisted largely of the issuance of orders extending the minimum wage principle to various classes of industries and the enactment of measures to close up loopholes of evasion. A characteristic expansion of the regulation is that of Massachusetts. The first decree in that State, in 1914, applied to brush-making; the second, effective in 1915, to laundries; 1916, retail stores; 1917, women's clothing factories; 1918, men's clothing and raincoats; 1918, men's and boys' furnishings; muslin underwear, petticoats, aprons, kimonos, women's neckwear, and children's clothing; millinery and office or building cleaning; 1920, candy making, corsets, knit goods, paper-boxes, etc.; in 1923, with the formation of a wage board for establishments manufacturing druggists' preparations, 17 occupations had come under review since the enactment of the law, and wage decrees had been issued for 16 occupations, affecting from 70,000 to 80,000 women. Among the controlling measures found necessary during this period was that of Massachusetts, providing for the publication of the names of employers who persistently violated minimum wage decrees; in other States the length of apprenticeship and the proportion of apprentices was definitely set, and a sliding scale of wages for apprentices was created, to prevent discrimination against those subject to the rate for experienced workers.

The critics of minimum wage laws continued to insist that it was class legislation: it did not fix a fair day's work to protect the manufacturer; a fair living wage could not be determined; the legislation was circular in effect, raising the cost of living in proportion to the increase in wages; it produced unemployment; it put States enforcing such laws at a disadvantage compared with those which had none. Attacks on the constitutionality of such measures were continuous, beginning in 1914, when the law of Maine was declared void as an unconstitutional delegation of legislative power to an appointed body and as an interference with both employer and employee. The outstanding case, however, was that of Oregon, in 1917, when the Supreme Court of the United States split evenly on its decision, thus leaving in effect the favorable ruling of the State Supreme

Court. Following this, favorable decisions were also brought in, apparently with misgivings, on cases which had meanwhile been pending in the State Supreme Courts in Arkansas and Minnesota; and in 1918 a similar case in Washington had a like issue. In 1923, however, the Supreme Court of the United States decided against the minimum wage measure of the District of Columbia as an interference with the freedom of contract guaranteed by the due process clause of the Fifth Amendment. This decision was disconcerting. Nevertheless, the States generally, taking it to apply only to the points raised in this particular law, proceeded with the administration of their respective acts. In Arizona the State officials announced their intention to support their new wage law, which raised the minimum from \$10 to \$16 a week; and the industrial commission of California was not deterred from handing down a new wage award. The California Legislature, moreover, memorialized Congress to adopt a constitutional amendment to permit such legislation by States; and the Governor of Washington advocated a conference of governors to campaign toward that end. In Oregon, the Manufacturers' and Merchants' Association pledged support and cooperation in maintaining the State law and in discouraging any attempt to repeal it or to test its validity in the courts. On the other hand, test cases had been started in Arizona and in Wisconsin; in Massachusetts the publicity method of enforcement had been brought up for settlement. Conferences were called by various labor and other organizations to consider the situation. The general attitude seemed to be divided between a desire to curtail the power of the Supreme Court, either by requiring a seven to two or a six to three vote, or by requiring a change in their decision if an act were again passed in Congress by an increased majority, and a desire for a constitutional amendment, either broad enough to permit the enactment of all welfare or social legislation, or one making possible at least minimum wage legislation for women workers.

Other Countries. In Australia, where the first serious political step toward the prevention of sweating in industry was taken in 1896, minimum wage legislation by 1915 covered 141 trades employing over 150,000 workmen and was considered to be beyond the experimental stage. Sweating had been abolished, and opposition to the principle on the part of either capital or labor was practically non-existent. In England, the movement had steady and successful growth, beginning with the Trades Boards Act of 1909, which established a minimum wage in the sweated trades. One act, passed in 1912 to terminate a general strike among coal miners, provided that a certain minimum should be part of their contract of service and enforceable in ordinary courts of law. A minimum wage was fixed for agricultural laborers by the Corn Production Act of 1917. The principle, in fact, was much in use during the War to keep wages consistent with the increased cost of living; the Trades Boards Act was extended in 1914 to cover additional occupations, affecting 400,000 workers, chiefly women; after the Armistice it was made use of to keep wages from falling suddenly during the period of adjustment. A new Trades Boards Act, passed in 1918, greatly extended the scope of the previous measure. By the end of 1922 there were in ex-

istence 63 boards, covering 39 trades and affecting the wages of approximately 3,000,000 workers, both men and women. Over a period of 14 years, the system appeared to have been effective in securing more commensurate wages even for the semiskilled and the skilled worker, and in reducing the normal number of hours per day and the amount of overtime; it did not seem, either through eliminating the less efficient worker or through driving employers out of business, to have had any effect on unemployment. That it was not wholly satisfactory, however, was indicated by a bill providing for certain changes, which failed of passage in 1923. Although the first minimum wage regulation in Canada was a clause of the Factories Act of Alberta as late as 1917, seven of the provinces (all except New Brunswick and Prince Edward Island) had such laws, by 1923; five of them included also provisions for hours; all of them, with the exception of the Alberta clause, applied only to women and children. The British Columbia law (1918) provided for a board to ascertain wages paid and to call a conference of employers, employees, and public representatives to fix and enforce suitable wages; it exempted from the provisions farm laborers, fruit pickers, and domestic servants; the Manitoba law (1918) applied only to shops, mail order houses, or factories in cities, but gave jurisdiction in limitation of hours and sanitary and other conditions; Quebec, in 1919, established a board with power of investigation; Saskatchewan's board, created in that year, was given power to fix wages without calling a conference; the laws of Ontario and Nova Scotia came into force in 1920. In France, special wage boards were created, in 1915, to fix a minimum piecework rate based on prevailing wages, applying chiefly to women engaged in home work in the clothing industry; and their power was extended in 1922 to include other industries employing home labor. Norway, in 1918, provided a home workers' commission, to establish special boards in any trade, on request, and to fix minimum wages for both time-work and piecework; in Prussia, in 1918, a Wages Department was formed under the general supervision of the German Wages Department. Switzerland, where the ultimate wage-fixing authority rested with the state department, established a number of wage boards during the period; and Argentina, in its budget law of 1923, provided for a minimum wage for government employees. See LABOR LEGISLATION; LAW, PROGRESS OF, *Constitutional Law*.

MINNEAPOLIS. The largest city of Minnesota. The population increased from 301,408 in 1910 to 380,582 in 1920, and 417,280, by estimate of the Bureau of the Census, for 1924. A city planning commission was created in 1919 following the proposed city plan prepared two years previously; this, in turn, was followed by a zoning law under the authority of which a zoning ordinance was adopted by the city council. A central coordinating financial body was created in 1919 under the title of Board of Estimate and Taxation, the Board of Charities and Corrections was reorganized into the Board of Public Welfare, and a Municipal Pension Board was created. In 1920 the city voted to accept home rule, and in the following year a citizens' charter committee proposed a new city manager charter, which was under discussion in 1924.

Minneapolis was made head of navigation on the Mississippi in 1917 on completion of the government high dam. The city had prepared preliminary terminal facilities. Four important bridges were built spanning the Mississippi, one over the Falls of St. Anthony; another was the Cappelen Memorial, containing the world's largest single concrete arch of 400 feet, a third was constructed in cooperation with St. Paul. Two monumental bridges were under construction in 1924, one nearly a mile long, over the Minnesota River. An extensive building programme, especially developing the junior high schools, placed Minneapolis in fourth rank in percentage enrolled in the high schools. The park system was enlarged by the addition of 491 acres, and over 24 miles of boulevards and parkways were paved. Funds for a new auditorium were voted by the Legislature and ratified by the voters. After investigation of the street lighting methods of many cities in 1922, a beginning was made on the installment of a new system. In 1919 a proposed new street railway franchise was rejected by referendum, and two years later the Legislature placed the street railway company, for valuation and rates, under the Railroad and Warehouse Commission.

MINNEAPOLIS SYMPHONY ORCHESTRA. See MUSIC, Orchestra.

MINNESOTA. Minnesota is the eleventh State in size (84,682 square miles), and the seventeenth in population; capital, St. Paul. The population increased from 2,075,708 in 1910 to 2,387,125 in 1920, a gain of 15 per cent. The white population rose from 2,059,227 to 2,368,936; negro, from 7084 to 8809; native white, from 1,516,217 to 1,882,772. The foreign white population decreased from 543,010 to 486,164. The urban and rural populations both showed increases: the former from 850,294 to 1,051,593; the latter from 1,225,414 to 1,335,532. The growth of the principal cities was as follows: Minneapolis (q.v.), 1910, 301,408; 1920, 380,582; St. Paul (q.v.), 214,744 to 234,698; Duluth (q.v.), 78,466 to 98,917.

Agriculture. As Minnesota is one of the principal grain-growing States, agricultural conditions in the decade 1914-24 were largely affected by the fluctuation in prices and production which characterized the War and post-war period. (See articles AGRICULTURE, CORN, WHEAT, etc.) The number of farms in the decade 1910-20 kept pace almost exactly with the increase in population; the population increased 15 per cent, the number of farms, 14.3 per cent (from 156,137 to 178,478). The acreage of land in farms increased from 27,675,823 to 30,221,758, or 9.2 per cent; and the improved land in farms, from 10,643,533 acres to 21,481,710, or 9.4 per cent. The total value of farm property showed an apparent increase, from \$1,476,411,737 in 1910 to \$3,787,420,118 in 1920; the average value per farm, from \$9456 to \$21,221. Farm land values greatly increased, as a result of war prices for farm products. In interpreting these values and indeed all comparative values for the decade 1914-24, the inflation of the currency in the latter part of the period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. The percentage of the total land area in farms increased from 53.5 in 1910 to 58.4 in 1920; the percentage of improved land in farms,

from 38 to 41.5. Of the total of 178,478 farms in 1920, 132,744 were operated by owners, 1596 by managers, and 44,138 by tenants. The corresponding figures for 1910 were 122,104, 1222, and 32,811. White farmers in 1920 numbered 178,271, compared with 155,844 in 1910; colored farmers, 207, compared with 293. Farms free from mortgage in 1920 numbered 54,086; mortgaged, 69,545. In 1910 65,038 farms were free from mortgage and 56,145 were mortgaged. The total number of cattle in 1920 was 3,021,469; in 1910, 2,347,435. Dairy cattle numbered 2,080,627 and 1,085,388, in those years. This indicates the steady growth of the dairy industry. The State had reached second place in butter production with Wisconsin only slightly ahead of it. Hogs increased in number from 1,520,257 to 2,380,862. The number of sheep on the farms in 1920 was 509,064, compared with 637,582 in 1910. The estimated production of the principal farm crops in 1923 was as follows: corn, 152,987,000 bushels; spring wheat, 20,513,000; oats, 146,623,000; rye, 12,312,000; barley, 23,159,000; potatoes, 38,815,000; hay, 2,547,000 tons; and flaxseed, 5,318,000 bushels. Comparative figures, for 1913, are: corn, 96,000,000 bushels; wheat, 68,040,000; oats, 112,644,000; rye, 5,700,000; barley, 34,800,000; potatoes, 30,250,000; and hay, 2,490,000 tons.

Mining. Minnesota is the leading State in production of iron ore. Although it produces also important quantities of clay products, cement, and stone, it is iron which sets it high among mineral producing States. Minnesota was eleventh in value of mineral products in 1921. The fluctuations in output of iron ore in the decade 1914-24 are indicated by the following comparative figures: 1914, 21,946,901 long tons; 1915, 33,464,660 long tons; 1916, 44,585,422; 1917, 44,595,232; 1918, 41,953,969; 1919, 36,000,626; 1920, 39,453,173; 1921, 17,811,325. In 1922, 30,209,372 long tons were shipped from the mines. The diminished production in 1921 was due largely to the general business depression, which lessened demand for the products of iron ore. The value of the clay products, exclusive of pottery, fluctuated from \$1,944,886 in 1914 to \$1,503,659 in 1918; \$3,341,477 in 1920; and \$2,482,286 in 1921. In addition to the minerals mentioned above, there are also produced in the State manganiferous ore, mineral waters, and sand and gravel. The total value of the mineral products in 1921 was \$72,609,973; \$177,589,967 in 1920; \$131,529,797 in 1919; \$155,412,823 in 1918; and \$45,680,865 in 1914.

Manufactures. Minnesota is an important industrial State. In 1920 there were 11 cities with populations over 10,000, forming 33.6 per cent of the total population. These cities, in 1919, produced 63.3 per cent of the State's manufactured products. There were in the State, in 1909, 5561 manufacturing establishments; in 1914, 5974; and in 1919, 6225. Persons engaged in manufacture numbered 104,406, 115,690, and 147,678; and capital invested amounted to \$275,416,029, \$354,434,177, and \$679,386,486, in those years. The value of the manufactured products in 1909 amounted to \$409,419,621; in 1914, to \$493,354,136; and in 1919 to \$1,218,120,735. The increase in value of products from 1914 to 1919 was to a great extent due to changes in industrial conditions brought about by the War and cannot properly be used

to indicate the growth of manufactures between the censuses of 1914 and 1919, but the increase in number of establishments and in number of persons engaged in manufacture shows clearly a considerable growth in the manufacturing activities of the State. Flour mill and gristmill products were chief in point of value; in 1909, \$139,136,000; 1914, \$148,244,000; and 1919, \$381,249,000. Slaughtering and meat packing is the second industry in this respect: in 1909, \$25,754,000; in 1914, \$47,710,000; and in 1919, \$146,919,000. The manufacture of butter and cheese ranks third, amounting in 1909, to \$25,287,000; in 1914, to \$33,746,000; and in 1919, to \$91,720,000. The product of the lumber and timber industry, in fourth place, was valued at \$42,353,000 in 1909; \$44,675,000 in 1914; and \$52,580,000 in 1919. The principal manufacturing cities are Minneapolis, St. Paul, and Duluth.

There were in Minneapolis, in 1909, 1102 manufacturing establishments, with a product valued at \$165,405,000; in 1914, 1349 with \$187,854,000; and in 1919, 1421 with \$491,383,000. In St. Paul, in 1909, there were 719 with \$58,990,000; in 1914, 737 with \$68,682,000; and in 1919, 818 with \$149,638,000. Similar figures for Duluth were: in 1909, 194 with \$17,180,000; in 1914, 243 with \$19,729,000; and in 1919, 226 with \$75,261,000.

Education. Substantial progress was made in educational development in Minnesota, in the decade 1914-24. School districts were authorized to establish special departments for the instruction of physically handicapped children, subnormals, the deaf, blind, defective of speech, and crippled, and a special grant of \$100 to \$300 per child was allowed by the State for this work; provision was made through the State Department of Education for the rehabilitation of disabled persons; a law was passed requiring physical training and health instruction in all public schools and in all institutions for the training of teachers; and a new supplementary State aid law was enacted, guaranteeing to every school district \$40 per child on a \$.02 tax levy in addition to all other forms of State support, with the State paying the difference between what a \$.02 tax levy would produce for each pupil involved, and \$40. The school enrollment increased from 457,041 in 1914 to 540,843 in 1923; the number of teachers, from 16,920 to 20,841. The expenditures for all public schools was, in 1922, \$38,986,486. In 1923, the permanent school fund amounted to \$33,750,529. The percentage of illiteracy in the State decreased from 4 in 1910 to 2.4 in 1920; among the native white, from 0.5 to 0.4; among the foreign-born white, from 7.7 to 5.6; among the negro, from 3.9 to 3.5.

Finance. For finance, see STATE FINANCES.

Political and Other Events. The decade 1914-24 was an important one in the political history of the State. Minnesota, together with other northwestern States, was greatly affected by the agricultural situation in the years following the Great War. Among the farmers the so-called Farmer-Labor party acquired sufficient power to elect candidates for important offices, including two United States Senators. In 1914, in the elections for governor and other State officers and Representatives in Congress, W. S. Hammond, the Democratic candidate, was elected governor. The Republicans elected Representatives in all districts except one. On Au-

gust 12 of this year, the International Harvester Company was declared to be a monopoly in restraint of trade, and its dissolution was ordered by the United States District Court of St. Paul. In the elections of 1916, Minnesota was one of the so-called doubtful States. The voting for President was extremely close. Charles E. Hughes received 179,553 votes and President Wilson 179,157 votes. In the elections for State officers the Republicans elected their candidate for governor, J. A. A. Burnquist, and F. B. Kellogg was elected United States Senator. The Republicans again were successful in the elections of 1918, when Governor Burnquist was reelected, as was Senator Knute Nelson. The Non-Partisan League took part in the campaign and showed considerable strength. In 1919 A. C. Townley, president and organizer of the National Non-Partisan League (see NORTH DAKOTA), was convicted of disloyalty and sentenced to three months' imprisonment by the Martin County district court at Fairmount. Elections were held again in 1920 for governor and other State officers. The Republican candidate for governor, J. A. O. Preus, was elected, defeating H. K. Shipstead, Independent Farmer-Labor. In the presidential election of this year W. G. Harding received 519,421 votes and J. M. Cox 142,994. At this election the people approved amendments authorizing the construction of a trunk highway system, the taxation of motor vehicles, and the assessment of all real property used for railway purposes. In 1922 the Republicans again elected Governor Preus, but the Farmer-Labor organization developed such strength that it was enabled to defeat Senator Kellogg and to elect its candidate for the Senate, H. K. Shipstead. At this election the State voted to loan its credit for the assistance of farmers. As the result of the death of Senator Nelson in 1923, a special election was held to fill the vacancy. Governor Preus was nominated by the Republicans and James A. Carley by the Democrats. The Farmer-Labor party nominated Magnus Johnson, who in 1922 was an unsuccessful candidate for governor. After a stirring and picturesque campaign. Mr. Johnson was elected. F. B. Kellogg, former Senator, was appointed Ambassador to Great Britain in 1923.

Legislation. The most important acts of the legislature in the decade 1914-24, are noted below. The legislature, in 1915, passed a local option bill on a proposed amendment providing for State-wide prohibition, which was defeated in the House. The Senate defeated a bill providing for the submission to the voters of a constitutional amendment granting full suffrage to women. The legislature of 1917, however, provided for the submission of both the woman suffrage amendment and the prohibition amendment to the people in 1918. This legislature enacted a "blue sky" law and made provision for the voting of citizens absent from the State in the national service. It also created a public safety commission. The prohibition amendment lacked the necessary three-fifths vote, but the 1919 Legislature ratified both the proposed prohibition and women's suffrage amendments. It also provided for an eight-hour day on public work, and passed statutes defining and punishing criminal syndicalism and sabotage. The Legislature of 1921 regulated aircraft and created the office of Commissioner of Agriculture and empowered him to aid coöperative

bodies engaged in buying and selling farm products. The manufacture or sale of adulterated or misbranded drugs was forbidden. The office of Labor Commissioner was abolished and an Industrial Commission was created. Provision was made for the enforcement of the laws relating to intoxicating liquors. The compulsory school laws were amended; a workmen's compensation insurance board was created; and amendments were made to the workmen's compensation law. In 1923 the legislature passed a measure forbidding the wearing of masks in public places with the intent to conceal the wearer's identity. A measure was also enacted to facilitate cooperative marketing of agricultural products, and provisions were made for creating associations for this purpose.

MINNESOTA, UNIVERSITY OF. A State institution, founded in 1868, with its main campus in Minneapolis, the department of agriculture in St. Paul, the graduate medical school in Rochester, and agricultural experiment stations in Crookston, Morris, Grand Rapids, Duluth, Waseca, and Zumbra Heights. In 1913-14, the number of resident students of collegiate grade was 4155; the total registration, including extension, subcollegiate, etc., was 8992. In the fall term of 1923-24, the resident students of collegiate grade numbered 8992; total registration, 13,594. The total annual residence registration of collegiate grade, including summer session, was above 12,000. The growth between these two dates was steady, except for 1917-18, when the collegiate registration was 5567. The faculty increased over the 10 years from 608 to 1250, the library from 175,000 to 380,000 volumes, and the income from \$2,445,491 to \$7,088,094. The method of instruction was changed in 1918 from the semester to the quarter system. A School of Business was established and courses in Americanization training work, training for the diplomatic and consular services, for State and Federal administration, and for municipal administration and engineering, and courses for teachers and supervisors of physical education were added. The dental course was lengthened from four to five years, the extra year to be taken in pre-dental work in the College of Arts and Sciences. Under a legislative appropriation voted in 1919, of \$560,000 a year for 10 years, the following new buildings were finished or in the course of construction in 1923-24: on the main campus, a music building costing \$259,000; mines experiment station building costing \$311,000; library, \$1,255,000; storehouse and shops building, \$154,000; an addition to the Minnesota Union, \$50,000; on the farm campus, two home management houses at a cost of \$30,000, and a dairy building costing \$215,000; at Crookston, an animal products building costing \$16,000, and a beef cattle barn to cost \$12,000; at Morris, a hospital to cost \$14,000. Dr. William J. Mayo and Dr. Charles H. Mayo of Rochester, Minn., have given over \$2,000,000 for medical research and examination. A trust fund of \$250,000 was established in 1923 by the Citizens' Aid Society of Minneapolis for the erection of the George Chase Christian Memorial Cancer Hospital. In the same year a site valued at \$100,000 was given for the Minnesota Hospital and Home for Crippled Children by William H. Euatis, as the first installment of a gift for buildings and grounds for the univer-

sity, which will eventually amount to \$1,000,000; pledges to the amount of approximately \$2,000,000 were made by alumni and friends for the erection of an athletic stadium and an auditorium; and two loan funds, one of \$5000 and one of \$12,000, were established in the names of Edward M. and Effie R. Johnson. George Edgar Vincent was president of the university until he resigned in 1916 to accept the presidency of the Rockefeller Foundation, when he was succeeded by Marion LeRoy Burton, who resigned in 1920 to become president of the University of Michigan. President, Lotus Delta Coffman.

MINNICK, JOHN HARRISON (1877-). An American educator, born at Somerset, Ind., and educated at Indiana, Illinois, Chicago, and other universities. For several years he taught in high schools in Indiana and Illinois, and from 1911 to 1913 he was critic teacher of mathematics at Indiana University. For two years following he was instructor in mathematics at the Horace Mann School at New York City. In 1916 he became instructor of mathematics at the University of Pennsylvania and was successively assistant professor of education, professor of education, and dean of the school of education at that university. He was a member of many learned societies, wrote *An Investigation of Abilities Fundamental to Geometry* (1918), and developed standardized tests in geometry.

MINNIGERODE, MEADE (1887-). An American writer, born in London. He graduated from Yale in 1910 and for several years was associated with publishers in New York. He represented the United States Shipping Board in France in 1917-18 and in the year following was first lieutenant with the American Red Cross. His books include *Laughing House* (1920); *The Big Year* (1921); *O, Susanna* (1922); and *The Fabulous Forties* (1924), a graphic and amusing picture of New York in the time of Dickens.

MIOMANDRE, FRANCIS DE (1880-). A French novelist, born at Tours, and educated at Marseilles. He began writing in his early twenties and won the Prix Goncourt in 1908 for his novel, *Ecrit sur de l'Eau*. His novels are highly imaginative and put together with the genuine talent of a romancer who has traveled far and wide at his own study table. His works include: *Du Vent et de la Poussière*; *L'Ingénu*; *L'Aventure de Thérèse Beauchamps*; *Le Veau d'Or et la Vache Enragée*; *Les Taupes*; *Ces Petits Messieurs*; *Les Jeux de l'Amour et de la Danse*; *La Cabane d'Amour*; *Journal Interrompu*; *Pavillon du Mandarin*.

MIQUELON. See ST. PIERRE AND MIQUELON.

MISSISSIPPI. Mississippi is the thirty-first State in size (46,865 square miles), and the twenty-third in population; capital, Jackson. The population decreased from 1,797,114 in 1910 to 1,790,618 in 1920, a loss of 0.4 per cent. The white population rose from 786,111 to 853,962, but was still greatly exceeded by the negro population, in spite of the fact that the number of negroes decreased from 1,009,487 to 935,184 during the decade. The native white population increased from 776,722 to 845,943, while the foreign-born white decreased from 9389 to 8019. The urban population of the State mounted, from 207,311 to 240,121; the rural population, on the other hand, decreased from 1,589,803 to 1,550,497. The growth of

Meridian was from 23,285 in 1910 to 23,399 in 1920; Jackson, 21,262 to 22,817. Vicksburg, with 20,814 in 1910 and 18,072 in 1920, showed a decrease.

Agriculture. As the raising of cotton is one of the chief agricultural industries of the State, conditions during the decade 1910-20 were greatly affected by the ravages of the boll weevil, which occupied most of the State by 1909 or 1910. This is indicated by a comparison of the acreage and production of various years during the period: in 1913, 3,067,000 acres, 1,311,000 bales; 1915, 2,735,000, with 954,000 bales; 1917, 2,788,000, with 905,000 bales; 1921, 2,628,000, with 813,000 bales; 1922, 3,078,000, with 989,000 bales. During 1923 more than usual damage was done to the cotton plant, and the abandonment of cotton farming was much heavier than usual; the forecast for production was 752,000 bales. For a more detailed account of the ravages of the boll weevil in the cotton growing States, see *BOLL WEEVIL*.

While the population of the State decreased 0.4 per cent in the decade, the number of farms decreased 0.8 per cent (from 274,382 in 1910 to 272,101 in 1920). The area of land in farms decreased 1.9 per cent, from 18,557,533 to 18,196,979 acres; and while the improved land in farms increased from 9,008,310 acres to 9,325,677, the total percentage of land used for agricultural purposes decreased from 62.5 to 61.3. The total value of farm property showed an apparent increase of from \$426,314,634 in 1910 to \$964,751,855 in 1920; the average value per farm, from \$1554 to \$3546. In interpreting these values and indeed all comparative values in the decade 1914-24, the inflation of the currency in the latter part of the period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. Of the total of 272,101 farms in 1920, 91,310 were operated by owners, 989 by managers, and 179,802 by tenants. The comparative figures for 1910 were 92,066, 825, and 181,491. White farmers in 1920 numbered 110,882, compared with 109,645 in 1910, colored, 161,219, compared with 164,737. There was a decrease in negro population, 1910-20, of 7.4 per cent, compared with an increase of more than 11 per cent in the preceding decade, which quite seriously affected the farm labor situation. Farms free from mortgage in 1920 numbered 91,310; 92,066 in 1910. In 1920, 23,990 were mortgaged, compared with 29,693 in 1910. The number of dairy cows in 1920 was 530,274, compared with 429,587 in 1910; "beef cows," 261,682, compared with 138,930; hogs, 1,373,311, compared with 1,292,119; mules, 308,216, compared with 253,866; sheep, 164,440, compared with 156,230. The estimated production of the chief farm crops in 1920 was as follows: corn, 38,137,000 bushels; oats, 2,581,000; potatoes, 1,144,000; sweet potatoes, 9,094,000; hay, 548,000 tons; peanuts, 10,744,000 bushels. For cotton, see above. Comparative figures for 1913 are: corn, 63,000,000 bushels; oats, 2,800,000; potatoes, 960,000; and hay, 293,000 tons.

Manufactures. Although Mississippi is not one of the leading industrial States, it has many important industries. See *UNITED STATES, Manufactures*.

Education. Mississippi has educational problems of great difficulty. The colored popu-

lation exceeds the white, and in addition to this the rural localities are many of them thinly populated, and widely separated. In the decade 1914-24, notable advances were made. There was put into operation a splendid system of consolidated schools, which in 1923 numbered 751; and a compulsory school law was put into force, which brought into the schools during the first year of its operation over 33,000 white boys and girls over 7 years of age who had never before attended school. An equalizing school fund was provided, of more than \$1,125,000, to be disbursed by the State Board of Education for the benefit of the poorer sections of the State. The State Normal School, established in 1912, was enlarged, and had at the close of this period an enrollment of approximately 1500. The trustees of the schools of every county had been organized for several years in the County Trustees' Association, and the 82 county superintendents of the State were organized into a State association. In the latter part of the period the work of rehabilitation of cripples and vocational education had been organized and was producing excellent results. The high school work in over 1000 schools doing from 1 to 4 years of high school work had been standardized. There were 237 four-year accredited high schools, and hundreds of others doing from 1 to 3 years of accredited work. Enrolled in the colleges of the State in 1923 were as many students as were contained in the high schools in 1913; during the preceding two years a \$5,000,000 bond issue was expended in repairing and expanding the State colleges and institutions. The white enrollment in the high schools in 1923 was 28,000; in the colored high schools, 4000. The total public school enrollment was placed around 550,000, as compared with 469,137 in 1909-10. The percentage of illiteracy in the State decreased from 26.8 in 1910 to 20.8 in 1920: among the native white population, from 6.2 to 4.4 per cent; among the foreign-born white, from 13.6 to 13.4; among the negro, from 43.2 to 35.9.

Finance. For finances, see *STATE FINANCES*.

Political and Other Events. Mississippi remained steadfastly Democratic in the decade 1914-24. In 1916 Senator Williams was re-elected, practically without opposition. In the presidential election of this year, President Wilson received 80,422 votes; Charles E. Hughes, 4253 votes. At this election an amendment was adopted increasing the number of Supreme Court judges to six, to be elected by the people for a term of eight years. Elections were held in 1917 for United States Senator. Former Senator Vardaman contested the nomination of Representative Harrison, who was nominated and elected. Senator Vardaman was opposed by President Wilson, who declared that the election of Vardaman would be a condemnation of the Wilson administration. In 1919, Lee M. Russell was reelected governor. In 1922 elections were held for United States Senator, and Hubert Stephens defeated former Senator Vardaman for the nomination. In elections held in 1923, Henry L. Whitfield was elected governor for the term 1924-28. On Feb. 18, 1920, the Legislature rejected the woman suffrage amendment.

MISSISSIPPI, UNIVERSITY OF. A coeducational State institution at University, Miss., founded in 1848. With the usual exception of the war years the university grew steadily dur-

ing the decade 1914-24, with an enrollment at the beginning of that period of 528, a faculty of 35, and a library of 25,000 volumes, as compared with an enrollment of 801, a faculty of 46, and a library of 35,000 volumes at the close. The income of the university also increased, from \$138,226 to \$167,000; five new dormitories and a pharmacy building were constructed, and a School of Commerce and Business and a department of hygiene were opened. Chancellor, Joseph Neely Powers, LL.D.

MISSOURI. Missouri is the eighteenth State in size (69,420 square miles), and the ninth in population; capital, Jefferson City. The population increased from 3,293,335 in 1910 to 3,404,055 in 1920, a gain of 3.4 per cent. The white population rose from 3,134,932 to 3,225,044; negro, from 157,452 to 178,241. The native white population showed an increase from 2,906,036 to 3,039,018, while the foreign-born white decreased from 228,896 to 186,026. The urban population mounted in the decade from 1,398,817 to 1,586,903; the rural population decreased from 1,894,518 to 1,817,152. The growth of the principal cities was as follows: St. Louis (q.v.), 1910, 687,020; 1920, 772,897; Kansas City (q.v.), 248,381 to 324,410; St. Joseph, 77,403 to 77,939; Springfield, 35,201 to 39,631.

Agriculture. As Missouri is one of the most important agricultural States, conditions in the decade 1914-24 reflected the fluctuation in prices and production which characterized the war and post-war periods. See AGRICULTURE.

Missouri is one of the minor cotton-producing States, and while the region where cotton is grown had lately become infested by the boll weevil, the insect was held back by the cold winters, and its ravages were not serious. Figures for area and production for several years are: 1913, 112,000 acres; production, 67,000 bales; 1916, 133,000 acres, 63,900 bales; 1920, 136,000, 79,000 bales. The production in 1922 was 149,000 bales; the estimated production for 1923, 198,000. It will be noted that since Missouri suffered less than most of the other affected States from the boll weevil, there was an increase in the area grown. In Missouri, in contrast with the situation in most of the other great agricultural states, the number of farms did not increase in proportion to the growth of the population in the decade. Whereas the population increased 3.4 per cent, the number of farms decreased 5.1 per cent (from 277,244 in 1910 to 263,004 in 1920). The total area in farms increased from 34,591,248 acres to 34,774,679, or 0.5 per cent; the improved land in farms, from 24,581,186 to 24,832,966 acres, or 1 per cent. The percentage of the total land used for agricultural purposes increased from 78.6 to 79.1 per cent; the proportion of improved land in farms, from 55.9 per cent to 56.5. The total value of farm property in the State showed an apparent increase from \$2,052,017,488 in 1910 to \$3,591,068,085 in 1920; the average value of farms, from \$7405 to \$13,654. In interpreting these values and indeed all comparative values for the decade 1914-24, the inflation of the currency in the latter part of that period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. Of the total of 263,004 farms in 1920, 186,030 were operated by owners, 2247 by managers, and 75,727 by tenants.

The comparative figures for 1910 were 192,285, 2001, and 82,958. White farmers in 1920 numbered 260,178, compared with 273,578 in 1910; colored, 2826, compared with 3666. Farms free from mortgage in 1920 numbered 82,090; under mortgage, 85,538. In 1910, 102,514 farms were free from mortgage; 88,486 were mortgaged. The total number of cattle in 1920 was 2,781,644 compared with 2,561,482 in 1910; dairy cattle numbered 1,066,750, compared with 856,430; hogs, 3,888,677 compared with 4,438,194; mules, 255,455 compared with 265,601; sheep, 1,271,616 compared with 1,811,268. The estimated production of the principal farm crops in 1923 was as follows: corn, 204,384,000 bushels; wheat, 37,947,000; oats, 32,382,000; barley, 114,000; potatoes, 8,788,000; hay, 4,038,000 tons; sweet potatoes, 1,501,000 bushels; and tobacco, 7,434,000 pounds. Comparative figures for 1913 are: corn, 129,062,000 bushels; wheat, 39,586,000; oats, 26,500,000; barley, 110,000; potatoes, 3,230,000; hay, 1,800,000 tons; and tobacco, 3,315,000 pounds.

Mining. Missouri is first among the States in production of lead. Important quantities of coal, clay products, and cement are also mined; but it is the lead industry which gives it its chief importance as a mineral producing State, with a rank of fifteenth in value of mineral products in 1921. Fluctuations in production of lead in the decade 1914-24 are indicated in the following figures: 1914, 192,612 short tons, valued at \$15,023,736; 1915, 210,440 short tons, \$19,781,300; 1916, 233,088, \$32,166,144; 1917, 234,156, \$40,274,832; 1918, 194,175, \$27,572,850; 1919, 163,290, \$17,308,740; 1920, 165,114, \$26,418,240; 1921, 180,085, \$16,207,650; 1922, 178,412, \$19,625,320. The greater part of the output is obtained from the southeast and central parts of the State. Coal production varied in the decade from 3,935,980 short tons in 1914 to 4,742,146 short tons in 1916; 5,667,730 in 1918; 5,369,565 in 1920; 3,551,621 in 1921; and 2,924,750 in 1922. Clay products during the decade ranged in value from \$6,077,284 in 1914 to \$7,640,995 in 1916; \$9,155,088 in 1918; \$17,474,542 in 1920; \$10,668,691 in 1921. The increased value in the latter years was due chiefly to changes in the buying power of currency which led to higher prices, since production was not greatly increased. The output of cement during the decade averaged about 5,000,000 barrels per year, but the value increased from \$4,485,744 in 1914 to \$8,034,540 in 1921, for a practically identical production, the increased value being due chiefly to the decreased buying power of money. The total value of the mineral products of the State for 1921 was \$56,375,543, compared with \$90,994,470 in 1920; \$61,862,232 in 1919; \$76,663,995 in 1918; and \$48,597,593 in 1914.

Manufactures. Missouri is an important industrial State. There are 13 cities with more than 10,000 inhabitants, containing 39.8 per cent of the total population of the State. In 1919 they reported 75.6 per cent of the value of the State's manufactured products. There were in the State, in 1909, 8375 establishments; in 1914, 8386, and in 1919, 8592. Persons engaged in manufacture numbered 185,705, 188,266, and 244,939, in those years, while the capital invested amounted to \$444,343,135, \$522,548,083, and \$938,760,773. The value of manufactured products in 1909 was \$574,111,070; in 1914, \$637,952,128; and in 1919, \$1,694,208,

338. The large increase in value of the product in 1914-19 was due largely to changes in industrial conditions brought about by the War and cannot properly be used to measure the growth of manufactures during the census period 1914-19; but the increase in number of wage earners indicates a decided growth in the manufacturing activities of the State. Slaughtering and meat packing is the first industry in point of value of products, which amounted in 1909 to \$79,581,000; 1914, \$92,060,000; and 1919, \$247,477,000. Flour and gristmill products rank second in value: in 1909, \$44,508,000; 1914, \$38,086,000; and 1919, \$113,297,000. The manufacture of boots and shoes is third, with a productive value of \$48,751,000 in 1909; 1914, \$52,522,000; and 1919, \$142,466,000. The manufacture of automobile bodies and parts, in fourth place, had an output in 1909 valued at \$1,677,000; 1914, \$2,183,000; and 1919, \$71,939,000. The most important manufacturing cities are St. Louis and Kansas City. In St. Louis, in 1909, there were 2667 manufacturing establishments, with a product of \$328,495,000; in 1914, 2787 with \$360,480,000; 1919, 3205 with \$871,700,000. Kansas City, in 1909, had 902 with \$54,705,000; in 1914, 1052 with \$60,953,000; and in 1919, 997 with \$192,815,000. St. Joseph is also an important manufacturing city, having, in 1909, 261 manufacturing establishments, with a product of \$17,026,000; 1914, 267 with \$17,068,000; and 1919, 219 with \$50,697,000.

Education. There was steady development in the educational system of Missouri during the decade 1914 to 1924. During that period a new plan of inspecting, supervising, and classifying high schools was formulated and put into operation. The State was divided into five districts coterminous with the five State teachers' college districts, in each of which a high school inspector or supervisor was placed, who had his office at the teachers' college and was responsible for the advancement of secondary education in his district. The department also undertook two other outstanding projects, a State-wide survey of educational conditions, and the reorganization of curriculum courses of study and standards for classification of high schools of the State. Trained experts were directing both activities. Attention was also given to the development of the rural schools, and there was at the end of the period one rural supervisor for the State and five rural school inspectors; the work of these supervisors was to help the county superintendents in group and community meetings, to inspect rural schools, and in general to help teachers in their work. The plan calls for a conference of teachers, school board members, and patrons at the close of the administration work; at this meeting plans for school improvement, better supervision, and improved presentation of the work, together with the individual problems of teachers, were to be discussed and remedies suggested. The total enrollment in the elementary and high schools in 1913 was 690,484; in 1923 it was 736,592. In the latter year, the white males numbered 353,301, and the white females, 349,183; the colored males, 16,174; and the colored females, 17,864. The total expenditure for educational purposes in 1923 was \$40,499,939. The percentage of illiteracy in the State decreased from 5.4 in 1910 to 3.8 in 1920: in the native white population, from 4.3 per cent to

2.8; in the foreign-born white, from 10.2 to 10; in the colored, from 21.1 to 14.3.

Finance. For finance, see STATE FINANCES.

Political and Other Events. While Missouri was regarded as a solidly Democratic State for many years, it has been gradually shifting to the doubtful class. It was carried by Roosevelt and the entire Republican State ticket except governor in 1904, by Herbert S. Hadley for governor in 1908, and by the Republicans again in 1910. During the decade 1914-24, following the Republican split of 1912, the Republicans in the latter part of the period developed sufficient strength to elect candidates for governor and United States senator. At elections held in 1914 for United States senator and for representative in Congress, William J. Stone was elected to the Senate, and the Democrats elected the Representatives in all the districts except two. A proposed prohibition amendment to the constitution was defeated at this election. In 1916 elections were held for governor and other State officers. The Democratic nominee for governor, Frederick O. Gardner, was elected; the Democrats elected all the State officers except the State auditor. In the presidential election of that year, President Wilson received 398,032 votes; Charles E. Hughes, 309,339. A constitutional amendment providing for State-wide prohibition was defeated at this election, but an amendment providing for pensions for the blind was carried. Senator W. J. Stone died in 1918, and X. P. Wilkey was appointed by Governor Gardner to serve until the election of a successor. The Republicans elected their candidate for senator, Selden P. Spencer, who defeated the Democratic candidate, Joseph W. Folk.

In 1919, the last year of Governor Gardner's administration, he appointed Lieutenant-Governor Wallace Crossley as State Fuel Commissioner acting in conjunction with the Federal fuel authorities, to conserve and distribute properly the coal supply when a shortage was threatened by labor trouble in the mines. The Republicans in 1920 elected their candidate for governor, Arthur M. Hyde, and reelected Senator Spencer. In the presidential election of that year, Warren G. Harding received 727,162 votes; James M. Cox, 574,799. At a referendum vote at this election, the people approved the enforcement of prohibition throughout the State. In 1922 the most important political happening was the election of a United States senator. Senator James A. Reed was a candidate for reelection. He was opposed for the nomination by Breckinridge Long. Senator Reed, although he was bitterly assailed for his failure to support President Wilson in the Senate, and although the former President strongly voiced his objection to his reelection, was successful at the primaries and was nominated. In the election in November he defeated the Republican candidate, R. R. Brewster. On May 10, 1922, more than 2500 citizens of Missouri petitioned Congress to modify the Volstead Act by restoring light wines and beer. During 1923, at St. Joseph a trial of 76 so-called radicals, including William Z. Foster and others, was conducted. Foster was acquitted, but several others were convicted.

Legislation. The most important acts of the Legislature in the decade 1914-24 were as follows: The Legislature of 1915 enacted a measure designed to prevent dishonest advertising.

This prohibits misstatements of facts in any form of advertising matter. In 1917 the Legislature amended the laws relating to criminal procedure and abolished capital punishment, which was restored in 1919 at an extra session. Provisions were made for the voting of citizens absent on military service. An income tax was created and corporation, inheritance, and secured debt tax laws were passed. The secured debt law was declared unconstitutional. The banking laws were also amended in important details. By a provision of the Legislature in 1919, women were permitted to vote for president. The Legislature enacted a child labor law and a workmen's compensation law, the latter annulled by referendum. On January 6 the Legislature ratified the Federal prohibition amendment, and on July 3, in extra session, the Federal woman suffrage amendment. The Legislature of 1921 created a Commissioner of Agriculture; passed measures for the relief of the deserving blind; created a State Department of the Budget and social welfare boards in cities of the second and third class; amended the child labor laws, and created a municipal cooperative court in all counties having a population between 19,000 and 150,000. The law creating a Commissioner of Agriculture and Department of the Budget were later suspended by referendum and defeated.

The Legislature created a State Highway Commission in 1921 and provided for the construction of 7600 miles of hard-surface roads from a bond issue of \$60,000,000 voted by the people, supplemented by Federal aid. Much of this mileage was already under contract in 1924. The issuance of \$15,000,000 in bonds was authorized for the payment of a soldiers' bonus. The Legislature also created a State Department of Finance and passed a resolution to submit to the voters an amendment enabling women to hold any office in the State. This Legislature also provided for a system of workmen's compensation. This was suspended by referendum. In 1923 the Legislature passed a general prohibition act, enacted measures proposing to extend the voting privilege equally to men and women, submitted a proposed amendment for two additional judges on the Supreme Court bench, and passed a measure to facilitate the cooperative marketing of agricultural products. See CITY PLANNING.

MISSOURI, UNIVERSITY OF. A coeducational State institution at Columbia and Rolla, founded in 1839. The student enrollment increased from 2605 in 1914 to 3604 in the year 1923-24, with 1163 enrolled in the summer of 1923, and the faculty increased from 262 to 315 members. The library was increased from 165,000 to 271,000 volumes, the productive funds from \$1,280,000 to \$2,500,000, and the income from \$1,100,000 to \$2,600,000. A new building for the School of Journalism was given by Ward A. Neff in 1920, and a hospital, a gymnasium for women, a chemistry building, an agricultural building, and a War memorial building were erected in 1922. In 1921, \$50,000 was received for a home economics building, in 1922 in memory of their son, Lee H. Tate, and Mr. and Mrs. Frank R. Tate gave \$50,000 toward a law building; in 1923 they gave \$75,000. Albert Ross Hill, LL.D., was president until 1921; John Carleton Jones was acting president from 1921 to 1923, when he was succeeded by Stratton Duluth Brooks, LL.D.

MITCHELL, WILLIAM (1879-). An American army officer, born at Nice, France, and educated at George Washington University and the Army Staff College. He was with Gen. Fitzhugh Lee in Cuba and served in the Philippines in 1899. In 1903 he constructed the Alaskan telegraph system and in 1914 joined the French aviation forces in France. He was the first American officer to fly over the lines, commanded the air units of the 1st Army, and was chief of the Air Service in the Argonne offensive. He commanded the air forces at St. Mihiel and served at Cambrai, the Somme, etc. He wrote *Our Air Force* and many pamphlets and magazine articles. In 1920 he was appointed brigadier-general in the Air Service.

MOBILIZATION. See ARMIES AND ARMY ORGANIZATION.

MOFFAT TUNNEL. See TUNNELS.

MOHAMMED VI (VAHID-ED-DIN) (1861-). A sultan of Turkey, brother of Mohammed V, whom he succeeded in 1918. He lived in seclusion until he became sultan and was suspected of having French sympathies. After the rise of the Nationalist movement under Mustafa Kemal Pasha, the sultan was merely a figurehead politically, although as caliph he was the supreme religious authority of the entire Moslem world. In November, 1922, he was de-throned and left Constantinople on board the British warship *Malaya*, bound for Malta.

MOHLER, JOHN ROBBINS (1875-). An American pathologist, born at Philadelphia, Pa., and educated at Temple University, the University of Pennsylvania, and Marquette University. For several years he was a practicing veterinarian and was also in the employ of the Bureau of Animal Industry of the Department of Agriculture. In 1891 he was appointed assistant pathologist in the Bureau and was successively zoologist, chief of the pathological division, assistant chief, and from 1917, chief of the entire Bureau. Besides translating several medical works from foreign languages, he was the author of many articles on pathology, bacteriology, and meat inspection. During the War he was a member of the Remount Board of the United States Army.

MOLDAVIA. See RUMANIA.

MOLEY, RAYMOND (1886-). An American educator, born at Berea, Ohio, and educated at Baldwin-Wallace College, Oberlin College, and Columbia University. He taught in several schools in Ohio until 1914. In 1916 he was appointed instructor and assistant professor of politics at Western Reserve University and from 1919 was director of the Cleveland Foundation. In 1918-19 he was also director of Americanization work under the Ohio State Council of Defense. He wrote *Lessons in Democracy* (1919); *Commercial Recreation* (1919); *Facts for Future Citizens* (1922); and various pamphlets and articles on the teaching of government.

MÖLLER VAN DEN BRUCK, ARTUR (1876-). A German writer, born at Solingen. He was educated and spent several years traveling in Germany, Austria, France, Italy, England, Scandinavia, and Russia. Besides editing the works of Dostoyevsky, he is the author of *Die Moderne Literatur in Gruppen und Einzeldarstellungen* (1900); *Die Variété: eine Kultur-dramaturgie* (1901); *Die Deutschen: Unsere Menschheitsgeschichte* (1904); *Zeitgenos-*

sen (1905); *Die Italienische Schönheit* (1913); *Der Preussische Stil* (1915); and *Das Recht der Jungen Völker* (1918).

MOLNAR, FRANZ (?-). A Hungarian playwright. He is the author of *Liliom*, which, played in New York City in 1922, presents a penetrating study of characteristic tendencies in a roughneck, and author also of *Launzi* which was unsuccessful in New York in 1923. His *Passions for Men* was seen in New York in 1923, and in the same year Eva Le Gallienne was starred in *The Swan*, a high comedy with a deft satirical thrust (1923).

MOLTKE, RAYMUND HERMANN SIEGFRIED (1869-). A German writer and economist. He studied in Leipzig and at the Art Academy in Berlin and later became librarian of the Chamber of Commerce of Leipzig. He is the author of *Verse* (1895); *Aus Meiner Skizzenmappe* (1897); *Der Heilige Karl*, a play (1903); *Die Feder Geschärft* (1914); *Gott im Leide* (1915); *Kreuzwege des Lebens* (1916), and *Um die Mark Main* (1919). His most important works, on economic and historical subjects, are *Leipzigs Handelskorporationem* (1907); *Zwei Kapitel aus Leipzigs Handels- und Verkehrsgeschichte* (1912); *Friedrich List* (1913); *Katalog Altkaufmännischer Archive in Leipzig* (1913); *Die Deutsche Eisenbahn im Kriege* (1916); *Die Leipziger Messe im Kriege* (1917); and the biography, *Bernhard von Tauchnitz* (1916).

MOLUCCA. See DUTCH EAST INDIES.

MONBERT, ALFRED (1872-). A German poet, born in Karlsruhe, and educated at the universities of Heidelberg, Leipzig, Munich, and Berlin. He practiced law for six years and then devoted himself to his literary work. His works include: *Der Sonnengeist* (1905); *Aeon, der Weltgesuchte* (1907); *Aeon vor Syrakus* (1911); *Der Himmlische Zecher* (1909); *Der Held der Erde* (1919); and *Aeon Zwischen den Frauen* (1920).

MONASTIR. See WAR IN EUROPE, Balkan Front.

MONDELL, FRANK WHEELER (1860-). An American public official, born in St. Louis, Mo., and educated in the public schools. For many years he was engaged in farming, stock-raising, and railroad construction. In 1887 he settled in Wyoming, where he took an active part in the development of the State. In 1909 he was elected a member of the first State Senate and from 1897 to 1899 was assistant commissioner of the Land Office. He was elected to Congress in 1895 and was successively reelected until 1922, when he was defeated. In the 66th and 67th Congresses he was majority leader on the floor of the House and took a prominent part in framing the legislation passed by that body. He took an active part in all the Republican conventions from 1902 to 1924, inclusive.

MONET, CLAUDE (1840-). A French landscape painter (see VOL. XVI). During recent years Monet has continued to hold his rank as the foremost landscape painter of impressionism. For two years after the beginning of the War, he ceased painting, but during the third year he built a larger studio and completed, up to the time of the Armistice, about 14 large paintings, arranged in groups of three to five. The subjects were chiefly water-lilies,

and he presented his fine blue diptych on this subject to the French nation in honor of the Armistice. Exhibitions of his works were recently held in Paris and New York (1923).

MONGOLIA. A Chinese outer territory, with an estimated area of 1,367,900 square miles, and a population of about 2,500,000. The difficulties of communication because of lack of railways and the obstacles presented by the barren reaches of the Desert of Gobi, which cuts into the heart of the region, made for a sparsely settled population. Agriculture was impossible, with the result that the inhabitants were hunters and raisers of camels, horses, and sheep. In the period 1914-24 the Chinese were steadily penetrating into Inner Mongolia and the Desert of Gobi and beginning to apply themselves to the tillage of the soil. Inner and Outer Mongolia were joined in 1917 by a motor transport service plying between Urga and Kalgan. Urga was the chief town and centre of population. During the decade 1914-24 Mongolia's fortunes were linked with those of Russia and China. Up to the Revolution, Russian penetration into Outer Mongolia continued; a loan arranged in 1913 was financed on the security of internal revenues; a bank was established with a Russian directorate; in 1914 a scheme was projected for the financing and construction of Mongolian railways. The overthrow of the Czar not only checked the completion of these enterprises but also put Outer Mongolia at the mercy of marauding bands. Fear of Bolshevik incursions, as well as the threat of Semenov's forces operating near the border, impelled the autonomous government of Outer Mongolia to appeal to China for aid. In November, 1919, the reigning prince, the Living Buddha or Hutuktu, prompted by his advisers, asked for the cancellation of the charter of independence; some days later the Chinese government acceded by denouncing the Russo-Chinese and Russo-Mongolian treaties of 1913-14. The Chinese did not maintain their position long. Early in 1921, Baron Ungern von Sternberg, heading remnants of Semenov's anti-Bolshevik troops, marched on the Chinese at Urga, captured the town, and put the garrison to the sword. The Hutuktu was compelled to announce his sovereignty once more, though his policies were plainly dominated by the Baron Ungern. The Peking government was defied, and troops were even sent into Inner Mongolia. Ungern could not stand up against the Bolshevik army of the Far Eastern Republic and in a series of engagements his troops were defeated and he himself captured. He was executed on Sept. 15, 1921. Russian influence again became paramount. Soviet troops remained at Urga; a Mongolian national government, taking control, adopted a consistently friendly attitude toward Soviet Russia. In 1923 a Russian mission proceeded to Peking for the purpose of restoring friendly relations and reestablishing the economic agreements of 1913-14. In June, 1924, a treaty was signed which called for the restoration of Mongolia to China. Inner Mongolia, during the period, continued to be administered by Chinese officials appointed through Peking. See CHINA; RUSSIA.

MONITOR. See VESSEL, NAVAL.

MONTAGU, EDWIN SAMUEL (1879-). An English public official, author of the so-called

Montagu Plan (see INDIA). He was educated at Trinity College, Cambridge, and from 1906 to 1908 was Parliamentary Secretary to the Chancellor of the Exchequer. He was secretary to the Prime Minister from 1908 to 1910; from that year to 1914, Parliamentary Under-Secretary of State for India. He served as chancellor of the Duchy of Lancaster in 1915 and as Financial Secretary of the Treasury from 1914 to 1916. He was Minister of Munitions and a member of the War Committee in the latter year and Secretary of State for India from 1917 to 1922. From 1906 he was a member of Parliament from Cambridgeshire. He was made a member of the Privy Council in 1914.

MONTAGUE, WILLIAM PEPPERELL (1873-): An American professor of philosophy, born at Chelsea, Mass., and educated at Harvard University. In 1903 he became a member of the faculty of Columbia University, when he was appointed full professor in 1920. One of the six authors of the Neo-Realist programme, he has written numerous essays on the reduction of consciousness to a form of energy and on the implications of realistic philosophy in the realm of what are ordinarily called spiritual values.

MONTANA. Montana is the third State in size (146,997 square miles) and the thirty-ninth in population; capital, Helena. The population increased from 376,053 in 1910 to 548,889 in 1920, a gain of 46 per cent. The white population increased from 360,580 to 534,260; the Indian population from 10,745 to 10,956. There were, in 1910, 1585 Japanese, and in 1920, 1074; the negro population also decreased, from 1834 to 1658. The native-born white population increased from 286,936 to 440,640; the foreign-born white, from 91,644 to 93,620. Both urban and rural populations mounted during the decade, the former from 133,420 to 172,011, and the latter from 242,633 to 376,878. The growth of the principal cities was as follows: Butte, 1910, 39,165; 1920, 41,611; Great Falls, 13,943 to 24,121; Billings, 10,031 to 15,100.

Agriculture. While the population of the State increased 46 per cent in the decade, the number of farms increased 120 per cent (from 26,214 in 1910 to 57,677 in 1920), and the total acreage in farms increased to 35,070,656 from 13,545,603, a gain of 158.9 per cent. The improved land in farms increased also, from 3,640,309 to 11,007,278 acres. The percentage of land used for agricultural purposes in 1910 was 14.5; in 1920, 37.5. The total value of farm property showed an apparent increase from \$347,828,770 in 1910 to \$985,961,308 in 1920, or 183.5 per cent; the average value per farm, from \$13,269 to \$17,095. In interpreting these values and indeed all comparative values in the decade 1914-24, the inflation of the currency in the latter part of the period is to be taken into consideration. The index number of prices paid to producers of farm products in the United States was 104 in 1910 and 216 in 1920. Of the total of 57,677 farms in 1920, 50,271 were operated by owners, 899 by managers, and 6507 by tenants. The comparative figures for 1910 were 23,365, 505, and 2344. White farmers in 1910 numbered 25,018; in 1920, 56,614, of whom 41,061 were native and 15,563 foreign-born. Of the 1063 colored farmers in 1920, 987 were Indians. Farms free from mortgage in 1920 numbered 16,365, compared with 18,014 in 1910; those under mortgage, 20,897 compared

with 4820. The number of dairy cows increased to 153,425 in 1920 from 77,527 in 1910; "beef cows," from 372,798 to 514,853; while sheep decreased in number from 4,959,835 to 2,082,919. The area under irrigation increased from 1,679,084 acres in 1909 to 1,681,729 acres in 1919. The estimated production of the chief farm crops in 1923 was as follows: corn, 9,016,000 bushels; spring wheat, 44,764,000; winter wheat, 12,546,000; oats, 23,051,000; barley, 2,161,000; potatoes, 5,091,000; and hay, 1,940,000 tons. Comparative figures for 1913 are: corn, 882,000 bushels; wheat, 20,673,000; oats, 21,750,000; barley, 1,860,000; potatoes, 5,040,000; and hay, 1,188,000 tons.

Mining. Montana is an important State in the production of minerals. In former years gold, silver, and copper were the most valuable products of the mines; latterly they were surpassed by coal. The progress of the mining industry, 1914-19, is indicated by comparative figures. The production of coal in 1914 was 2,805,173 short tons, valued at \$4,913,191; 1915, 2,789,755 short tons, \$4,526,509; 1917, 4,226,689, \$8,919,136; 1918, 4,532,505, \$11,444,875; 1920, 4,413,866, \$13,923,000; 1921, 2,733,958, \$8,921,600; and 1922, 2,572,221 short tons. The production of silver varied from 12,016,460 fine ounces in 1914 to 16,494,366 in 1916; 16,797,479 in 1918; 12,579,178 in 1920; and 12,468,151 in 1922. In production of copper, Montana ranks second among the States; it is surpassed only by Arizona. In 1914 the copper output was 233,229,640 pounds; 1916, 352,928,373; 1918, 323,174,850; 1920, 177,059,260; 1921, 48,098,730; and 1922, 165,754,442. The diminished production in 1921 was due chiefly to business depression which diminished the demand for copper. Comparative figures for gold, lead, and zinc are as follows: 1914, gold, \$4,117,911; lead, 9,656,008 pounds; zinc, 11,580,544; 1916, gold, \$4,550,494; lead, 13,595,136 pounds; zinc, 229,259,075; 1918, gold, \$3,104,764; lead, 37,135,875 pounds; zinc, 209,258,148; 1921, gold, \$1,480,763; lead, 20,366,917 pounds; zinc, 23,275,966; 1922, gold, \$1,656,757; lead, 29,767,479 pounds; zinc, 11,069,818. A considerable amount of petroleum is also produced in the State, the output increasing from 340,000 barrels in 1920 to 1,509,000 barrels in 1921, and 2,449,000 barrels in 1922. In addition to the minerals noted above, quantities of graphite, iron ore, and stone are also produced. The total value of the mineral production in 1921 was \$30,161,734, compared with \$85,885,403 in 1920; \$73,630,824 in 1919; \$139,331,507 in 1918; and \$54,244,899 in 1914.

Manufactures. Montana is not one of the important manufacturing States. See UNITED STATES, *Manufactures*.

Education. Montana has been one of the most efficient States in the conduct of its educational system; the Russell Sage Foundation in 1920 placed the Montana school system first among those of the United States. The public school fund, which was greatly increased during the decade 1913-23 by the sale of school lands and by grants of the State, amounted to more than \$20,000,000 and contributed an annual revenue, together with the amount received from leases of school lands, of more than \$1,000,000. The Legislature was liberal in the enactment of laws relating to schools. Development in vocational education was marked; the Smith-Hughes Law, providing Federal aid to

States, was accepted by the Legislature in 1917, and provisions were made for the coöperation of State and local boards of education in vocational training. The boards of trustees of the school districts of the States were authorized to establish and maintain Americanization schools for all mentally normal persons over the age of 16. One phase of the development is indicated by the increase in enrollment; in the public schools in 1914, 85,728 were enrolled; in 1922, 122,380 (elementary schools, 99,011). In the high schools of the State, in 1921-22, the enrollment was 18,514. The total disbursement for schools in 1922 was \$8,646,758. The percentage of illiteracy in the State decreased from 5.5 in 1910 to 2.8 in 1920. In the native-born population it remained for both periods at 0.4 per cent; among the foreign-born white population it decreased from 9.2 per cent to 6; in the negro population it decreased from 12.6 to 8 per cent.

Finance. For finances, see STATE FINANCES.

Political and Other Events. The political control of Montana in the decade 1914-24 fluctuated between the Republican and Democratic parties, with the latter ahead for a larger portion of the time. An election held in 1914 for representative-at-large was carried by the Democrats. At this election a prohibition amendment was carried. On Sept. 6, 1914, Mayor Lewis J. Duncan of Butte was removed from office after trial in the district court for neglect of duty in connection with miners' strikes. The elections of 1916 were notable in that Jeannette Rankin was chosen the first woman member of the House of Representatives. The Democrats elected their candidate for governor, S. V. Stewart; Henry L. Myers, Democrat, was re-elected to the Senate. In the presidential voting, President Wilson received 101,063 votes; Charles E. Hughes, 66,750. In 1917 there were many industrial disturbances in the mines of the State, and on August 2 of that year, Frank Little, organizer and agitator of the Industrial Workers of the World, was lynched in Butte for attempts to organize a strike in the metal mines and for denouncing the army and the Federal government. The State was on the point of persecuting him for these utterances and attempts when he was seized at night and hanged. In the elections of 1918 Miss Rankin was defeated for reelection to the House of Representatives by Carl Riddick. Senator T. J. Walsh was re-elected to the Senate. The Republicans came into power in 1920 and elected Joseph M. Dixon governor, together with other State officers. In the presidential voting of this year, Warren G. Harding received 109,430 votes; James M. Cox, 57,372. In 1922 elections were held for United States Senator; Burton K. Wheeler, the Democratic candidate, was elected. In this election two constitutional amendments were adopted. One permitted the consolidation of city, county, and town governments; the other created a State Board of Equalization. The voters also approved a referendum measure of the soldiers' bonus. This was afterward declared unconstitutional by the Supreme Court, and the Assembly voted to submit to the people in 1924 the question of amending the constitution so as to permit the granting of such a bonus.

In 1924 both Senators from Montana were much in the public eye on account of their prominence in investigations held by the Senate.

Senator Walsh practically conducted the investigation into the alleged frauds and the leasing of oil reserves, while Senator Wheeler was responsible for and took a prominent part in the investigation of the administration of H. M. Daugherty, Attorney-General of the United States. Senator Wheeler was indicted in Montana for alleged infraction of the law which prohibits members of Congress from taking part in litigation in which the government is concerned. An investigation held by a Senate committee headed by Senator Borah exonerated Senator Wheeler.

Legislation. The most important acts of the Legislature in the decade 1914-24 are noted below. The Legislature of 1915 passed a measure providing for the submission of the question of prohibition to the people by referendum, to be voted for in 1916. This was carried. The Legislature of 1917 amended the laws relating to the administration of justice in the courts. It also authorized cities to adopt a commission form of government and amended the prohibition laws. On July 30, 1919, the Legislature ratified the woman suffrage amendment. At this session of the Legislature a law was passed providing for a State budget. In 1921 the Legislature revised the tax laws and imposed new taxes on the production of oil, gas, minerals, etc. In 1920 measures were passed preventing the holding of land by aliens. A measure was also enacted granting a modified old-age pension. Laws were passed putting into effect constitutional amendments passed in 1922.

MONTANA, STATE UNIVERSITY OF. A co-educational institution at Missoula, founded in 1895; a part of the University of Montana which comprises the State University at Missoula, the State College at Bozeman, the State Normal College at Dillon, and the State School of Mines at Butte. The student enrollment of the State University rose from 220 in 1910 to 1595 in the year 1922-23, with 515 in the summer of 1923. In 1923-24, the faculty had 84 members, the library contained 100,000 volumes, and the income was \$470,000. Six new buildings were completed in 1923, including a library, gymnasium, forestry building, two residence halls, and a central heating plant, bringing the total number of buildings to 20, and the investment in buildings, equipment, and grounds, to \$2,250,000. E. O. Sisson was president from 1917 to 1920 and was succeeded by Charles H. Clapp, Ph.D., in 1920.

MONTEMEZZI, ITALO (1875-). An Italian composer, born at Verona. He received his musical education at the Conservatory of Milan. Next to Puccini he is the most talented of living Italian composers. In 1919 he visited the United States, conducting the American premiere of his opera *La Nave* (Chicago Opera Association, Nov. 18), which had its world premiere in Milan (1918). His other works include the operas, *Giovanni Galluresse* (Turin, 1905), *Hellera* (ib., 1908), *L'Amore dei Tre Rè* (Milan, 1913; New York, 1914), and *La Principessa Lontana* (not yet produced); and a cantata, *Il Cantico dei Cantici*.

MONTENEGRO. The history of this state during the War was obscure, both because of its military unimportance, and more largely, because of its doubtful loyalties. From 1914 to 1918 a division of sentiment ever widened the breach between the partisans of the ruling family and the growing group that looked to Serbia for

the fulfillment of racial and nationalistic aspirations. On Aug. 8, 1914, Montenegro declared war on Austria-Hungary. The fear on the part of King Nicholas and his sons that victory for the Allies would mean the submergence of their dynasty led in 1915 and 1916 to a series of intrigues with Austria whose purpose was interpreted by Slav patriots as an endeavor to erect a Slav state in the South, ruled by one of Nicholas's sons and virtually under Austrian domination. Montenegro was overrun by the Austrian army early in 1916; in the same year, having failed to gain over the Central Powers, Nicholas abandoned his country and retired to France. This absence strengthened the hand of the Slav nationalists. In 1917, Montenegrins met with Serbs, Croats, and Slovenes at Corfu, where the pact setting forth their common principles was issued. On Nov. 26, 1918, the stamp of popular approval was put on this declaration when a National Assembly repudiated the dynasty and declared the union of Montenegro with the other southern Slav peoples. The court party, supported by Italians who sought to drive a wedge into Slav unity by encouraging Montenegrin independence, maintained that the Assembly had been elected under unfair conditions, with Serbian troops occupying the country. The course of events made even these few opponents confess defeat; Nicholas died in March, 1921; the Crown Prince Danilo abdicated in favor of a young nephew; France and England withdrew diplomatic recognition. When, in 1921, it was evident that Montenegrin delegates to the Jugo-Slav Constituent Assembly were unalterably in favor of union, it became clear that the history of Montenegro as an independent state was closed. See JUGO-SLAVIA, *History*.

MONTEUX, PIERRE (1875-). A French conductor, born in Paris. He studied at the Paris Conservatoire under Bertheliet (violin; first prize), Lavignac (harmony), and Lenepveu (fugue). For some years he played the viola, first in Colonne's orchestra, then at the Opéra Comique, and during this period appeared with various ensemble organizations. In 1904 he began his career as conductor with the Concerts Monteux in Paris, at which he produced chiefly new works of impressionist composers. In 1911 he became conductor for Diaghilev's Ballet Russe in Paris and subsequently made four European tours with that organization, with which he also came to the United States in 1916. During the summer of 1917 he gave a series of concerts with the Civic Orchestra in New York, and from 1917 to 1919 he was conductor of the French operas at the Metropolitan Opera House. From 1919 to 1924 he was conductor of the Boston Symphony Orchestra. When he assumed the leadership, the once famous orchestra was almost completely demoralized (see MUSIC, *Orchestras*), but he succeeded in bringing the organization back to its former high level of excellence.

MONTFORT, EUGÈNE (1877-). A French novelist. He was the editor of the literary review, *Les Marges*. In his novels he showed a predilection for the sea, particularly for the picturesque Mediterranean and the port of Marseilles. In several of his novels he showed himself a master of description and psychological analysis. His works include: *Les Courus Malades* (1904); *Le Ohâlet dans la Montagne* (1905); *La Maitresse Américaine* (1906); *La Turque* (1912); *Les Noces Folles*

(1913); *La Belle Enfant, ou l'Amour à Quarante Ans*; *Mon Brigadier Triboulère* (1918); *Un Cœur Vierge* (1920); *La Soirée Perdue* (1921); *Brelan Marin* (1922).

MONTGOMERY, ROBERT HIESTER (1872-). An American lawyer and accountant, born at Mahanoy City, Pa., and educated in the public schools. For many years he was an accountant in New York City. In 1902 he was admitted to the bar. He served as instructor in economics and assistant professor of law at Columbia University from 1912 to 1919, and in the latter year he was appointed professor of accounting there. He served in the Spanish-American War, and during the War in Europe he was attached to the General Staff in Washington. He also served on the War Industries Board and in several other important capacities. He was a member of many legal and economic societies and author of *Income Tax Procedure* (1917-22); *Excess Profits Tax Procedure* (1920); and *Auditing Theory and Practice* (1921).

MOON, PARKER THOMAS (1892-). An American educator, born in New York City, and educated at Columbia University. In 1913-14 he was William Mitchell fellow at Columbia and was Gilder fellow in 1914-15. In the latter year he was appointed instructor in history, and in 1919 assistant professor, at Columbia. In 1921 he became managing editor of the *Political Science Quarterly*. He was a member of the staff of the American Commission to Negotiate Peace in 1918-19. He is a member of several economic societies, and author of *A Syllabus of Imperialism and World Politics* (1919); and *The Labor Problem and the Social Catholic Movement in France* (1921). He also contributed to periodicals and year books.

MOORE, CLARENCE LEMUEL ELISHA (1876-). An American mathematician born in Ross County, Ohio, and educated at Ohio University and Cornell. He was assistant in mathematics at Ohio and held a similar appointment at Cornell. In 1904 he was called to the Massachusetts Institute of Technology, where in 1920 he became professor. Among the subjects in which he has made special investigations are geometry of the sphere, geometry of the circle in space, and the differential geometry of hyperspace.

MOORE, GEORGE EDWARD (1873-). A British philosopher. He was educated at Trinity College at Cambridge and was appointed Lecturer on Moral Science at that university in 1911. He became one of the leaders of the realistic group of philosophers, constituted around the scientific researches of which Cambridge was the centre. His volume on *Principia Ethica* (1903) was an attempt to apply the method of scientific realism to the field of morality and value judgments, but the attempt was only partially successful. Among his other works are a popular exposition of ethical theory (*Ethics*, 1912) and a volume of collected *Philosophical Studies* (1922). In 1920 Professor Moore became the editor of the British philosophical periodical, *Mind*.

MOORE, HARRY TUNIS (1874-). An American bishop, born at Delavan, Wis., and educated at Hobart College and the Western Theological Seminary. In the same year he was ordained priest in the Protestant Episcopal Church and served as rector in several cities of Nebraska, Texas, Illinois, and other States. He

was rector of St. Matthew's Cathedral in Dallas, Texas, 1907-17, and in the latter year was appointed coadjutor bishop of the Diocese of Dallas.

MOORE, HENRY LUDWELL (1869-). An American economist, born in Charles County, Md. He studied at Randolph-Macon College, in Vienna, and at Johns Hopkins University, where during 1896-97 he was instructor of political economy. In 1897 he became professor of political economy at Smith College (Northampton, Mass.). From this position he resigned in 1902 to accept a similar chair at Columbia University. In addition to many articles on the statistical aspects of his specialty, he is the author of *Laos of Wages* (1911); *Economic Cycles, Their Law and Cause* (1914); and *Forecasting the Yield and Price of Cotton* (1917).

MOORE, HENRY THOMAS (1886-). An American psychologist, born at Ansonville, N.C., and educated at Yale and Harvard Universities. He taught at Simmons College and after 1915 at Dartmouth. He is the author of *The Genetic Aspect of Consonance and Dissonance* (1914); *Pain and Pleasure* (1917); and *Modern Psychology for the Beginner* (1922).

MOORE, HUGH KELSEA (1872-). An American chemist, born at Andover, Mass., and educated at the Massachusetts Institute of Technology. He began his professional work as a chemist with the Electro-Chemical Company in Rumford Falls, Me., in 1897. Three years later he became connected with the American Electrolytic Company and with the Burgess Sulphite Fibre Company (1903-10). On the consolidation of several sulphite paper pulp mills as the Brown Company, he became its chief chemical engineer. His original investigations were chiefly concerned with various processes in paper pulp making and its bleaching, on which he obtained many patents. He invented a continuous process for the hydrogenation of oils, and in 1897, the unsubmerged cathode cell. In recognition of "the best contributions to applied science since 1913" he received the gold medal of the American Institute of Chemical Engineers, of which he became a vice president. During the War he was a member of the Council of National Defense and also a member of the division of chemistry of the National Research Council. In addition to many chemical papers he is the author of *The Human Elements in the Mill* (1918) and *Why the Church Fails to Interest People Enough to Attend* (1918).

MOORE, JOHN BASSETT (1860-). An American jurist and diplomat (see Vol. XVI). He served as delegate to the Pan-American Financial Congress in 1915 and was vice president of the International High Commissions organized by that conference. In 1921 he was appointed judge of the Permanent Court of International Justice. His later works on politics and diplomacy included *Principles of American Diplomacy* (1918).

MOORE, JOHN MONROE (1867-). An American bishop, born at Morgantown, Ky., and educated at Lebanon College and Yale and in Germany. He was ordained as a preacher in the Methodist Episcopal Church and filled pastorates in St. Louis, San Antonio, and Dallas, Texas. For several years he was managing editor of *The Christian Advocate* and secretary of home missions of the Methodist Episcopal Church, South, from 1910 to 1918. In the lat-

ter year he was elected bishop and given charge of work in Brazil. He was a member of several important church societies and was the author of *Etchings of the East* (1909); *The South To-day* (1916); *Brazil—An Introductory Study* (1920), and *Essential Objectives in Missionary Endeavor* (1922).

MOORE, RICHARD BISHOP (1871-). An American chemist, born at Cincinnati, Ohio, and educated in England and France and at Chicago University. He was instructor in chemistry at Missouri; and during 1905-11, professor of chemistry at Butler College; and thereafter physicist at the Bureau of Soils of the Department of Agriculture. In 1912 he became connected with the United States Bureau of Mines, whose chief chemist he became in 1919. His original investigations were largely concerned with the properties of rare gases in the atmosphere, and the metallurgy of rare metals, especially tungsten, uranium, and vanadium, and more recently the metallurgy of radium, on which he wrote valuable papers. He is the author of *A Laboratory Chemistry* (1904).

MOORE, UNDERHILL (1879-). An American lawyer and educator, born in New York City, and educated at Columbia University. From 1892 until 1907 he practiced law in New York City. After service on the faculty of the Universities of Kansas and Wisconsin, he was appointed professor of law at Columbia University in 1916. He served in the Spanish-American War. He wrote several books on legal subjects and contributed to the *Columbia Law Review* and other law publications.

MORAND, PAUL (1888-). A French novelist, born in Paris of a French father and a Russian mother, and educated at the Sorbonne. He entered the French diplomatic service and was attached to the embassies at London, Rome, and Madrid. As a man of letters he rose to prominence with his novels, *Ouvert la Nuit* and *Tendres Stocks*, descriptions of cosmopolitan Paris after the War. His other works include *Lampes à Arc*, *Feuilles de Température*, *Fermé la Nuit*, and *Lewis et Irène*.

MORAVIA. See CZECHO-SLOVAKIA.

MORAVIAN CHURCH, THE (UNITAS FRATRUM). This denomination, tracing its origin to the followers of John Huss and Jerome of Prague, was first organized in Bohemia in 1457. Its members found their way into Pennsylvania in 1740. Its two chief centres in the United States were Bethlehem, Pa., and Winston-Salem, N. C. The denomination had no formal statement of creed peculiar to itself; it is evangelical in belief, in harmony with other Protestants. One explanation of its smallness is that it refrained on principle from seeking proselytes at the expense of other Christian bodies. Its polity was a modified episcopacy; its ritual, liturgical. After the beginning of the War, the administration of the foreign missions was decentralized; the American branch of the church had special responsibility for those in Nicaragua and for the Eskimo and Indian work in Alaska and California. It also rendered aid during the 10 years to other missions of the Moravian Church in Labrador, the West Indies, Dutch Guiana, the Cape Province of South Africa, Tanganyika Territory, and among the Tibetan-speaking peoples of the Western Himalayas and the lepers of Jerusalem. It also supported a college and seminary at Bethlehem, Pa., and several board-

ing schools, throughout the period. In 1913 the communicant membership in the United States and Canada was 19,463; in 1923 it was 23,723. The number of churches increased from 122 to 128; the number of ministers, from 142 to 147. Of these, 33 were either released for temporary service elsewhere or were in partial or complete retirement on account of age or ill health, etc.

MORESNET. See EUPEN, MALMÉDY, AND MORESNET.

MOREY, CHARLES RUFUS (1877-). An American educator and author, born at Hastings, Mich., and educated at the University of Michigan. From 1900 to 1903 he was a fellow of the American School at Rome. In 1903-04 he was a fellow at Princeton University, and in 1906 he became head of the Princeton summer school. He was appointed professor of art and archaeology there in 1918. A member of many learned societies, he was the author of *East Christian Paintings in the Freer Collection* (1914); *Lost Mosaics and Frescoes of Rome* (1915), and *Romanesque Sculpture* (1920).

MORGAN, EDMUND MORRIS, JR. (1878-). An American jurist and educator, born at Mineral Range, Ohio, and educated at Harvard University. In 1905 he began practice in Duluth, Minn., remained there until his appointment as professor of law at the University of Minnesota in 1912. From 1917 he was professor of law at Yale University. He was several times city attorney of Duluth. In the War he served in the judge advocate-general's department with the rank of lieutenant-colonel. He was the author of *Introduction to the Study of Law* (1917) and *Cases of Common Law Pleading*.

MORGAN, JOHN PIERPONT (1867-). An American financier (see VOL. XVI). He took a prominent part in the financial aspects of the War and following its outbreak made the first loan of \$12,000,000 to Russia. His firm was appointed commercial agent of the British government in the United States in 1915 and conducted purchases of all munitions and supplies in the United States. In the same year a loan was made of \$50,000,000 to the French government, and he organized a syndicate of about 2200 banks and floated a loan of \$500,000,000 to the Allies. After the War he was frequently called on to advise the American and foreign governments in financial matters and made several trips to Europe to investigate and report on financial conditions there.

MORGENTHAU, HENRY (1856-). An American diplomat (see VOL. XVI). In 1913 he was appointed ambassador to Turkey and served until 1916. From 1914 he was also in charge of the interests of Great Britain, France, Italy, Russia, Serbia, and other countries in Turkey. In 1919 he was a member of the commission appointed by President Wilson to investigate conditions in Poland. He was appointed ambassador to Mexico in 1920, but owing to the severance of relations between the United States and that country, he did not serve. He was vice president of the Near East Relief from 1919 to 1921. He wrote *Ambassador Morgenthau's Story* (1918) and *All in a Lifetime* (1919). Decorations were conferred on him by various countries for his services during the War.

MORINI, ERIKA (1906-). An Austrian violinist, born in Vienna. She received her first instruction from her father, who was the director of his own music school in Vienna, and

completed her studies under Otakar Seveik. Hers is a case of remarkable precocity, for when she made her début in Berlin, under Nikisch, in 1917, the critics made no allowance for her youth, but spoke of her work as the equal of that of the most famous of the younger generation of violinists. Her American début at New York (Jan. 26, 1921) was one of the musical sensations of the year, and since then she has been heard in the United States every season, both in recital and with the foremost orchestras. She made her first visit to London in 1923.

MORISON, SAMUEL ELIOT (1887-). An American historian, born in Boston, Mass., and educated at Harvard and in Paris. After serving a year as instructor in history at the University of California, he was instructor and lecturer in history at Harvard from 1915 to 1922, when he became Harold Vyvyan Harmsworth professor of American history at the University of Oxford. He served as a private in the United States Army in the War and was attached to the Russian division of the American Commission to Negotiate Peace in 1919. He was a member of many learned societies and wrote *Life of Harrison Gray Otis* (1913); *History of the Constitution of Massachusetts* (1917), and *Maritime History of Massachusetts* (1921).

MORLEY, CHRISTOPHER (DARLINGTON) (1890-). An American editor and writer, born in Haverford, Pa. He graduated from Haverford College in 1910 and from that year to 1913 was a Rhodes scholar at Oxford. He served on the editorial staff of several publications and journals and from 1920 to 1924 conducted a column in the *New York Evening Post*. In the latter year he joined the staff of the *Saturday Review of Literature*. His books in prose and verse include *The Eighth Sin* (1912); *Songs for a Little House* (1917); *The Rocking Horse* (1919); *Travels in Philadelphia* (1920); *Pipefuls* (1920); *Tales from a Rolltop Desk* (1921); *Chimney-smoke* (1921); *Where the Blue Begins* (1922); *The Powder of Sympathy* (1923); *Inward Ho!* (1923); and *Parson's Pleasure* (1923).

MORLEY OF BLACKBURN (JOHN MORLEY), 1st VISCOUNT (1838-1923). A British public official and man of letters (see VOL. XVI). From 1910 to 1914 he served as Lord President of the Council but resigned in the latter year after the declaration of war with Germany, which he opposed. He retired to his country home and devoted himself to the writing of a volume of recollections, which was published in 1917. In 1914 he published notes on politics. A complete edition of his works was brought out in 1921.

MORNINGSIDE COLLEGE. An institution at Sioux City, Iowa, founded in 1889. The student enrollment grew steadily from 584 in 1913-14 to 1300 in 1923-24, and the budget increased in the same period from \$60,000 to \$150,000. A chair of religious education, departments of economics and sociology, and a complete course in public school music were established, and additional faculty members attached to several other departments. Three fire-proof buildings, Main Hall, a conservatory and a gymnasium, and a temporary science hall were built. An athletic bowl and bleachers was constructed. President, Frank E. Mossman, A.M., D.D.

MOROCCO. The largest of the Barbary states, in northeastern Africa. Since 1912

about 95 per cent of its area has been a French protectorate; the rest, except for the free zone around Tangier (q.v.), was under the protection of Spain. Total area, 231,500 square miles. The Spanish zone included 8280 square miles in the North. However, Spanish claims also took in the 9500 square miles in the Cape Juby region (southern zone) and the 580 square miles of Ifni on the west coast. By 1921 the French had effectively occupied 92,664 square miles. An official French census in 1921 gave the population for the French zone as totaling 5,400,000; urban population, 537,071. Of these, 399,979 were Mussulmans, 65,510 Jewish natives, and 66,875 Europeans (1025 British, 41,028 French, 14,114 Spanish, 9155 Italian). The largest cities in the French zone, with populations for 1921, were: Casablanca, 101,690 (35,283 Europeans); Marakesh, 139,874 (1956 Europeans); Fez, 70,540 (2217 Europeans); Rabat, 30,953 (9226 Europeans); Meknes, 36,592 (2622 Europeans). For the Spanish zone (northern), the population was estimated at 550,000; for Tangiers, at 50,000 (12,000 Europeans). Tetuan, in the Spanish zone, had 30,000 inhabitants. Immigration, which had languished during the War, became considerable again after 1918. In that year, 22,139 immigrants arrived; in 1919, 31,797 (14,929 French); in 1920, 27,797 (14,721 French). See **TANGIER CONTROVERSY**.

Industry. Agricultural and pastoral pursuits occupied four-fifths of the native population. Of the 25,000,000 acres in the French zone capable of cultivation, only 6,000,000 acres were being tilled. Barley and wheat received the most attention; other crops were beans, oats, maize, and millet. In the regions of Fez, Mequinez, Rabat, and Donkkala, 14,247 acres of vineyards were cultivated by natives; European vineyards covered 3715 acres (1921). Fruit trees, notably the olive, orange, lemon, palm, and almond, were beginning to play an important part. Stocks in 1921 in the French zone comprised 6,733,022 sheep, 2,040,304 goats, 1,517,117 cattle, 115,036 pigs, 420,232 asses, 202,006 horses and mules, 98,252 camels. Minerals included phosphates (80,583 tons exported in 1922), iron ore (115,489 tons exported in 1921 from the Spanish zone), and copper, lead, petroleum, and manganese. In the French zone in 1921 were to be found 268 industrial establishments with 4060 employees and a total invested capital of 173,298,090 francs; the capital invested in 1918 had been only 35,246,000 francs. As a result of European occupation, steady advances were made. The construction of roads, harbors, and sanitary measures were the particular concern of the French. The harbor of Casablanca received particular attention. The Spanish concerned themselves with irrigation projects as well as the expansion of the port facilities of Ceuta and Larash.

Commerce and Communications. The trade of the French zone increased regularly. In 1913 imports and exports had been 181,426,000 francs and 40,180,000 francs; by 1921 they had increased to 909,164,220 and 306,446,857. The 1921 imports originated in the following proportions: France and Algeria, 50 per cent; Algeria (land frontier), 20.7 per cent; United Kingdom, 16 per cent; United States, 9 per cent. The following, in order, received French Morocco's exports: France and Algeria, Spain, the United Kingdom, Italy. Imports from the United States were valued at \$214,460 in 1913

and at \$5,725,000 in 1921. The chief exports in 1921 were barley, eggs, beans, linseed, wool, and almonds. The following indicates the quantity, by quintals, of animal products exported for 1913 and 1920: cowhides, 15,544 and 5065; sheepskins, 18,730 and 12,878; goatskins, 16,815 and 18,407; wool, 38,897 and 15,633; eggs, 23,465 and 42,240; wax, 1141 and 1586. That the increase in trade was real, in spite of the inflation of the franc, may be seen by the fact that 2,921,000 tons of shipping entered French Moroccan ports in 1912 and 4,516,592 tons in 1921. The trade of the Spanish zone was as follows: imports and exports for 1913 were 25,335,000 and 2,876,000 pesetas; for 1921, 72,552,340 and 6,431,000 pesetas. The trade for Tangier was as follows: imports and exports for 1913 were 24,455,000 and 3,408,000 francs; for 1921, 59,379,252 and 4,522,460. Under the French administration, road building went on rapidly so that by 1922 2590 miles were open for use. As part of the same general plan for the opening up of the protectorate, military lines of 2 foot gauge were converted into standard gauge lines. There were 820 miles of such roads in 1922. The principal lines were the Fez-Oudja (223 miles), Fez-Casablanca (210 miles), Casablanca-Marrakesh (171 miles). In the Spanish zone a meter gauge line ran from Ceuta to Tetuan, and another from Rio Martin to Tetuan. Telephone and telegraph communications were widely extended, and wireless stations were erected at Fez, Marrakesh, Mogador, Tangier.

Government. In the French zone, as a result of increased activity, administrative costs mounted steadily. Expenditures in 1916-17 were 45,389,000 francs; in 1922, 261,171,495. Revenues continued in excess during the whole period with the result that the debt service carried annually was conspicuous. Of the 1922 budget, 44,730,154 francs were applied to the public debt, which in that year totaled 705,624,000 francs, of which 300,000,000 francs had been floated in 1922 as the first section of an authorized loan of 700,000,000 francs. The scheme encompassed a great series of public works, including the development of harbors, roads, water power resources, phosphate works, posts, telegraphs and telephones, health service, forestry, public instruction, etc. The budget for the Spanish zone in 1922-23 balanced at 17,097,268 pesetas. Education, under the foreign influence, made great advances. In 1912, the French zone had only 37 schools; by 1921, it had 192 with 25,159 pupils in attendance.

History. The partial withdrawal of French troops on the outbreak of the War, and the ever-present anti-European feeling which German agitators continually fostered, aggravated the unruliness long chronic in Morocco. As the War continued, French occupation was extended; the Tafilalet region was subdued by 1917, and an uprising of the Ait Atta there was put down, after desultory fighting, by 1919. France's policy of continuing public works and of befriending native chieftains stood her in good stead, for many of the powerful native leaders remained consistently friendly. In 1919 and 1920, as a result of trouble in the Sifru region and the Gharb, the French were able to push further into the interior, so that by 1923 most of the country, with the exception of the Middle Atlas, was effectively occupied. An exceptionally able administrator, Marshal Lyautey, occupied the post of President-General during the whole

period; and under his energetic direction remarkable progress was made in sanitation, road construction, railway-building, and education.

The Spanish problem in Morocco was less easily solved. Because of the tardy development of the Spanish zone and the difficulties of communication, the native independent temper was less easy of subjugation. Brigandage continued the rule; the Rif and Jebala tribes were particular offenders. Most of the dissident spirits gathered around Raisuli, one of the important chieftains. From 1916 to 1919 all attempts to eject him from the Tangier-Tetuan road which he held were unavailing; when he finally evacuated the country he merely moved to another centre of operations. The upshot was that by 1920 the Spanish were abandoning one interior post after another. In 1921, the fighting broke out with greater fierceness. Under the Rif attacks, Spanish forces lost Nador, Zeluan, Mt. A-rut, Sheshuan, Tefer, and even Penon de Valez, an island east of Ceuta. In September and October of the same year, strong Spanish forces carried the war into the Rif country and after many engagements retook Nador and Zeluan and cleaned out the heights around Melilla. Desultory fighting continued throughout 1922. That the country was not pacified and could not be so long as the inefficient Spanish military juntas continued to exert a preponderant influence in Morocco, was indicated when the Rif tribes once more took up arms in 1923 and occupied the Tetuan-Sheshuan line. The action indicated how universal disaffection was, for it followed the pledge of loyalty given the Spanish occupation by Raisuli, about whom, heretofore, most of the rebellious forces had gathered. The influence of this succession of reverses on the local situation was momentous. (See SPAIN.) In July, 1922, the Spanish High Commissioner-General, Berenguer, was forced to resign; his successor, Gen. Ricardo Burguete, found it necessary to retire in December; and in September, 1923, because of the unsatisfactory handling of the whole situation, the Spanish government was seized in a coup d'état and a military dictatorship under General Rivera was created. In spite of the lofty pretensions of the Directorate, Morocco remained unconquerable, the continued impertinences of the tribesmen only revealing the impotence of Spain the more clearly. Rivera had announced in the beginning his intention to accomplish the extrication of his country from her Moroccan entanglement. But no party favored such a move, and it was doubtful whether Rivera could take the step even if he would. The result was repeated Rif victories. In 1924 engagements were reported in which a Spanish Foreign Legion column was lost, several Spanish airplanes brought down, and a Spanish cruiser openly shelled. Early in 1924, 80,000 tribesmen were marching on Melilla; among the Spanish troops gathered to oppose them, a mutinous spirit was plainly visible. To July, 1923, the cost of pacification since 1909 was put at 2,404,000,000 pesetas, and the end, evidently, was not yet in sight. For the Tangier controversy, see TANGIER. See also SPAIN and WAR IN EUROPE.

MORRIS, JAMES CRAIK (1870-). An American bishop, born at Louisville, Ky., and educated at the University of the South, the Louisville Law School, and the General Theological Seminary. He became a priest in the

Protestant Episcopal Church in 1896 and was the curate of churches in Texas and New York. From 1901 to 1916 he was dean of St. Mary's Cathedral in Memphis, Tenn., and from 1916 to 1919, rector of Grace Church in Madison, Wis. In 1920 he was consecrated bishop of the Panama Canal zone and parts adjacent.

MORRIS, ROBERT TUTTLE (1857-). An American surgeon, born in Seymour, Conn., and educated at Columbia University. He settled at first in Albany. After removing to New York, he became a professor of surgery at the New York Post-graduate Medical School in 1895. He is the author of many books, including *How We Treat Wounds To-day* (1886); *Lectures on Appendicitis* (1895); *Dawn of the Fourth Era of Surgery* (1910); *Microbes and Men* (1918); *A Surgeon's Philosophy* (1918); *Doctors vs. Folks* (1918); *The Way Out of the War* (1918); *Nut-growing* (1921). As the titles imply, some of these books are semipopular and others non-medical in scope.

MORROW, DWIGHT WHITNEY (1873-). An American lawyer, born at Huntington, W. Va., and educated at Amherst College and Columbia Law School. In 1899 he began the practice of law in New York City as a member of the firm of Simpson, Thatcher, and Bartlett. In 1914 he became a member of the firm of J. P. Morgan and Company. He took an active part in civic matters in New York City and in New Jersey. He was director of the War Savings Committee of New Jersey (1918). During the War he served with the Military Board of Allied Supply and received the Distinguished Service Medal.

MORTAR, TRENCH. See TRENCH WARFARE MATERIAL.

MOSELEY, GEORGE VAN HORN (1874-). An American soldier, born in Evanston, Ill. He graduated from the United States Military Academy in 1889 and was commissioned 2d lieutenant in the cavalry in the same year. He rose to the rank of major in 1916 and in 1917 was appointed colonel in the National Army, with the command of the 5th Field Artillery. He was appointed chief of the 4th Section of the General Staff at General Headquarters in 1918 and had general charge of the strategic supply, transportation, construction, and evacuation of the American Army in France. He was a member of several important commissions, including the Harbord Commission to the Near East, where, after commanding the 2d Field Artillery Brigade, he was assigned as assistant to General Dawes in 1921. He was awarded the Distinguished Service Medal and was given decorations by the Belgian, British, French, and Italian Governments.

MOSUL. See MESOPOTAMIA.

MOTHERS' PENSIONS. "Mothers' pension" laws, or laws providing for public aid to dependent children in their own homes, are intended to conserve family life by preventing the break-up of homes after the death, desertion, or disability of the father. The first State-wide mothers' aid law was passed in 1911, two years after the White House Conference on the Care of Dependent Children, called by President Roosevelt, had declared as its fundamental proposition that children should not be deprived of home care except for urgent and compelling reasons, and that "children of parents of worthy character . . . and children of reasonably efficient and deserving mothers who are without

support of the normal breadwinner, should, as a rule, be kept with their parents, such aid being given as may be necessary to maintain suitable homes for the rearing of children." The "mothers' pension" movement became an effective answer to the arguments of opponents of child labor legislation that children of widowed mothers would be helpless if they were not permitted to work. By the close of 1913, 19 States had State-wide mothers' pension or aid-to-mothers laws, and Missouri had provided for such aid in Kansas City and St. Louis. By 1924 such laws were in effect in 42 States, Alaska, and Hawaii.

At first the aid was usually limited to widows, but the conception of this method of provision for children has gradually widened, until by 1924 only four States of the 42 in which laws were in operation limited the grant to children of widows, though all the States included widows directly or by implication. The Colorado act included a parent, or other person designated by the court, who because of poverty was unable to provide properly for a dependent child. Children of widowed or deserted mothers, and of mothers whose husbands were serving penitentiary sentences or were physically or mentally incapacitated, were commonly included. The ages under which children were eligible for aid ranged from 14 to 17 years and one State (Ohio) mentioned no age limit; in many States the upper age limit had been made to correspond with the upper age limit of the child labor law, so that aid might be continued until the child was legally permitted to go to work. In the majority of States maximum amounts were specified, ranging from \$8.66 to \$35 a month for one child, with additional amounts (usually smaller) for each additional child. Frequently the maximum amount for a family of any size was specified in sums ranging from \$40 to \$60, but in many States there was no such limitation. The amount of aid granted to each family can be adjusted to the actual needs of the family only if the maximum amount authorized by law is sufficiently high or if no limit is specified. The administration of the aid-to-mothers law was vested either in a court having juvenile jurisdiction, a county or town board granting poor relief, a county board of public welfare, a special county board, or a State board. There was some form of State supervision in 23 States in addition to those in which definite administrative authority was lodged in a State board.

Survivors' insurance under governmental auspices, providing pensions for both widows and orphans, existed in Germany, France, Holland, and Austria, by 1924. In Great Britain, in that year, a measure to establish a mothers' pension system was in preparation. Canada, Denmark, and New Zealand also had made public provision for mothers with young children to support.

MOTHS DESTRUCTIVE TO VEGETATION. See ENTOMOLOGY, ECONOMIC.

MOTOR SHIP. See SHIPBUILDING AND NAVAL ARCHITECTURE; SHIPPING.

MOTOR VEHICLES. Despite the marked advances in the design and production of all forms of motor vehicles during the decade 1914-24, it is believed by those familiar with automotive engineering that so far as designs are concerned there is still room for improvement. The most apparent improvement was in simplifying

and strengthening the mechanism so that cars of all types were reliable in action and capable of running thousands of miles without mechanical failure and of serving their owners for two or three years without overhauling and with only the most cursory repairs and attention. Of the three well-known forms of motive power, steam, electricity, and the internal-combustion motor, the last reigned almost supreme; by far the greatest number of motor vehicles in use depended on it for propulsive power.

Electric Automobile. Electric automobiles were still used in fair numbers. Storage batteries were increased in capacity without a proportionate increase in weight, by more careful design and construction, and were installed, especially on vehicles intended for commercial use, in shock-insulated containers which were readily accessible for examination and easily changed for fully charged batteries as replacements. This was valuable in cases where it was not always possible to lay up the vehicle for the time necessary to recharge the battery if exhausted in service.

Gas-electric Trucks. Combination gas-electric trucks have been designed and put to practical use. In these, an internal-combustion motor drives a generator, which in turn keeps a charge of electricity in the battery. The wheels are driven by electric motors; in some cases, there is a separate motor in each rear wheel. In special applications, such as fire apparatus of the heavier types, there may be a motor in each of the front wheels and none in the rear. There are other forms which have a driving motor in each of the four wheels, all of which may be moved at an angle from the normal direction of vehicle movement to make steering easier. There is still another system in which a small engine is operated at constant speed while the vehicle is in motion, regardless of the vehicle speed; the generator supplies current to a driving motor, and the storage battery, which is smaller than that ordinarily used in an electric automobile, is "floated on the line" so that it absorbs excess current when power requirements are less than that supplied by the engine-generator combination, and it gives out electricity to the power motor when conditions of road or gradient are such that more than the normal energy output is required. Such combinations are cumbersome and relatively inefficient and have not won much recognition.

In order to increase the cruising radius per charge, some makers of electric vehicles use as motive power a motor which can be turned into a generator by a simple control lever movement when coasting down hills; advantage can be taken of the conversion of mechanical power due to vehicle momentum produced by gravity into electrical energy which is "stored" in the storage battery of the vehicle. Tests made by competent drivers have shown an increase per charge in cruising radius of from 10 to 15 per cent when the driving motor may be used as a dynamo under favorable conditions.

Trackless Trolleys. Still another form of motor vehicle using electric motors for power is a hybrid between the usual form of electric rail car and the self-propelled motor vehicle; it is built just like an electric automobile as far as chassis and body construction go, as well as in the placing of the driving motor and the character of control and power transmission ele-

ments. No storage battery is provided in some cases, but a trolley pole taking current from a pair of conductors overhead is used. In other forms, a battery of limited capacity is supplied to take care of cross-overs or to permit the vehicle to change from one line to another at points where the current conveying conductors themselves do not change. Owing to the use of rubber tires, these trackless trolleys, as such vehicles are called, cannot use rails as a return; so the current must enter the vehicle circuit by one trolley wheel, and after it has done its work, it passes back into the return conductor of the line through the trolley wheel which is electrically insulated from the other. The overhead conductors must also be carefully separated from each other. The vehicle is steered from one side of the road to the other just as the more conventional automobile is and it can thus pass around slower traffic that might retard a car running on rails. The expense of operation is reduced over the form needing rails to run on because no roadbed need be provided other than the highway used by all vehicular traffic.

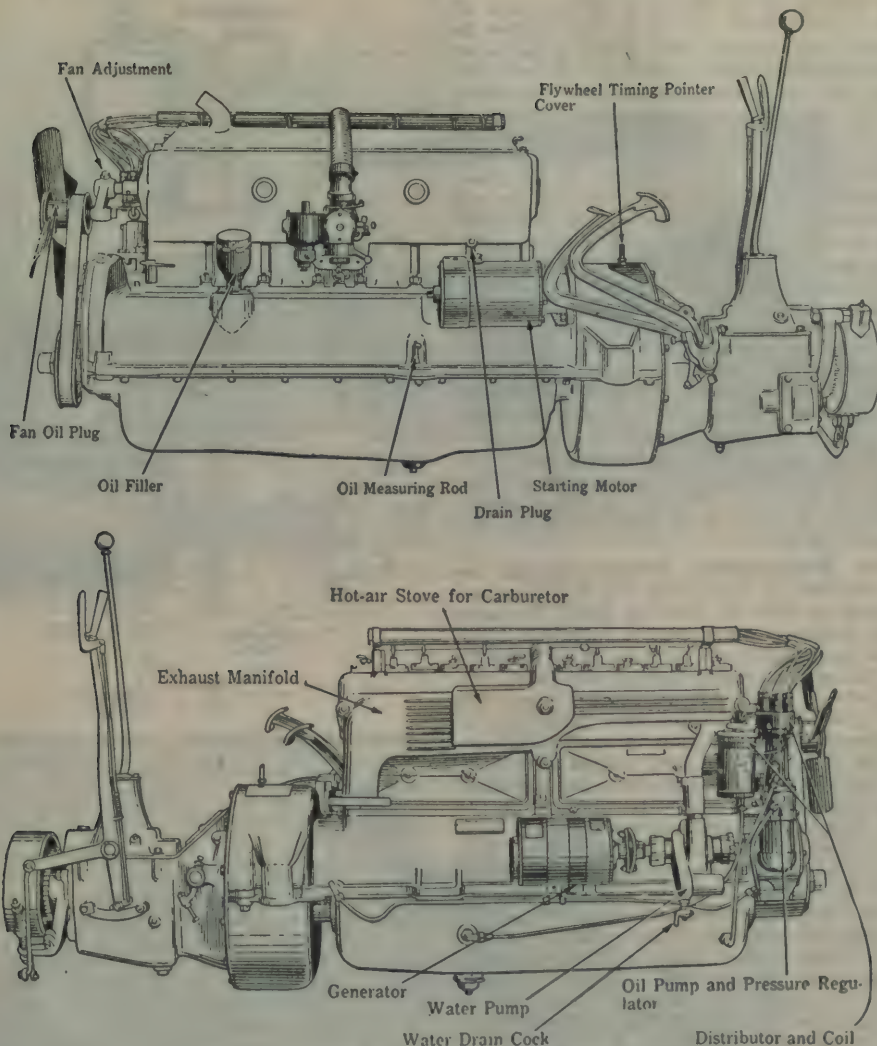
Steam Automobiles. Steam automobiles are rapidly decreasing in number in the United States, where their application in the past has been mostly for passenger use; but they are still used to some extent in England for commercial purposes. Several marked improvements have been made in steam automobiles and some of the objections formerly advanced against them are no longer tenable. One of these was the frequent refilling of the water-supply tank, which in the case of the earlier Stanley steamers was necessary every 25 or 30 miles. This was because the steam was exhausted directly into the air after it had passed through the engine. The modern steam automobile exhausts the steam into a condenser mounted at the front of the chassis just as the radiator or water cooler is in vehicles propelled by internal-combustion motors. The steam condenses, and the cylinder oil is separated from it; the resulting water obtained by cooling the steam is pumped back into the tank and used again as boiler-feed water. The cruising radius on one tank of water is increased from 6 to 10 times what would be possible without the condenser.

The other big improvement has been the use of the Doble combustion system, in which the usual form of Bunsen or Argand burner flame or "fire" is replaced by a more intense blow torch or blast flame, which burns in a closed combustion chamber, under the boiler, lined with refractory material. This reduces the fire risk incidental to the use of the older form of Bunsen burner. Not only is a hotter fire obtained, but it is more easily started. The older form of burner was started from a "pilot" or small auxiliary burner which was started initially by preheating with a plumber's blow torch. It took 15 to 20 minutes to start the generation of steam with the fire-tube boiler and old burner combination before enough steam had been generated to supply the engine. In the new combustion system, an electrically driven air blower supplies the blast and vaporizes the fuel sprayed into the air stream thoroughly. So completely are the two mixed that the resulting vapor may be ignited almost instantaneously by an electric spark plug such as used in internal-combustion motors; as a flash boiler is used, steam generation starts almost as soon as the combustion chamber is filled with burning gas. A generator driven from the

steam engine while the vehicle is in motion keeps the storage battery charged. The battery supplies the blower motor with current and furnishes the igniting spark for the electric "pilot" and current for the usual complement of lamps used in night driving. The engine used in either case is the simple, two-cylinder double-acting type, directly geared to the rear-axle differential-drive gear. Much better results are obtained with kerosene or fuel oil in the blast combustion system, and the burner cannot clog so easily as when a Bunsen burner is used with fuels of other than high volatility, when imperfect combustion causes carbonization of the numerous fine fuel vapor spray orifices.

Internal-combustion Motors. The most notable change between 1914 and 1924 in automobiles utilizing internal-combustion motors for propulsion was in the power plant. No passenger automobile worthy of the name is built with less than four cylinders, and while the majority of motorists use four-cylinder cars because these are produced in such large quantities, the six-cylinder type is also very popular and is favored by most builders of passenger cars. Eight-cylinder engines are used to a limited extent, the V-type being favored in some quarters and the eight-in-line or straight-eight by other makers. There is no "best" type; each fills a real demand. For the low- and medium-priced car and commercial vehicles, it will be difficult to replace the economical, simple, and easy-to-maintain four-cylinder engine. For 1924, 120 chassis models of passenger cars were produced by 95 manufacturers. About 70 per cent of these were equipped with six-cylinder engines; this form is thus favored by most designers. The four-cylinder type, which is used on about 80 per cent of the automobiles manufactured, was found on about 20 per cent of the models, while the eight-cylinder was used on only 10 per cent of the models. Racing engines have demonstrated that by the use of more costly construction, such as a counterbalanced crankshaft, a four-cylinder may be run with very little vibration. The increase in cost might be just as well employed in building six-cylinder engines as in improving the four-cylinder, because no four-cylinder can give the overlapping explosions or power impulses of the six-cylinder engine. This explains why designers favor the six-cylinder form. Designers of "luxury" cars provide eight-cylinder engines, because the power impulses occur with such frequency that an almost continuous power application to the driving wheels is secured, and the resulting smooth action is reflected in the riding qualities.

The efforts of designers of internal-combustion motors for vehicle use seem to have had two main objectives; first, to secure maximum efficiency; secondly, to secure quiet operation and freedom from vibration. As a quiet engine is usually efficient, improvements in engine construction to attain one object often effect the other. The automobile engine of 1924 differed from that of 1914 in numerous respects. It was smaller; that is, its cubic capacity was less; yet the power developed was greater. Higher compression pressures are used, which mean greater power to the explosion. Marked improvements in lubrication systems, lighter reciprocating and rotating parts, and improved materials permit of higher speeds. Of valve materials available, a silicon-chromium steel alloy will withstand a white heat repeatedly and also repeated cooling



VIEWS OF HAYNES SIX-CYLINDER UNIT POWER PLANT

without warping or scaling. Aluminum alloy pistons of the split skirt type may be as closely fitted to the cylinders as cast-iron pistons weighing two or three times as much; with no loss of reliability or endurance, they permit the engine to run at much higher speeds because the inertia forces are reduced. Connecting-rods are being made of duralumin, an aluminum-magnesium alloy which has the strength of steel and may be heat-treated after forging as steel is and yet weighs only one-third as much. Pressure-feed oiling systems are generally used, even on low- and moderate-priced cars. Systems of this type have positive oil supply to the various main bearings, and passages drilled in the crankshaft supply the connecting-rod big ends. As the pressure produced by the positive acting mechanical pump may run as high as 80 or 90 pounds per square inch, it will be evident that an oil film may be maintained on all important bearings even at high engine speeds.

Improved Fuel. Not only the physicist and mechanical engineer are concerned with improving engine efficiency; the chemist has also helped.

A large and prominent company, the General Motors Corporation, has developed in its research laboratories a treatment for gasoline that will permit engineers to obtain double the mileage possible with untreated fuel. In brief, it was determined that the knocking noticed in the average engine when climbing a hill with gas throttle wide open could be eliminated by adding about one-tenth of 1 per cent by volume of a liquid called tetra-ethyl-lead to the gasoline. While such a discovery increases the efficiency of the present types of engine and adds to the comfort of the driver, its greatest importance lies in the fact that engines can be built in the future to use this fuel with twice the amount of compression of present-day engines. When this is done, without any decrease in engine dimensions or sacrifice of speed and hill-climbing power, twice the present mileage per gallon of fuel will be obtained.

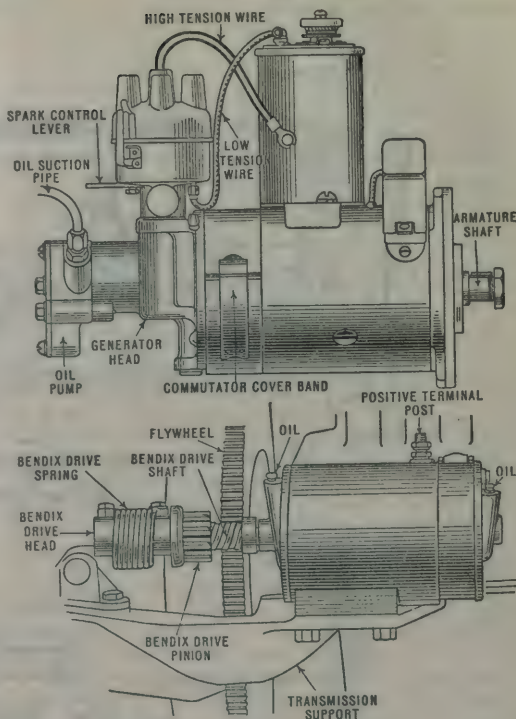
Even in engines of the eight-cylinder type, every care is taken to secure balanced operation. In the 1924 Packard, a type of crankshaft is used marking a departure from usual straight-

eight practice. Four crankpin throws, two at each end of the shaft, are set at right angles to the centre four throws. This makes possible an interlocking firing order which cancels both the primary and secondary forces and eliminates vibration completely. The secondary unbalanced forces are completely neutralized or "cancelled out" because in any engine employing reciprocating and rotating masses in balance at all times, no vibration will be transmitted throughout the car at certain critical engine speeds. Inherent balance is secured in the Cadillac V-type, eight-cylinder engine by a new arrangement of the crank throws, and compensators or counterweights are added. The four cranks are in two planes at right angles to each other, instead of in one plane as in previous V-eight practice. This type of engine, which is really a twin four, —formerly used a short, compact crankshaft similar to that employed in a four-cylinder engine. The new arrangement may be easily understood; if the crankpin at the forward end of the shaft be considered to correspond with the figure XII on the clock dial, the second crankpin would fall at III, the third crankpin at IX, and the fourth pin at VI.

Engine Refinements. Having greatly reduced vibration by lightening and balancing reciprocating as well as rotating parts, the next effect to secure is quiet engine operation. The thorough enclosure of all working parts formerly left in the open, as valve springs and valve lifting tappets or push rods and rocker arms, has made it possible to lubricate these parts and reduce noise by the reduction of mechanical depreciation and resulting lost motion or rattle, as well as by the deadening effect enclosure has on minor sounds. Sleeve valve motors of the Knight design are much more extensively used both in Europe and the United States than formerly, and of course the sliding sleeves work without the clatter found in poppet valve engines after they have been used for a time. The valve operating camshaft drive has also been improved. Where a gear train is used, the gears have angularly placed teeth, and one or more gears of the train are made of some sound-absorbing material, such as treated, compressed cotton or phenol condensite. A very popular method of driving the camshaft and auxiliaries is by silent chains of the link-belt form; automatic tightening devices are provided to take care of the stretching of the chains in service.

Ignition Systems. Ignition systems have been greatly improved, and nearly all passenger cars use a single coil-distributor battery system. Air-cooling is also receiving practical application; the leading exponent of this form of engine for automobiles, the Franklin Company, developed a type of engine in which a blower rotor member on the crankshaft supplies an air blast through jackets which confine it to the cylinder walls and other parts to cool the engine directly, without the use of water as an intermediary heat-absorbing medium. Such a cooling system is independent of climate, as it cannot freeze at extremely low temperatures or boil away at high temperatures.

Starting and Lighting Systems. The electric starting and lighting systems have been simplified and are now practically middle-proof. The Bendix drive or automatically engaging drive pinion has greatly simplified the mechanism necessary to put the engine in motion.



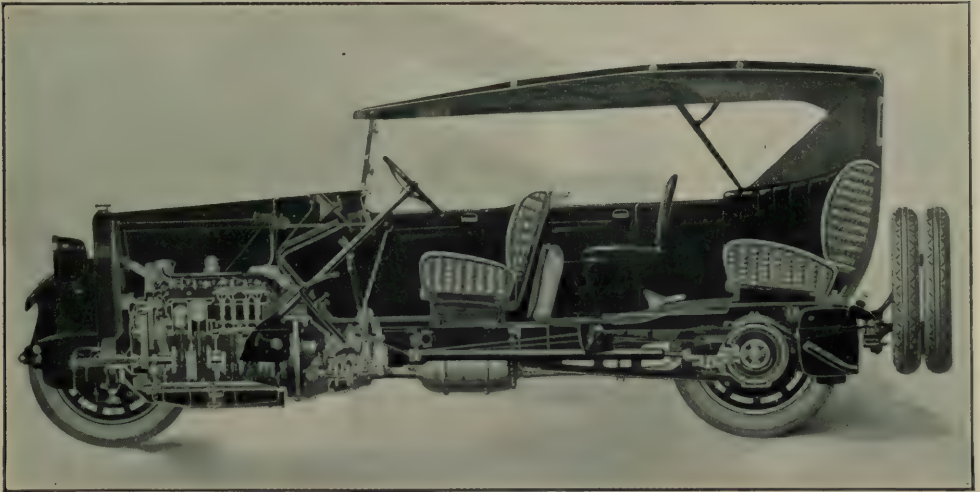
GENERATOR AND STARTING MOTOR USED ON SOME MODELS OF CHEVROLET AUTOMOBILES

The upper figure shows the generator which has important components of ignition system, such as induction coil and timer distributor, mounted thereon. Below is the starting motor, having the Bendix automatic starting pinion shift. When the motor is started by the switch, the armature rotation automatically engages pinion with gear teeth cut on flywheel.

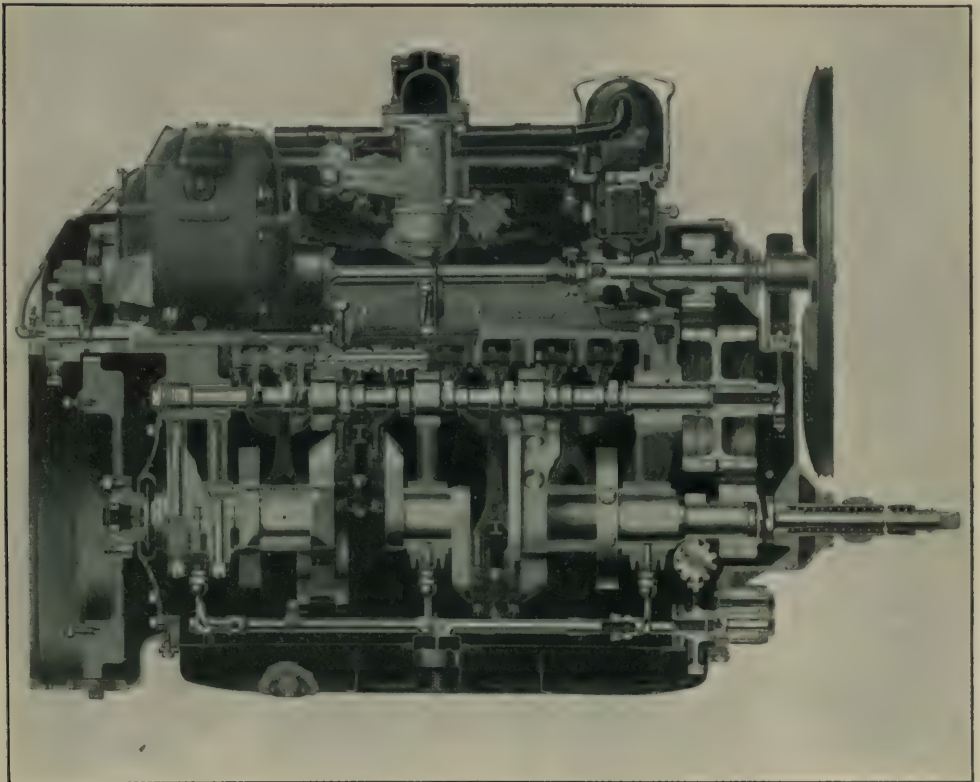
There is no need of shifting gears or clutches in the modern starting system. A pressure of the foot on the starting switch button or pedal starts the electric motor turning. A pinion having a spiral thread cut in its bore is mounted on the motor armature shaft so that the rotation of that member causes the pinion or small gear to move laterally as well as to rotate until it meshes with and turns the flywheel, which has corresponding teeth cut around its outer periphery. Sufficient reduction is secured so that the electric motor rotates the crankshaft of the automobile power plant and starts the engine on its cycle of operations. As soon as the engine starts, the electric motor is disconnected from the battery and the pinion automatically moves on the spirally threaded armature shaft until it is out of engagement with the flywheel.

Generators. The generator has also been greatly simplified. The most popular forms employ the third brush system of current output regulation instead of the centrifugal governors, slip clutches, separate resistances, etc., of the older systems. A simple form of automatic current cut-out prevents the battery from discharging back through the generator when it is not turning fast enough to generate charging current. The single wire system is also a step forward in simplifying the layout. Instead of using two wires for each circuit, only one insulated wire is used; the metal frame of the car is used for a return or ground, and one

MOTOR VEHICLES



Longitudinal Section of Seven Passenger Touring Car of Approved American Type — Cadillac V-63

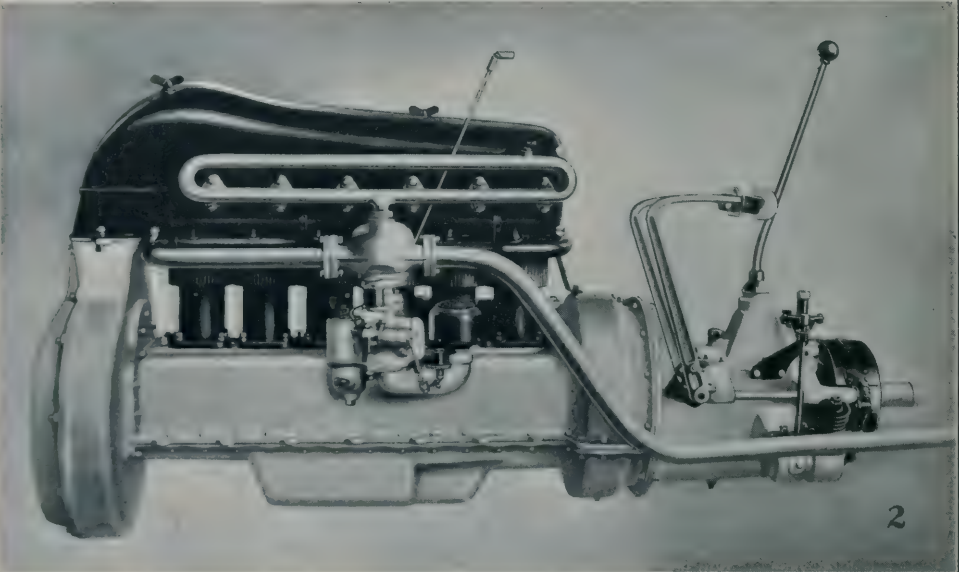


LONGITUDINAL SECTION OF CADILLAC V-63 ENGINE

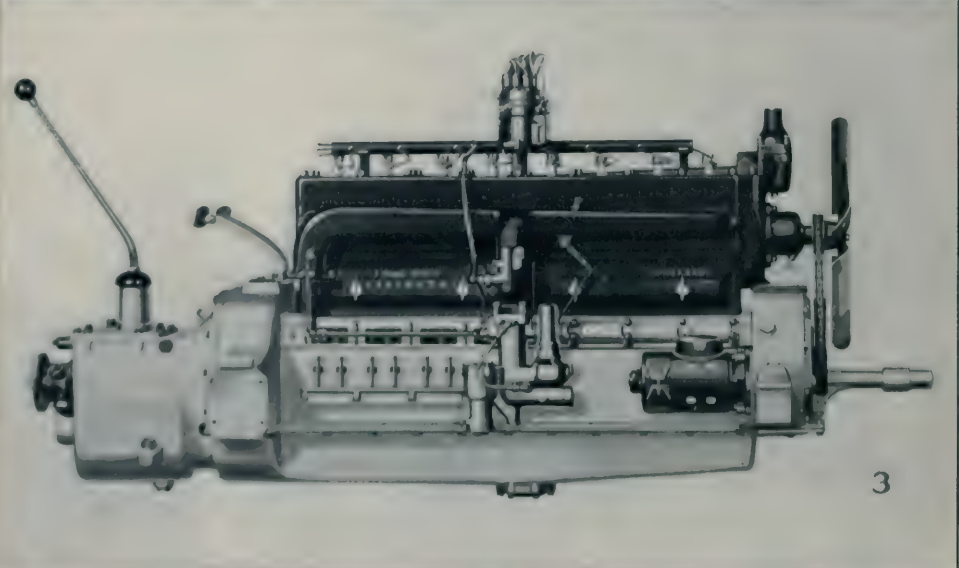
MOTOR VEHICLES



1

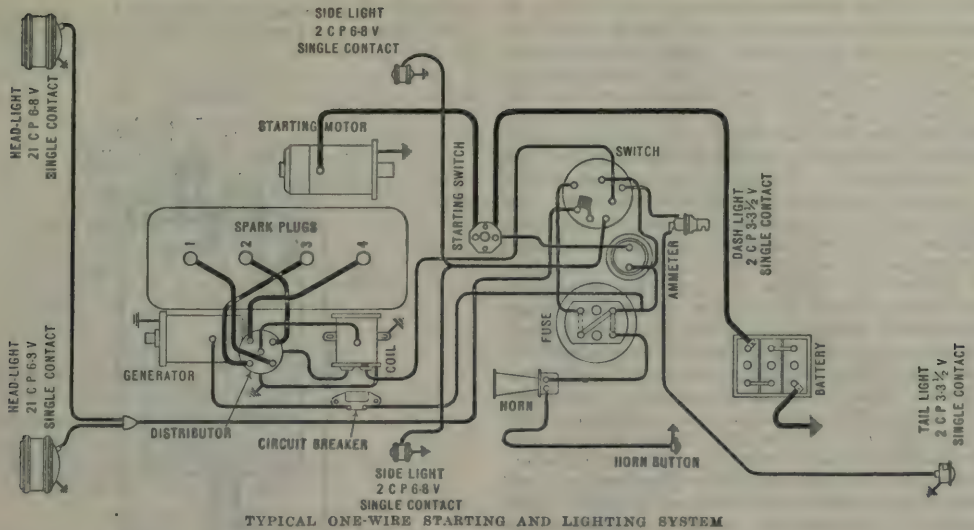


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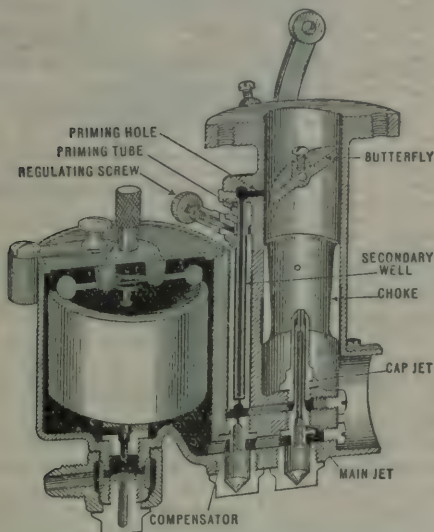
1. Typical Six-Cylinder Engine Crankshaft with counterweights to reduce vibration due to unbalanced internal forces.
2. Side view of air cooled motor, where a blower mounted at the front provides an air blast passing around the cylinders.
3. Straight Eight Cylinder Engine combined with clutch and change speed gear units to form single power plant.



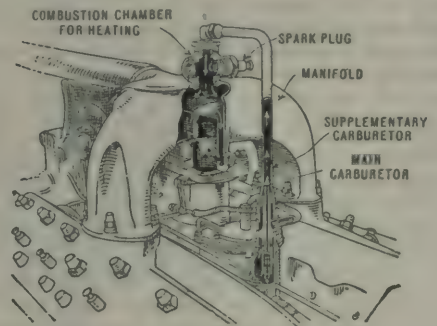
pole of each appliance, such as lamp bulbs, horn, etc., is grounded to the frame or some metal part in good electrical contact with it. The wire is carried in a metal sheath to prevent chafing the insulation, and every precaution is taken to make all connections in such a way that no trouble will be experienced. Such a system is known as a two-unit system when separate starting motors and generators are used, but the Delco one-unit system is also deservedly popular. In this, a single motor-generator suffices. Two commutators are provided on the armature shaft; one of these is used when the machine is used as a starting motor, and the other commutator and set of brushes come into action automatically when the engine has started and is running fast enough to turn the armature shaft by an automatic driving clutch.

Carburetors. There was considerable change, during the period 1914-24, in the form of carburetor; and devices using automatic air valves,

which were formerly very popular, were used less than the compensating jet type as exemplified in the Zenith carburetor. The automatic air-valve type was apt to be noisy on account of "fluttering" of the valve, and the moving parts sometimes gave trouble by premature wearing or loss of adjustment. There are no rapidly moving parts in modern carburetors, only the float feed control mechanism, which is very simple and not apt to get out of order. The Zenith carburetor has two jets, one inside the other, projecting into the venturi of a plain-tube mixing chamber. No adjustment is provided at the spray nozzles, and by utilizing an ingenious hydraulic-pneumatic principle, compensation is provided automatically, as the throttle is opened and mixture proportions best suited for various operating conditions provided. Another popular carburetor is known as the metering-pin type. In this, an automatic air valve carries a needle or pin which regulates the opening of the spray nozzle; as more air is admitted to the mixture by the lift of the valve, the metering pin also lifts and permits an increased flow of liquid fuel. A very practical modern device is



THE ZENITH CARBURETOR
This fuel vaporizing device gives automatic mixture compensation without air valves.



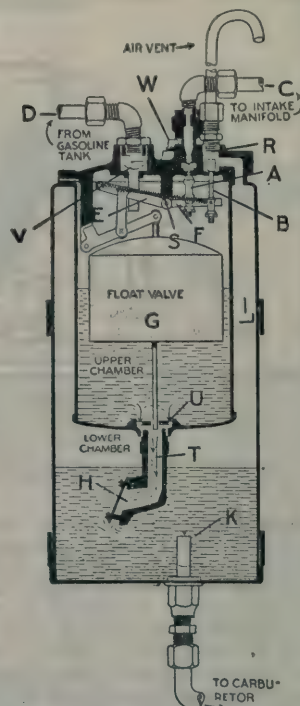
PACKARD FUELIZER applied to twin-six engine provides warm fog or vapor to mixture so as to make easier starting of engine in cold weather.

the "fuelizer" in its various forms. This makes starting easy at low temperatures when vaporization of fuel by ordinary methods would be

difficult. The Packard fuelizer, which may be considered representative of devices of this character, consists of a chamber which is an auxiliary to the carburetor in which the vapor may be ignited by an electric spark passing between the electrodes of a spark plug. The combustion is not complete, because the air supply is limited; but a warm fog is produced which heats the rest of the mixture so that it ignites readily in the engine cylinders even in zero weather. Another carburetor auxiliary is an air filter or cleaner. Chemical analysis has disclosed that the carbon deposit in the combustion chambers of automobile engines is composed largely of road dust sucked in on the aspiration stroke through the carburetor. Various forms of filters and separators are provided through which all air passing into the carburetor must first go in order to cleanse it of dust particles. Considerable depreciation of engine parts has also been attributed to the abrading action of the non-combustible mineral matter drawn into the engine with the fuel mixture. The simplest and most compact device operates on the centrifugal separator principle. A rapidly revolving fan wheel throws the dust particles aside as the entering air-stream passes through the device and clean air enters the engine.

Fuel Supply. The gravity feed of fuel to the carburetor has been perfected by the use of a small auxiliary container known as a "vacuum" tank which draws its supply of fuel from the main tank, which may be placed at any desired point on the chassis, by utilizing engine

method of securing gravity feed by placing the tank under the front seat. The Ford car is the



THE STEWART VACUUM TANK

Almost universally used as a means of fuel supply, is placed near the carburetor, which it supplies. It draws gasoline from a tank at rear of chassis.

A—Suction valve for opening and closing the connection to engine intake manifold.

B—Atmospheric valve permitting or preventing an atmospheric pressure condition in upper chamber.

C—Pipe connecting tank to engine intake manifold.

D—Pipe connecting vacuum tank to main gasoline supply tank.

E—Lever to which two coil springs S are attached. This lever is operated by movement of the float G.

F—Short lever operated by the lever E and in turn operating valves A and B.

G—Float.

H—Flapper valve in the outlet T, closed by suction whenever the valve A is open, but opening when the float valve has closed suction valve A and opened atmospheric valve B.

K—Line to carburetor extended on inside of tank to form pocket for trapping water and sediment.

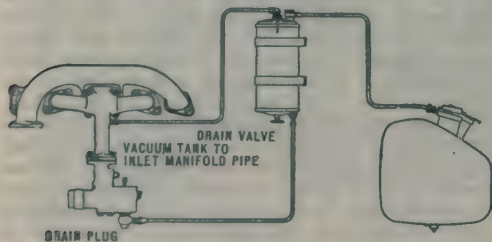
L—Channel space between inner and outer shells connecting with air vent R.

R—Air vent over atmospheric valve for preventing an overflow of gasoline in case the position of vehicle should ever be such as to raise the gasoline supply tank higher than the vacuum tank.

T—Outlet at bottom of float reservoir, in which is the flapper valve H.

W—Plug for temporary removal while driving to service station in case of trouble due to leaky float and for giving access to tank for wetting valves with gasoline when dry and for washing dirt or sediment from flapper valve H.

U—Guide for stem of float G.



TYPICAL MODERN FUEL SUPPLY SYSTEM

A vacuum tank is interposed between main fuel container and carbureting device.

suction. Its mechanism is so simple and its action so positive that most of the automobiles built at the present time have this method of fuel supply incorporated in their construction. The suction chamber is connected to the intake manifold of the engine by a short tube and with the fuel tank at the rear of the chassis by a length of tubing. A simple float mechanism is used to shut off the fuel flow when the float chamber is full. This trips a lever carrying two valves, one of them shutting off the suction pipe, the other opening an air-valve which admits air from outside. A flap valve opens at the bottom of the float chamber and permits the fuel to flow into the supply chamber connected with the carburetor by suitable piping. When the upper chamber empties itself, the float falls, and the suction valve unseats to let the engine create a partial vacuum in the float chamber. The pressure of the air on the liquid fuel in the main tank raises it to the auxiliary tank in the engine compartment. Pressure feed by engine-driven air pump and auxiliary hand-operated air pump is found only on a few high-priced cars. Very little use is made of the cowl tank or the

only passenger automobile using the latter location. The Overland uses a cowl tank. Some motor trucks of the speed wagon type have the fuel tank carried on the dash or bulkhead separating the engine from the driver's compartment.

Formerly, several types of clutches received almost equal application; the cone clutch was very popular, and the multiple-disc clutch ran it a close second. Single-plate clutches were in

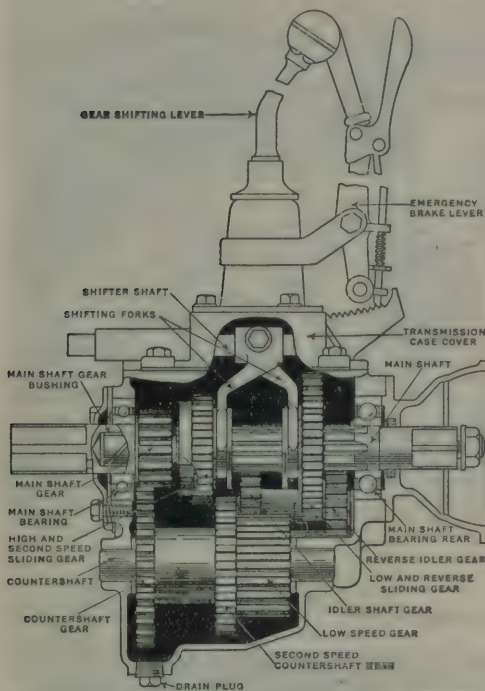
the minority. In 1924, on the basis of the number of models of cars produced rather than the number of any one model in use as a gauge of popularity, the cone clutch was used on only 3 per cent of the models, the multiple-disc clutch on 43 per cent, and the single plate clutch on 54 per cent. The all-metal plate clutch was seldom used; designers favoring the multiple-disc system used plates faced with Raybestos friction material, alternately with metal plates. The most popular single-plate clutch design has a driven member of cast iron engaging "floating" discs or rings of woven asbestos friction material interposed between it and the two driving faces, also of cast iron.

Gearsets. Considering change speed gearing, practically all passenger cars with the exception of the Ford employ the sliding gear system. The conventional gearbox operates on the selective principle, which means that it is possible to engage any desired set of gears directly from neutral without first passing through lower ratios, as was necessary with the progres-

sive system. truck designers now provide what is known as a "power take-off" on the gearset, this being a short shaft driven by the gearing so that engine power may be delivered to a screw hoist mechanism to operate a dump body or to a winch or windlass carried by the chassis for hoisting. Some passenger car gearsets have a power take-off, so that an engine-driven tire pump may be attached to the gearset. The 1914 disharmony of opinion regarding gearbox placing resolved to that form of unit power plant in which the change speed gears are mounted in a case forming an extension of the clutch housing member which is bolted to the engine. All parts are thus maintained in line and the alignment cannot be influenced by chassis frame deflection or distortion. The unit power plant construction was found in 1924 on 85 per cent of passenger cars and most trucks not of long wheelbase. The amidship location was found on only 13 per cent of passenger-car models. Whereas 20 per cent of 1912 models had the gearset attached to the rear axle, in 1924 only one make of car used this construction. One make had the gearbox mounted at the front end of the torque tube.

The full-floating axle was found in 1914 on more than 60 per cent of the models, but it lost ground steadily, and in 1924 was used on only 16 per cent. The semi-floating axle, which was considered suitable only for cheap and light cars in 1914, and as a result of this belief was found on only 20 per cent of the models, gained ground and occupied the same position in 1924 that the full-floating type did 10 years previously, as it had come to be used on 60 per cent of the models. Improvements in axle steels and housing construction, as well as the use of a smaller number of bearings and simpler construction, all contributed to the popularity of the semi-floating design. In an endeavor to combine the good features of both semi-floating and full-floating types, an intermediate design known as the three-quarter floating was evolved and was found on about 20 per cent of the models. Practically all axles used in passenger-car construction were of the bevel gear drive type, but straight-tooth bevels were found only on the Ford; all other automobiles were driven by spiral bevel gears because of their greater quietness. Worm-drive axles were found only on electric passenger cars but were very popular in motor-truck construction. The bevel pinion type of differential mechanism is universally used, and while various forms of positive differentials were devised in an attempt to prevent loss of traction of the wheel that has the poorest adhesion to the ground, few of these were applied as standard equipment except in motor trucks.

Brakes. Two of the most discussed innovations in the 1924 automobiles were four-wheel brakes and balloon tires. There is no question but that four-wheel brakes have many advantages, but there is also much to be said against them. Some makers furnished them as standard equipment; others supplied them optionally. The principle of operation of front-wheel brakes is the same as that of the members on the rear wheels, and no argument is possible against any motor vehicle's stopping quicker if all four wheels are retarded than if only the traction members are stopped. Provision must be made, however, to prevent locking of the front wheels



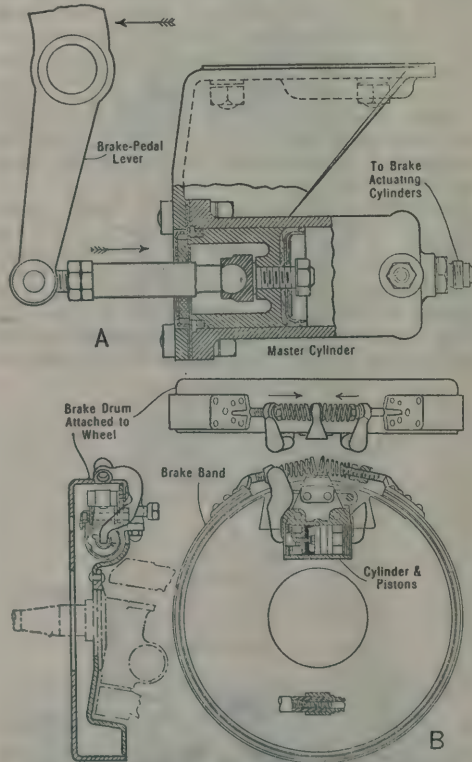
TYPICAL THREE FORWARD-SPEED AND ONE REVERSE SELECTIVE SLIDING GEARSET

sive system. The flexible control possible with the modern engine, even the four-cylinder form, has made the use of more than three forward speeds and one reverse unnecessary except on the heavy passenger cars and commercial vehicles which use four speed gearsets. In fact, several motor trucks are equipped with "two range" gearsets. By the use of two sets of constant mesh gears between main and counter shafts, either of which may be used at will, it is possible to have a high speed range for all favorable conditions and a low speed range when loads are heavy or roads are poor. By this construction it is possible to convert the usual three-speed selective gearset into one giving six forward speeds and two reverse. Numerous motor-

when the brakes are applied, on account of the danger which attends the stopping of a rapidly moving vehicle when the front wheels are displaced by the steering mechanism in rounding curves. As long as the ability to steer a car depends on the rolling motion of the front wheels, stopping this must make the car more difficult to control. The wear on the brakes will be less when four are used to stop the car than when only two are employed. It is stated that half the pressure of the foot on the brake pedal will stop the car in the same distance as with two wheel brakes and that the same exertion will stop it in half the distance. Engineers who favor four-wheel brakes do not all agree on the type of brake or on the method of operation. Some favor internal expanding bands or spreading shoes; others favor external constricting bands. While in most cars the brakes are actuated by mechanical linkage and equalizers, some makes have hydraulic operation. In the last-named system a master cylinder is mounted on the transmission case; the brake pedal is attached to a piston rod which forces oil out of the cylinder through pipes running to the brake and operating cylinders at the wheels. This method provides for compensation or equalization to make sure that all brakes are applied equally without mechanical linkage. To show how rapidly four-wheel brakes were gaining in favor: in 1923 only one American model furnished them as standard equipment, 20 per cent of the models had the emergency brake on the drive shaft and service brakes on the rear wheels, and 76 per cent had both sets of brakes on the rear wheels only. In 1924 about 14 per cent of the models had four-wheel brakes as standard equipment, 29 per cent had one of the braking effects on the drive shaft, and 57 per cent of the models had both brakes acting on the rear wheels. Nearly 20 per cent of the models have four-wheel brakes optional at extra cost.

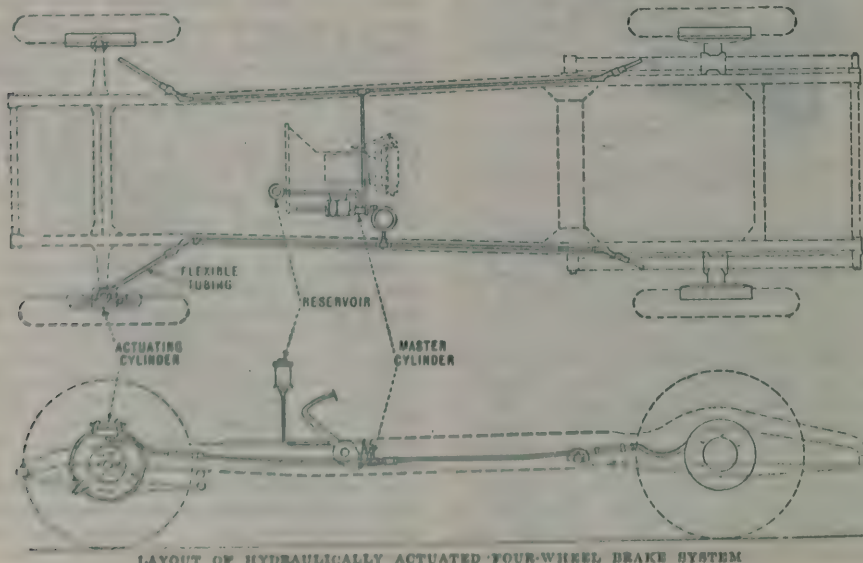
Tires. No discussion of recent features of motor vehicles would be complete without brief mention of low-pressure, oversize, light-walled tires known as "balloon" tires. The essential feature is the cushioning effect obtained from a low-pressure tire on rough roads. Of equal im-

portance with the increased comfort to passengers is the effect on the mechanism and the car body. So far, no way has presented itself of making deliberate comparisons between high-pressure and low-pressure tires in preventing a



IMPORTANT PARTS OF HYDRAULICALLY ACTUATED FOUR-WHEEL BRAKE SYSTEM

A shows the master cylinder from which oil is forced to the brake-actuating cylinder which is shown at B. The latter is mounted on each wheel with two pistons between which oil is introduced. The pressure of the oil forces them apart and constricts the band around the drum.



LAYOUT OF HYDRAULICALLY ACTUATED FOUR-WHEEL BRAKE SYSTEM

MOTOR VEHICLES



1. Typical American Motor Bus for Interurban Lines . 2. Sport Model of Modern Five-Passenger Car
3. Closed Body, Coach-Type, Moderate-Price Car, accommodating four or five adults comfortably

car from developing rattles, creaks, and mechanical depreciation, because balloon tires are of such recent derivation. In 1924 there were three types of balloon tires ranging from oversize cords through semiballoon tires intended to fit the same rims as for high-pressure tires to the true balloon tires, which have great width and which require special small-diameter wheels and wider rims. That a marked improvement in riding comfort will be obtained from a tire having an internal pressure of 30 pounds over one carrying the same load on a lesser volume of air at 70 to 80 pounds' pressure is obvious. The side walls of a true balloon tire are lighter and more flexible than those of a high-pressure tire, because the tire is supposed to yield to minor obstacles, such as stones in the road, instead of riding over them. Experiments have shown that balloon tires, when properly selected, should be as enduring and give as long life as the high-pressure tires they replace. It is also stated that they are not liable to puncture any quicker than tires having heavier side walls and treads, because they yield and throw aside a puncturing object which would penetrate a more rigid tire.

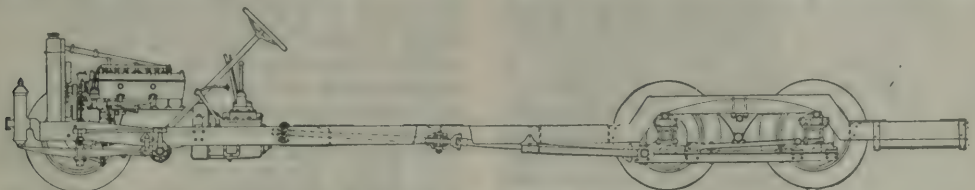
Most motor vehicles are sold with a very complete equipment. Stock cars are furnished with bumpers, luggage carriers, rear stop signals, windshield cleaners, shock absorbers, thermostatic water-circulation regulators, disc wheels, and numerous other devices. Bodies were greatly improved in appearance, and even those fitted to low-price chassis were complete in appointments and graceful in outline. The demand was increasing for closed cars of the sedan and coupé type, and the majority of people purchasing new cars were ordering the all-year, all-weather closed bodies instead of the open models. A new process of body painting greatly increased the life of the finish over the process which, developed in carriage shops, was formerly almost exclusively used for motor vehicles. Instead of being applied with a brush, the new material, a modified pyroxilin lacquer, is sprayed on the body; when it hardens it gives a celluloid-like coating which cannot be scratched by dust, affected by road tar, cracked by extremes of heat and cold, or deteriorated by exposure to weather. The high finish obtained by the use of gloss varnish is lacking, but a practical finish is secured which does not soon lose its lustre.

Commercial Vehicles. In the field of commercial vehicles, the most marked development of the decade 1914-24 was in motor busses for transportation as a public utility. Busses came to be operated with much success in city services as auxiliaries to the electric street railways, as well as traction line feeders, on inter-city lines, for de luxe tours, for schools, and for sightseeing. They have become a very definite part of the United States' transportation system. Just as motor trucks successfully proved their economy and dependability as independent freight

carriers, the motor bus was fast becoming a vital factor in passenger transportation. Special chassis designs were evolved for carrying bus bodies. By dropping front axles, undersliding the front and rear springs, and in some instances having the frame side members dropped between the springs, busses were evolved which were easy of access and had a low centre of gravity. When a bus body is mounted on the usual type of commercial automobile chassis, it is apt to sway in turning corners, to skid on slippery streets, and to be uncomfortable for passengers. In order to secure easy riding, special spring suspensions and giant pneumatic tires are employed.

Very heavy loads are now carried on large cord tires, and even freight trucks are carried by the more resilient instead of the solid rubber tires. Truck tires are made 8 to 10 inches in width and 40 to 42 inches in diameter, with extra-heavy treads and side walls so that internal pressures from 120 to 130 pounds may be safely withstood. Bus bodies are sometimes carried by special resilient supports, either in the form of rubber pads or metal spring members attached to the chassis frame. One marked improvement was the use of rubber shock absorbers or insulators at the spring ends to replace metal shackles, which soon wear. It is stated that a life of 100,000 miles is not uncommon with the rubber insulators, which act to reduce vibration. The rubber blocks are molded in suitable shapes to carry the spring leaf ends and permit the spring leaves to flatten out under load and to move as the spring deflects under the influence of varying highway surface contour. The blocks of rubber are carried in malleable iron housings forming part of the chassis and are easily renewed when worn.

Motor Rail Cars. Many railroad lines have lost so much of their freight and passenger traffic because of the greatly increasing use of motor vehicles that they have found it unprofitable to operate the usual steam train on short lines. The modification of the motor vehicle known as the rail car has come to the rescue, and motor-truck engineering is followed in many respects. In some cases, the rubber-tired wheels are replaced with flanged metal wheels adapted to run on rails; no other change is made in the chassis. The use of antifriction bearings of the ball and roller type, alloy steels, and aluminum and pressed-steel sections assures heavy-duty qualifications with the economy of light weight. The power plant, change speed gearing, clutch, and power transmission are modified from motor-truck types. The engines are truck engines and usually of the four-cylinder type. Between the engine and the main transmission an auxiliary reverse transmission is installed which serves to change the direction of main drive shaft rotation when it is desired to reverse the car, and as many reverse speeds as there are forward drive ratios are thus provided. Small rail cars with a passenger capacity of 30



SIDE ELEVATION OF CHASSIS FOR MOTOR BUS

Four driven wheels are employed to support load. Note drop frame to provide low centre of gravity.

persons may be operated for \$.30 per car mile, and as the rate on short line work may be from \$.04 to \$.05 per mile per passenger, such cars can show a profit even if the car does not carry its full capacity on all trips. These cars climb grades well and are controlled much like a motor truck; the engine speed is varied by spark and throttle control; gear shift is made by lever, and the clutch is actuated by pedal control. Of course, the operator is relieved of steering; when a wheel is provided, it is used to operate one set of brakes. Most rail cars are provided with air brakes.

Unit Containers. In freight transportation, containers usually thought of as individual boxes, which can be loaded and sealed by the shipper and transported to the consignee on motor-truck chassis, freight car, boat, or all three, without disturbing the contents, offer great possibilities in the coordination of all transportation facilities and the expediting of freight movement. Some motor-truck manufacturers supply special chassis for handling unit containers, in which mechanism actuated by the engine to facilitate moving them is incorporated in the truck chassis. The demountable body in its various forms was in some use in many parts of the country. It is probably more adaptable for general purposes of motor cartage than the unit goods container.

American Motor Vehicle Industry. The magnitude of the motor vehicle industry can be grasped by considering a few production figures for 1923. It is stated that in the United States over 3,636,500 passenger cars were produced; of this number 80 per cent of the output were cars selling at less than \$1000. Of all these cars, 33 per cent were closed models. Over 300,000 motor trucks were built, and 45,000 motorcycles were delivered. The growing use of the tractor is reflected by a production of 125,000. The number of cars in use can be realized by the production of tires; 40,000,000 shoes and tubes were needed to supply the demand. That the United States was very much in the lead in producing motor vehicles is evident from a comparison of its production with that of Europe. France produced 125,000 passenger cars and trucks; England, 78,000; and Germany, 35,000 motor vehicles. One American manufacturer, Ford, produced more automotive vehicles in a month than the 80 manufacturers of France did in a year, with the English production thrown in for good measure; over 200,000 cars and trucks have been turned out of the Ford shops in 30 days.

In 1912, 356,000 passenger cars were built, with a total value of \$335,000,000. In 1923, the 3,636,500 passenger cars had a value of \$2,250,000,000 in round numbers. In 1912, 22,000 motor trucks valued at \$43,000,000 were made. In 1923, 376,267 trucks valued at \$267,500,000 were produced. It was stated by *Automotive Industries* in its statistical number for 1924 that 18,241,477 cars and trucks were in use in the world, and of this number over 15,000,000 were in use in the United States. A few figures will be of interest in showing how the automotive industry helps other industries. In 1923, 41,400,000 square feet of plate glass was built into automobile bodies and windshields. Of leather and imitation leather, 246,840,000 square feet was used; upholstery cloth consumption was 18,585,600 yards. The industry used 32,080,200 square feet of top material.

The automotive consumption of steel in its

various forms was 11 per cent of the total tonnage and 16 per cent of the total output value. It is stated that 3,470,000 tons of steel, valued at \$300,038,000, were used. Each of the States of California, New York, Ohio, and Pennsylvania has over 1,000,000 cars and trucks registered; New York leads with 1,214,642 registrations, and California follows closely with 1,100,283. In spite of these staggering figures, the saturation point did not appear to have been reached by 1924. Reckoning the life of the average motor vehicle at five years, the industry would have to produce over 3,000,000 motor vehicles every year just to replace those worn out in service. Over 2,750,000 persons are employed in the motor vehicle industry and closely allied lines. The gasoline consumption for 1923 was 5,404,184,000 gallons. To keep the vast number of automotive vehicles in repair there are over 70,000 service stations and repair shops. Nearly 50,000 car and truck dealers supply the demand for vehicles, and 66,000 supply stores take care of the demand for accessories. Nearly every suburban home of persons in moderate circumstances now has either a one- or two-car garage, and over 50,000 large public garages are needed in the United States to provide storage facilities for people living in congested areas. See **INTERNAL-COMBUSTION ENGINES; ARTILLERY.**

MOULTON, ARTHUR WHELOCK (1873-). An American bishop, born at Worcester, Mass., and educated at Hobart College, the General Theological Seminary, and the Episcopal Theological School. He was ordained a priest in the Protestant Episcopal Church in 1901. From 1900 to 1918 he was curate and rector of Grace Church, Lawrence, Mass. He served in the War as a chaplain in the field artillery and at a base hospital in France. In 1920 he was consecrated bishop of Utah. He wrote *Memoir of Augustine H. Amory* (1909), and *It Came to Pass* (1916).

MT. EVEREST. See **EXPLORATION, Asia.**

MT. HOLYOKE COLLEGE. A college for women at South Hadley, Mass., founded as a seminary in 1837 and given the college charter in 1888. The enrollment increased from 796 in 1914 to 864 in 1918, dropped to about 800 for each of the succeeding years until 1923-24, when it rose to 946. The faculty increased from 114 to 134 members during the decade. The library grew from 64,000 volumes in 1916 to 82,852 in 1924. A \$3,000,000 endowment fund was nearly achieved. The student-alumnæ hall, containing an auditorium, banquet rooms, committee rooms, etc., was built in 1916; Williston Hall, the biological building burned in 1917, was replaced by a temporary building in the next year and by a new permanent building in process of construction in 1923-24. Two new dormitories were built in the latter year, one to replace Rockefeller Hall, which was destroyed by fire in December, 1922. In 1919 an alternative method of matriculation by comprehensive examinations as well as by examination in individual subjects was instituted, and the former method of matriculation by certificate from approved schools was discarded. In 1923, a general examination in the senior year on work in the major subject was made a prerequisite of graduation. President, Mary Emma Woolley, A.M., LL.D., Litt.D., L.H.D.

MOVING PICTURES. The 10 years from 1914 to 1924 witnessed an extraordinary de-

velopment of the moving pictures, as an art, as an industry, and as an educational medium. Before 1914, the moving picture was regarded as a "freakish fad" which would enjoy its temporary period of popularity and would vanish; since then, the moving picture became firmly established as the only truly universal form of entertainment in the world. There is a steady increase in the number of theatres and of patrons, and in the number of schools, colleges, churches, and industrial corporations using the moving picture for educational purposes. There were in 1924 approximately 18,000 film theatres in the United States, with an average daily attendance of 12,000,000. In 10 days, the paid admissions at film theatres equal the total population of the country. The same figures, of course, do not apply to other countries, as the United States was actually the birthplace of the moving picture, and was furnishing in 1924 over 90 per cent of the world's supply of films. But in Europe, and particularly in Great Britain, France, and Italy, the popularity of the cinema was incredibly great. The gradual rehabilitation of Germany was resulting in increasing interest in moving-picture exhibition and production. South America and Japan were both enormous fields for the distribution of pictures. In Australia, it was estimated that half the total population attended the film theatres every week, a higher average, unquestionably, than in any country outside the United States.

The centre of moving-picture production was established in Los Angeles, Cal., in 1914, and that city, together with its suburbs, notably Hollywood and Culver City, attracted most of the large producing units. New York City, always the financial centre of the industry, was second to Los Angeles in point of production, although in later years there was a marked tendency to move the studios nearer to the source of capital. The number of producing units outside these two localities was negligible.

There are six stages in the preparation of a moving picture. First, its story is purchased from the author; secondly, it is adapted to the screen by a continuity writer; thirdly, the director and the cast are chosen; fourthly, it is actually photographed in the studio and at suitable exterior locations; fifthly, it is assembled in crude form and equipped with "subtitles" or "captions"; sixthly, it is edited and cut down to the required length. The unit of moving-picture measurement is the "reel," which contains about 980 feet of film. Pictures may be of any length, from 1 reel to 12, although 5, 6, or 7 reels is the average for so-called "feature pictures." The running time for one reel through a projection machine is approximately 12 minutes. The film itself is manufactured of a standard size and material so as to be available for use in projection machines in all countries of the world. After the completion of a moving picture, it goes through three stages: exploitation, distribution, and exhibition. For purposes of distribution, the United States is divided into exchange districts. Copies of the pictures are delivered to the exchanges and are rented through them to the theatre owners for purposes of exhibition. This service is given at various fixed rates to the exhibitor, the rate depending on the assumed value of each picture and depreciating as time goes on and the picture assumes wider circulation. "First-run houses," theatres which show pictures which

have not been exhibited in their district before, sometimes pay as much as \$20,000 for the rental of a picture for one week. So high are the running expenses of such theatres that it is often necessary for them to take in \$25,000 a week at the box-office before they can declare a profit.

The amazing progress of the moving picture has depended almost entirely on the development of the photoplay as a medium of entertainment. It is through this form that the moving picture achieves its widest popular appeal. The original photographs are made not only in the large moving-picture studios that have become so common, but it is often desirable to transport a company of actors long distances to make even one reel under the exact natural surroundings called for by the story to give it a proper historical setting. Thus, some films have been made in the desert of Sahara, in the South Seas, or in the most inaccessible portions of the Alps. Examples of pictures thus produced were *If Winter Comes* (England), *Ben Hur* (Italy), *The Arab* (Tunisia), *The White Sister* (Italy) and *The Bright Shaul* (Cuba). All these were made by American producing companies, with American actors and American technical staffs. The first photoplays were one or two reels in length, but with the production in 1912 of *Queen Elizabeth* and *The Prisoner of Zenda*, the vogue of the "feature film" commenced. From then on, it became necessary to protract all photoplay stories to five reels, or about 5000 linear feet of film, whether the conditions warranted it or not. Victor Hugo's *Les Misérables* and Rudyard Kipling's *A Man There Was* had to be shortened and lengthened, respectively, until they approached a common size. In 1915, however, David Wark Griffith revolutionized all the theories of motion-picture production with *The Birth of a Nation*, which was the first multiple-reel photoplay. He proved that one picture could provide an entire evening's entertainment, and that the public would pay as much to see it as they would pay to see a play on the speaking stage. Consequently, *The Birth of a Nation* paved the way for a great flood of 8-, 10- and 12-reel pictures. Another type of photoplay, the serial, came into popular favor at this time. The serial is presented in episodic form, two reels at a time, and is usually melodramatic in nature, so that the suspense will be carried over from week to week. Most serials average 30 reels in total length, although several have materially exceeded that number.

The development of the photoplay has rested with a few genuine artists and a host of imitators. Griffith, in *The Birth of a Nation*, introduced the first battle scenes, and his pictures of the Civil War served as models for all the war pictures made between 1914 and 1919. Mary Pickford's popularity inspired countless golden-haired ingenues, just as Charlie Chaplin caused all film comedians to adopt black mustaches and grotesque shoes. William S. Hart was responsible for the Wild West cowboy melodramas, and Douglas Fairbanks for the acrobatic-hero farce-comedies. When George Loane Tucker produced *The Miracle Man*, he promoted a wave of religious enthusiasm in the films. The success of Theda Bara in *A Fool There Was* started the "vampire" craze which lasted for several years. In the same way, the demand for "mother-love" themes originated with *Humoresque* and for symbolism with Griffith's *Intolerance*. The Richard Barthelmess picture, *To l'able*

David, created a vogue for rugged mountaineer dramas; Rex Ingram's production, *The Four Horsemen of the Apocalypse*, inspired many imitators to dwell on the terrible ravages of war; and *The Covered Wagon* promoted a revival of interest in the pioneer days when the West was first settled. After the War the screen reflected the general trend toward realism, and so-called "costume dramas" in historical settings fell into popular disfavor. But then, for the first time in seven years, films were imported from Germany, and they tended to reverse the situation. The first of these, *Passion*, was based on the story of Madam DuBarry and the French Revolution, and it was followed by a number of others, including *Deception*, *Gypsy Blood* and *The Loves of Pharaoh*—all costume dramas. Not all of these German pictures were successful financially, but they inspired many American producers to attempt photoplays of a historical nature. Examples of films that demonstrate this influence are Douglas Fairbanks's *The Three Musketeers* and *Robin Hood*, and Griffith's *Orphans of the Storm* and *America*.

The Germans also introduced a distinct innovation, the futuristic photoplay, as exemplified by *The Cabinet of Dr. Caligari* and *The Golem*. These two pictures proved that the effect of a supernatural story may be vastly increased by the use of weird, impressionistic settings. They disclosed a fourth dimension on the screen. The great possibilities of the screen as a medium for the development of fantasy were demonstrated with startling effect by Douglas Fairbanks in *The Thief of Bagdad*. It was also proved in a number of notable productions that a moving-picture camera could photograph the subtler emotions, and that screen drama could be derived from the minutest details as successfully as from the most stupendous pictorial effects. A whole new school of moving-picture direction arose as a result, and its products were increasingly in evidence. In this way, the moving picture again invaded the particular province of the stage. *The Dramatic Life of Abraham Lincoln* represented the first attempt at a biography on the screen. It told the story of Lincoln's life with no superficial fictional frills added, and its success attested the popularity which this sort of narrative might achieve. It will be seen that the photoplay is rapidly emerging from its early limitations. It no longer depends on swift-moving melodrama, violent action, and expansive scenic investiture; it is relying more and more on delicacy and subtlety; it is delving deeper into the profundities of human emotion.

While the photoplay has effected substantial progress, other moving-picture forms have not stood still. The number of non-dramatic films produced each year is increasing at an enormous rate. Several companies are devoted exclusively to the production of travel pictures, which form a regular feature of almost every programme. One of these, *Nanook of the North*, was released as a regular "feature" and achieved considerable popularity. Showing the life of the Eskimo, it possessed anthropological as well as geographic value and served to concentrate interest on the possibilities of this type of film. Yale University produced an inclusive history of the United States, in short installments, picturing all the major events from the landing of Columbus to the present; the educational value of such a work is obvious. The story of the Bible

has been similarly set forth on the screen. Moving pictures have been used widely by the various "Safety First" movements, by the Boy Scouts, by charitable institutions, by boards of trade, by anti-tuberculosis crusaders, by the Young Men's Christian Association, and by departments of the United States government for purposes of propaganda or public instruction. They are exhibited regularly in many prisons for the entertainment and diversion of the inmates. The most important field for moving pictures, aside from the photoplay, is the recording of news events. Every theatre includes a "news reel" on every bill, and the preparation of these pictures entails great expense and much work in all parts of the world. A fairly complete record of the War was made by the thousands of cameramen who followed the armies and navies and will remain as a historical document of vast importance. Four weeks after the Japanese earthquake, in September, 1923, pictures of the devastation caused by it and of the subsequent relief work were being shown all over the United States. During the War aeroplane photography was developed extensively because of its obvious military value. The moving picture was used to record the effects of shell fire, enemy operations, and strategic positions. Similar strides were made in submarine photography. By placing a camera in a water-tight compartment, which is lowered into the water, pictures of submarine life were made at great depths.

Since the invention of the moving picture and the realization of its practicability, scientists and engineers have concentrated on two developments: color photography and the synchronization of pictures and sound. Both of these problems have proved extremely difficult of solution, and neither has as yet approached perfection in its solution. Many color processes are in use, but none of them is really adequate, and all are expensive. The necessity of employing only two primary colors, on either side of the film, has placed a distinct limitation on this form of photography, and while certain colors, notably reds, may stand out effectively, others, notably natural greens, will present a false and washed-out appearance. Hand coloring has been employed at various times, but this process is slow, arduous and prohibitively costly. At the coronation of King George V, and the subsequent Durbar in India, Charles Urban made moving pictures with the Kinemacolor process; but these were crude and productive of considerable eye strain. Following this, color was used only in travel pictures and in the photography of rare flowers, birds, or precious stones. The first full-length photoplay to be made entirely in color was *The Glorious Adventure*, a costume drama of the Restoration period in England, which failed of substantial success. With the development of the Technicolor process, color photography made a distinct advance, and this has been used successively in several pictures, notably *Toll of the Sea*, *the Ten Commandments*, and *Wanderer of the Wasteland*. Considerably less progress was made in the perfection of talking-moving pictures. Edison's kinetophone, (q.v.), first put before the public in 1912, was an almost total failure, as were the devices developed by Gaumont and Clermont-Huet in Europe at the same time. All these processes attempted to achieve synchronization between pictures and sound by means of a phonograph at-

tached to the controlling current of the projection machine. More recently Dr. Lee De Forest made successful experiments in photographing the human voice, converting sound waves into light waves, and so reproducing them on film. This discovery led him to the development of the Phonofilm, on which are photographed both the pictures and the sound at the same time. When run through the projection machine, the light waves are converted back into sound waves and transmitted through a microphone, so that the synchronization is necessarily perfect. No attempt has been made to produce a full-length picture with this process, but it has been used successfully in transcribing short speeches and in reproducing musical scores. Dr. De Forrest made a complete record of the musical score of *The Covered Wagon* and reproduced it on the film itself, so that the picture might be shown with its own orchestral accompaniment.

In 1909 the National Board of Censorship was organized for the purpose of regulating the moral tone of photoplays. This was a voluntary, unofficial group, with no legal standing, and was formed by the moving-picture producers themselves. With the advent of official State and municipal censorship, the National Board was rendered obsolete; local governments took its work into their own hands. Seven States enacted moving-picture censorship laws (Pennsylvania, Ohio, Kansas, Maryland, Florida, Virginia, New York), and similar measures were adopted in numerous cities and towns. Censorship became a formidable menace, in view of the fact that different standards obtained in different localities. There have been cases of the total rejection of a picture in one State and its approval, unchanged, in another. Often pictures are so materially cut by censor boards as to make them utterly unintelligible. Thus, photoplays must frequently undergo radical revision every time they pass a State line. This situation, of course, has worked great havoc on the moving-picture industry, and determined efforts have been made to defeat censorship bills wherever they have been proposed. With this idea in mind, the Motion Picture Producers' and Distributors' Association was formed in 1922, with Will H. Hays as its president. Since then, moving-picture censorship has gained no ground. It was decisively defeated by popular referendum in Massachusetts in 1922 and has been effectually kept out of the statute books in 14 other States since then. In the meantime, the Hays organization coöperated extensively with women's clubs and civic organizations in an effort to censor moving pictures from within.

The moving-picture play as a distinct artistic form grew out of the moving picture in much the same way as the regular drama developed from the crude mimicry of early times. The process of evolution in the one case, however, occupied only a few years, while in the other it extended over centuries. Just as the most primitive forms of drama were probably no more than rude attempts to portray or caricature actual events in the lives of persons and animals, so the first moving pictures were mere photographic transcripts from life, with little or no attempt at artistic arrangement.

But when the public had once become accustomed to the novelty of the moving picture there was a natural falling off in attendance at the places of exhibition, and it became necessary to invent some further means of entertainment.

The exhibitors hit upon the obvious device of telling a story by means of the pictures. At first the attempts were confined largely to broad comedy or farce of the slap-stick variety; but the popular success of these crude efforts opened the eyes of both public and producers to the artistic possibilities of the new form of entertainment, and photographic dramatizations of popular stories and plays began to appear.

These attempts at story-telling were decided improvements over the original pictures. They were far from satisfactory, however, because the producers had not yet realized that a new technique was necessary and were trying merely to duplicate the effects of the legitimate stage. It was only after long experiment that the advantages and limitations of the art as a distinct form revealed themselves and the moving-picture play as we know it to-day was evolved.

Technically the new form is perhaps more closely related to pantomime than to drama. There is this essential difference, however: in pantomime we accept the convention that there is a race of beings whose natural language is gesture and who are therefore capable of expressing all their thoughts and emotions without the assistance of words, while in the motion picture we imagine the characters to be speaking as in ordinary life though, by convention, we are unable to hear them.

It is this convention of silence which has imposed the chief limitations on the moving-picture play as an artistic form. So long as the characters in the moving-picture play can express nothing that cannot be conveyed by means of gesture or facial expression the moving-picture playwright would naturally be limited in the choice and treatment of his theme to the more elemental emotions. The moving-picture play does not, as a rule, therefore, attempt to deal in psychological subtleties or nice shades of character, but relies for its effect mainly on plot, as does the pantomime. It has an advantage over pantomime, though, in its use of captions or leaders. These are printed matter—inscriptions, letters, dialogue, headings, etc.—thrown on the screen to explain a scene or sequence of scenes that would not be intelligible from the acting alone; but the tendency, however, is to dispense with these devices wherever possible and allow the story to unfold itself in action. Nevertheless, as noted above, there were signs in the latter part of the decade under review that the motion picture could enter further into the psychological domain than had been supposed, and there were a number of film productions in 1923 and 1924 which by the skillful use of suggestive detail and by a more confident appeal to the imagination of the audience vied with the best of the stage plays in expressing the subtler emotions.

In structure the moving-picture play follows the Elizabethan rather than the modern tradition. Change of scene is frequent, and there is no obligation on the part of the playwright to arrange the events of his story so as to fall into the ordinary divisions of time and space which is obligatory to the contemporary legitimate dramatist. If in the course of the play some of the characters move from Europe to America, the spectators may take passage with them and witness the events on the journey; if the hero and heroine steal into the garden for five minutes, they may follow and see precisely what

happens instead of trusting their report when they return to the drawing room. This flexibility of form lends an impression of greater continuity in action and makes possible a wealth of detail and added air of veracity that renders the moving-picture play a dangerous rival to the type of regular drama in which character and psychology are subordinate to plot. Already there is a tendency on the part of writers of melodrama to imitate the dramaturgy of the moving-picture play.

It is in connection with the representation of dramatic scenes in the form of so-called photoplays that the moving-picture industry finds its widest application. Depicting current events in this way of course aroused interest, but this does not bulk large in connection with the portrayal of successive scenes from some new or standard play in which the action follows along rapidly and emphasizes the dramatic succession of incidents. This involves the reduction of a play to a simple scenario or story, or it may be the construction of a scenario or outline from new and original ideas. Once this is done the work of staging and photographing the scenes must be started. This involves large expense and considerable time, as many of the situations may be modified as the work proceeds, to give them proper dramatic value and effect. For production on the large scale that is now necessary, when moving-picture plays as regards not only elaboration but even in prices charged for admission and seats are in some cases put on a level with actual stage productions, extensive workshops and large studios are increasingly common. Several photoplays may be in process of production simultaneously, and a large force of costume makers, scene painters and other assistants are employed, together with the necessary workshops for developing and finishing the films as rapidly as possible. The expense for the duplication of a film, once it is made, is not large proportionately, and as soon as films are released for rental the profits, according to the popularity of the subjects, are very large. When a film has been made and found satisfactory for exhibition it is imprinted with the name of the manufacturer and copyrighted. A film may be run about 500 times in the hands of a careful operator before its condition renders its projection unsatisfactory by reason of streaks and spots that appear greatly magnified upon the screen; in addition to which there is a certain increased fire danger from the frayed and split condition of the edges when exposed to the intense heat in front of the lantern.

MOWRER, PAUL SCOTT (1887-). An American newspaper correspondent, born in Bloomington, Ill. He studied at the University of Michigan and began his newspaper career as a reporter in Chicago, in 1905. He was a correspondent at the front in the 1st Balkan War and again in the War in Europe from 1914 to 1918. In 1921 he acted as special correspondent of the Disarmament Conference. He wrote *Hours of France*, poems (1918), and *Balkanized Europe—a Study in Political Analysis and Reconstruction* (1921). He also contributed many articles to magazines on world politics.

MOZAMBIQUE. See PORTUGUESE EAST AFRICA.

MUDANIA, ARMINICE OF. See PEACE CONFERENCE AND TREATIES; SMYRNA; TURKEY.

MÜLLER, GEORG ELIAS (1850-). A German psychologist. He completed his analysis of memory (*Analyse der Gedächtnis Stätigkeit*) in 1917. As representative of the associationistic school, he opposed the relativistic notions of the proponents of the *Gestaltpsychologie* (see PSYCHOLOGY, Perception). His book on *Complextheorie und Gestalttheorie, ein Beitrag zur Wahrnehmungs Psychologie* (1923), is a defense of associationism against its critics.

MÜLLER, HANS (1882-). An Austrian writer and dramatist, born at Brünn, and educated at the University of Vienna. He traveled extensively in Germany, Austria, Italy, France, Belgium, Holland, and England. He is the author of *Dämmer* (1900); *Die Lockende Geige* (1903); *Der Garten des Lebens*, a Biblical epic (1904); and *Die Rosenlaube* (1909), all verse. He also wrote several volumes of fiction, among them *Buch der Abenteuer* (1905), *Geheimnisland* (1909), and *Träume und Schäume* (1911), besides a volume of sketches, *Die Kunst Sich zu Freuen* (1917). His reputation rests chiefly on his plays, which include: *Das Wunder des Beatus* (1910); *Gesinnung* (1912); *Der Reizende Adrian* (1913); *Die Blaue Küste* (1914); *Könige* (1915); *Violante* (1916); *Der Schöpfer* (1918); and *Die Sterne* and *Die Flamme* (1920).

MÜLLER-FREIENFELS, RICHARD (1882-). A German writer, born at Ems, and educated at the universities of Munich, Berlin, Geneva, Tübingen, Paris, London, and Zurich. He traveled in Europe, Asia, and Africa. His works include: *Psychologie der Kunst* (1912); *Deutsche Denker und die Phantasie* (1916); *Persönlichkeit und Weltanschauung* (1918); *Psychologie der Religion* (1920); *Philosophie des Individualismus* (1920); *Psychologie des Deutschen Menschen* (1921); *Bildungsideen und Erziehungsmöglichkeiten* (1921); and *Irrationalismus* (1922).

MÜLLER-URY, ADOLFO (1864-). A Swiss-American portrait painter (see VOL. XVI). He painted a portrait of Mrs. Woodrow Wilson (1916); of President Wilson delivering his "war speech" before Congress on Apr. 3, 1917; of Cardinal Mercier, during his visit to the United States, for the Catholic University at Washington; of Pope Pius XI in 1922, and many others.

MUNDELEIN, GEORGE WILLIAM (1872-). An American cardinal, born in New York City, and educated at Manhattan College, St. Vincent Seminary, and in Rome. He was ordained priest in 1895 and served as associate secretary to the bishop and as pastor in Williamsburg, Pa., from 1895 to 1897. From the latter year until 1909 he was chancellor of this diocese. In 1903 he was appointed censor of the Liturgical Academy, the only American holding that office. In 1906 he received the appointment of domestic prelate and in 1909 was appointed titular bishop of Loryma and auxiliary bishop of Brooklyn, N. Y. He held this office until 1916, when he was made archbishop of Chicago. In 1924 he was elevated to the rank of cardinal.

MUNICIPAL ENGINEERING. See CITY PLANNING; GARBAGE AND REFUSE DISPOSAL; MUNICIPAL GOVERNMENT; MUNICIPAL OWNERSHIP; ROADS AND PAVEMENTS; SEWERAGE AND SEWAGE DISPOSAL; WATERWORKS AND WATER PURIFICATION.

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